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A Survey of Biology Teachers Use of Activity-Oriented, Laboratory Practical Exercises to Promote Functional Biology Education

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Abstract

A major goal of science education is fostering students' intellectual competencies such as independent learning, problem-solving, decision-making and critical thinking. This goal can only be achieved when students are actively involved in the teaching-learning process through activity-based, practical-oriented instructional methods involving the use of laboratories. This study therefore, investigated the extent to which the biology teachers employ activity-oriented, laboratory/practical instructional methods in order to improve the learning outcome of their students. The descriptive survey involved 73 Biology teachers randomly selected from all the six education zones of Anambra state, Nigeria. Four research questions were posed and four hypotheses were formulated to guide the conduct of the study. A 32-item structured questionnaire which has reliability co-efficient of 0.82 was used to collect data. Data were analyzed using mean, standard deviation and t-tests. Results show that Biology teachers adopt practical-oriented strategies in teaching biology, conduct practical activities to a high extent, and perceive practical exercises as essential to effective teaching and learning of the subject. Provision of adequate number of laboratory materials, employment of adequate number of biology teachers, making provision for well designed laboratory activities in the curriculum and training of teachers on how to effectively combine theory with practical are some of the strategies that will encourage biology teachers to conduct practical lessons. There was no significant difference between male and female biology teachers in their responses to the different aspects investigated. Based on these findings, some recommendations were made that include that curriculum designers should incorporate guides for practical activities that go with each topic in the curriculum so as to encourage the teachers to teach theory with practical as a unified whole to increase students' understanding and internalization of the facts and ideas taught.

Keywords*: biology, activity-oriented instruction, laboratory-practical exercises, functional biology education*

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Introduction

A major goal of science education is fosatering students' intellectual competencies such as independent learning, problem-solving, decision-making and critical thinking (Barak & Shakhman, 2008). Perhaps, it is in recognition of this goal that the Federal Republic of Nigeria (FRN, 2004) stated in her national policy on education that there is need for school programme to be relevant, practical and comprehensive. Consequently, several moves were made to improve the quality of science teaching at the secondary school level through the development of radical science curricula and teaching methodology (Abdullahi, 2002). These curricula, which Abdullahi (2002) described as activity-oriented, emphasize pupil-centered activities as the right approach to learning science. The objectives of these moves can only be achieved when the learners are actively involved in the classroom practices through activity-based, practical-oriented instructional method.

Biology as a science subject is a practical-oriented subject which focuses more on knowledge application than mere knowledge acquisition (Okeke, 2004). Biology plays a vital role in the economic development of the nation. According to Nwakonobi (2008), the recent advances recorded in the field of biochemistry, physiology, ecology, genetics and molecular biology are due to biological knowledge and application. Biology plays a very important role in most human activities including finding solutions to the problems of food security, pollution, population explosion, climate change, disease outbreak, family health, poverty eradication, management and conservation of natural resources, various social vices as well as biotechnology and ethics. In addition, biology forms a link between secondary school level and many life-related fields of study offered at the tertiary level including biochemistry, biogenetics, physiology, ecology, zoology, botany, molecular biology, life sciences, engineering and biotechnology. Given its important role in the economic development of a nation, biology is a subject that must be properly taught and learnt by secondary school students in order to make it functional and relevant. Biology curriculum was designed to meet the needs of the society through relevance and functionality in its content, method, processes and application. The curriculum therefore has all it takes to make biology education functional and relevant to the society's needs and expectations for economic development.

Functional science education enables the recipient to explore school-industry linkage or school-world of works relationship by transferring the skills acquired from the school to the industry (Egbunonu & Okeke, 2005). Consequently, functional science education should be relevant to the students' environment and experiences as well as equip them with skills for consolidation of science behaviours. Egbunonu & Okeke (2005) also stated that effective science teaching in schools should be laboratory oriented rather than text and lecture oriented. Therefore, functional biology education should develop in the students the right attitude, interest and skills to cope with life around them.

There is need to give the students a feeling of participation, confidence and interest in what they do with their hands so as not to perceive science as merely theoretical study. For this to be achieved, teaching of science must be practical-oriented. Cirfat (2013) maintained that whatever the argument for or against the impact of practical work on students' learning outcomes in Science Technology Engineering Mathematics (STEM) subjects, it is incontrovertible that engagement of students in practical activities would make their learning more concrete and aid the development of many life-coping skills. These practical activities can only be properly handled in science laboratories since according to Egbunonu and Okeke (2005), laboratory is regarded as the focal point for the study of science. A laboratory is any place or area where children learn to formulate problems, develop the ability to propose solutions, design and carry out experiments or investigations (Okeke, 2004). Biology laboratories are places where different types of experiments and researches concerning all the disciplines of life science take place for acquisition of skills. These skills cannot be acquired in the absence of well-equipped biology laboratories geared towards effective teaching and learning to empower students to become qualitatively and functionally educated.

Teaching methods have continued to occupy top position as factors affecting students' performance in secondary school science subjects, biology inclusive (Amaefuna, 2013). Through laboratory methods of teaching, students are given the opportunity of having first-hand experience in the observation and manipulation of science materials which will foster their intellectual competencies such as independent learning, problem-solving, decision-making and critical thinking as well as equip them with scientific skills to be self-reliant (Onyegegbu, 2006).

A number of recent science curricular reforms that have taken place in Nigeria tend to be inquiry-based and problem-solving in approach with the aim of making science education functional. This notwithstanding, research findings according to Baikie (2000), has continued to show that teaching and learning in science remain predominantly didactic, teacher-centered and teacher-directed. This kind of ineffective instructional practice adopted by science teachers could be responsible for the consistent

poor performance of students in science and more especially in biology especially at Senior Secondary Certificate Examinations (Ahmed, 2008; Egbunonu & Ugbaja, 2011). Science is a doing subject that involves regular hands-on practical work by both the teacher and learners. There is therefore a need to investigate the extent to which biology teachers employ student-centered, activity-oriented, laboratory instructional methods as a panacea for achieving functional biology education in order to move our children forward and put them in the right pedestrian for global competitiveness.

Gender was also considered as a variable that may influence the attitude of male and female biology teachers in their conduct of biology practical exercises. Okeke (2007) asserted that males are said to be bold, strong, intelligent, logical in reasoning and self-confident while females on the other hand, are said to be fearful, gentle, illogical in reasoning and dull. In line with this, Nnaka and Ezekannagha (2014) stated that science in perceived by the society as a male domain requiring a lot of intellectual ability which women are perceived not to possess. Based on this, the males are usually encouraged to take to sciences which are believed to be tougher areas of study than the arts. Also, biology is erroneously believed to be an easier science subject than the other science subjects like physics and chemistry and so, biology is regarded as a feminine subject. It is on this premise that the researchers wanted to find out if such impressions will have any influence on the attitude of male and female biology teachers to their conduct of laboratory practical exercises in teaching biology.

The Problem

Students' performance in biology has continued to be poor especially in external examinations (Ogunleye, 2006; Osuafor & Okonkwo, 2013). Similarly, Okoro (2011) observed that for some years, the percentage of students who obtained credit pass in biology at West African Senior School Certificate Examination (WASSCE) in Nigeria has been low and their performance is poor. Teaching methods seem to have occupied top positions as factors affecting students' performance. Frequent use of teacher-centered methods (for example, lecture) alone can affect children's performance in academics negatively especially in science. For instance, West African Examinations Council (WAEC) Chief Examiners' report (2012) revealed that students' performance in biology was poor due to their inadequate exposure to practical work. This study therefore aims at investigating the extent to which biology teachers employ practical laboratory instructional methods as a panacea for achieving functional biology education.

Four research questions and four hypotheses guided the conduct of the study.

Research Questions

1. How do biology teachers organize biology lessons?
2. To what extent do biology teachers conduct biology practical?
3. How do biology teachers perceive practical exercises as being essential to the teaching and learning of biology?
4. What are the strategies for encouraging biology teachers to conduct practical lessons?
5. In addition to these research questions, respondents were requested to make their own suggestions on strategies to encourage them to conduct practical exercises. Their responses were also analyzed.

Hypotheses

1. Male and female biology teachers will not differ significantly on the ways they organize biology lessons.
2. Male and female biology teachers will not differ significantly on the extent they conduct biology practical.
3. Teachers' perception on how essential practical exercise is to the teaching and learning of biology will not differ significantly according to gender.
4. Male and female teachers mean ratings of the strategies to be adopted to encourage biology teachers to conduct practical lessons will not differ significantly.

Method

The study was a descriptive survey carried out in Anambra state, Nigeria with a total of 256 Senior Secondary Schools in which there are 525 biology teachers (328 females and 177 males). Out of the 256 schools, 30 senior secondary schools were randomly selected and all the biology teachers in the schools numbering 73 (49 females and 24 males) constituted the sample for the study. A 32-item structured questionnaire was used for data collection. The instrument was validated by two experts, one

in Science Education and the other in Measurement and Evaluation, both from Nnamdi Azikiwe University Awka, Nigeria. They were requested to assess the instrument in terms of clarity and relevance to the title and research questions. Their comments/corrections were effected to arrive at the final draft. The reliability was established using cronbach alpha to calculate the internal consistency of the different sub-scales of the instrument. This yielded reliability indices of 0.80, 0.79, 0.83 and 0.84 respectively. This gave an aggregate of 0.82 and so the instrument was considered adequate for the study.

Data were analyzed using mean, standard deviation and t-test. For research questions, 1, 3 and 4, analyses were done on a 5-point scale of Strongly Agree (SA), Agree (A), Undecided (U), Strongly Disagree (SD) and Disagree (D). Values 5, 4, 3, 2, and 1 respectively were assigned to them. Mean scores of 3.00 and above shows acceptance (Agree) while mean scores below 3.00 were interpreted as Disagreement/ non-acceptance. For research question 2, analysis was done on a 4-point scale of Very High Extent, High Extent, Low Extent and Very Low Extent. The decision rule was as follows:
1.00-1.49= Very Low Extent (VLE); 1.50-2.49= Low Extent (LE); 2.50-3.49= High Extent (HE); 3.50-4.00= Very High Extent (VHE)
The hypotheses were tested at 0.05 level of significance.

Results

Research Question One:

How do biology teachers organize biology lessons?

Table 1. Biology Teachers' Mean Responses on how they Organize Biology Lessons

	Gender									
	Male			Female			Total			
	N	Mean	*SD*	*N*	Mean	*SD*	*N*	Mean	*SD*	Decision
1. Provide materials and allow students to work on their own	24	4.29	0.86	49	3.63	1.167	73	3.85	1.11	A
2. Demonstrate the practical aspect while the students watch	24	3.46	1.53	49	3.71	1.37	73	3.63	1.42	A
3. Teach all topics theoretically	24	2.21	0.72	49	1.71	0.89	73	1.90	0.87	D
4. Give out topics to students to read up	24	2.54	1.22	49	2.63	1.48	73	2.60	1.10	D
5. Combine theory with practical	24	4.00	1.14	49	4.24	0.99	73	4.16	1.04	A
6. Teach all topics using only practical	24	2.41	0.97	49	1.76	0.78	73	1.97	0.90	D

Table 1 shows that of the six possible ways of teaching Biology, Biology teachers agree that they use three namely: providing materials and allowing students to work on their own (Mean = 3.85), demonstrating the practical aspect while the students watch (Mean = 3.63) and combining theory with practical (4.16). Although male and female biology teachers agree they adopt these three methods, female biology teachers seem to be more disposed to the use of two of these methods (demonstrating the practical aspect while students watch and combining theory with practical) than their male counterparts. On the other hand, male biology teachers seem to be more disposed to providing materials and allowing students to work on their own (male = 4.29; female = 3.63).

Research Question Two:

To what extent do biology teachers conduct biology practical?

Table 2. Mean Responses of Biology Teachers on Extent to which They Conduct Biology Practical

Gender	*N*	Mean	*SD*	Decision
Male	24	3.12	1.04	HE
Female	49	3.02	0.80	HE
Total	73	3.06	0.88	HE

Table 2 shows that generally Biology teachers conduct Biology practical to a high extent though the mean response of male Biology teachers was slightly higher than that of the females.

Research Question Three

How essential are Biology practical exercises to the teaching and learning of the subject?

Table 3. Biology Teachers' Mean Responses on how Biology Practical Exercises are Essential to the Teaching and Learning of the Subject

	Gender									
	Male			Female			Total			
	N	Mean	*SD*	*N*	Mean	*SD*	*N*	Mean	*SD*	Decision
1. Students cannot do well without engaging in practical activities	24	4.29	0.55	49	4.29	0.93	73	4.27	0.82	A
2. Practical exercises are very essential for sustainable academic growth of students	24	4.75	0.44	49	4.71	0.46	73	4.73	0.45	A
3. Practical activities enhance students' intellectual ability	24	4.83	0.38	49	4.63	0.49	73	4.70	0.46	A
4. Through practical lessons, students learn to behave and work like scientists	24	4.08	1.14	49	4.37	0.49	73	4.27	0.77	A
5. Through practical activities, students learn to appreciate the role of science and scientists	24	4.33	0.56	49	4.20	0.76	73	4.25	0.70	A
6. Laboratory activity gives training in problem -solving, thus promoting self-reliance	24	4.38	0.49	49	4.39	0.49	73	4.38	0.49	A
7. Training in laboratory work helps students to develop skills necessary for more advanced study and research	24	4.71	0.46	49	4.61	0.49	73	4.64	0.48	A
8. Laboratory activities promote better understanding and interest in science concepts	24	4.63	0.58	49	4.57	0.50	73	4.59	0.52	A
9. Laboratory activities provide training in acquisition of science process skills	24	4.50	0.78	49	4.20	1.14	73	4.30	1.04	A
10. Practical activities do not have much effect on students' performance in Biology	24	2.2	0.99	49	1.69	0.87	73	1.88	0.94	D
11. Students still perform well in exams even when they are not taught with laboratory method	24	2.96	1.04	49	2.53	1.17	73	2.67	1.14	D
12. Students can still learn science process skills without engaging in practical work.	24	2.46	0.93	49	1.92	0.95	73	2.10	0.97	D
13. Practical work is not very important in Biology	24	1.79	1.22	49	1.69	1.36	73	1.73	1.30	D

As shown by the mean responses in Table 3, Biology teachers perceive Biology practical exercises as essential to teaching and learning of the subject as they agree that with all the positive items (items 1-9) and disagree with the negative items (items 10-13).

Research Question Four

What are the strategies for encouraging Biology teachers to conduct practical lessons?

Table 4 shows that the Biology teachers agree that all the strategies listed will encourage biology teachers to conduct practical lessons.

Table 4. Mean Responses of Biology Teachers on Strategies to Encourage Conduct of Practical Lessons

	Gender									
	Male			Female			Total			
	N	Mean	*SD*	*N*	Mean	*SD*	*N*	Mean	*SD*	Decision
1. Provision of adequate number of biology laboratory materials	24	4.63	0.58	49	4.80	0.46	73	4.74	0.50	A
2. Making provision for well-designed laboratory activities in the biology curriculum	24	4.58	0.50	49	4.43	0.65	73	4.48	0.60	A
3. Employment of laboratory assistants / attendants to assist the	24	4.25	1.22	49	4.20	1.21	73	4.22	1.20	A

biology teachers										
4. Restoration of science /hazard allowance	24	4.08	0.93	49	4.35	0.86	73	4.26	0.88	A
5. Organizing workshops for biology teachers on how to effectively combine theory with practical during lessons	24	4.33	1.13	49	4.53	0.79	73	4.47	0.91	A
6. Biology curriculum content should be reduced	24	3.25	1.45	49	3.37	1.52	73	3.33	1.49	A
7. Less emphasis should be placed on content coverage of syllabus to give room for effective teaching	24	4.00	1.10	49	3.37	1.36	73	3.58	1.31	A
8. Adequate number of biology teachers should be employed to reduce work load.	24	4.54	0.59	49	4.73	0.49	73	4.67	0.53	A

Other Strategies Suggested by Biology Teachers

Biology teachers were asked to suggest other strategies not included in table 4 which could help them to conduct practical exercises. The following strategies suggested by the teachers were analyzed and presented in Table 5.

Table 5. Strategies suggested by Biology Teachers to Encourage Teachers to Conduct Biology practical

S/NO	Strategies	N	%
1.	Reconstruction of dilapidated biology laboratory buildings and furniture	2	9.5
2.	Encouraging science quiz and project competition in schools	1	4.8
3.	Biology syllabus should be drawn to tally with the seasons of availability, for instance one may not be able to find toad or algae during the dry season	1	4.8
4.	Effective monitoring and supervision of biology teachers by supervisors	1	4.8
5.	Proper storage and handling of laboratory equipment and materials	2	9.5
6.	Organizing excursion for science students.	1	4.8
7.	Emphasizing the use of all the teaching methods relevant in biology teaching.	1	4.8
8.	Biology teachers should be encouraged to attend Science Teachers Association of Nigeria (STAN) conferences and workshops for professional development	1	4.8
9.	Emphasis should be placed on the use of local instructional materials in the teaching of practical biology.	1	4.8

Table 6. *t*-Test Analyses of Male and Female Biology Teachers' Mean Responses on Their Ways of Organizing Biology Lessons

	Male			Female					*p*-	Remark
	N	Mean	*SD*	*N*	Mean	*SD*	Df	*T*	value	
1. Provide materials and allow students to work on their own	24	4.29	0.86	49	3.63	1.17	71	2.46	.02	S*
2. Demonstrate the practical aspect while the students watch	24	3.46	1.53	49	3.71	1.37	71	-.72	.47	NS**
3. Teach all topics theoretically	24	2.21	0.72	49	1.71	0.89	71	1.91	.57	NS
4. Give out topics to students to read up	24	2.54	1.22	49	2.63	1.48	71	-.26	.80	NS
5. Combine theory with practical	24	4.00	1.14	49	4.24	0.99	71	-.94	.35	NS
6. Teach all topics using only practical	24	2.41	0.97	49	1.76	0.78	71	3.14	.00	S

*Significant **Not Significant

Hypothesis 1

Male and female biology teachers will not differ significantly on the ways they organize biology lessons.

There was no significant difference between male and female Biology teachers regarding the ways they organize their Biology lessons as the *t*-values of four out of the six items on the possible ways (*ts* = -.72, 1.9, -.26, -.94) were less than the table value (1.99). Likewise, their *p*-values were greater than the stipulated 0.05 level of significance. The null hypothesis of no significant difference was therefore supported.

Hypothesis 2

Male and female Biology teachers will not differ significantly on the extent they conduct Biology practical.

Table 7. t-Test Analysis of Male and Female Biology Teachers' Mean Responses on Their Extent of Conducting Practical

	Male			Female						
	N	Mean	*SD*	*N*	Mean	*SD*	Df	*T*	*p*-value	Remark
Extent of Conducting Biology Practical	25	3.12	1.04	60	3.02	0.88	71	.47	.64	NS

Using a *t*-test, there was no significant difference between male and female Biology teachers on the extent they conduct Biology practical, $t = .47$ and p-value = .64. This shows the mean response by male teachers (Mean = 3.12) was not significantly greater than the mean response (Mean = 3.02) by the female teachers. The null hypothesis of no significant difference was supported.

Hypothesis 3

Teachers' perception of how essential practical exercise is to the teaching and learning will not differ significantly by gender.

Table 8. *t*-Test Analyses of Teachers' Perception of how Essential Practical Exercise is According to Gender

	Male			Female						
	N	Mean	*SD*	*N*	Mean	*SD*	Df	*T*	p-value	Remark
1. Student cannot do well without engaging in practical activities	24	4.29	0.55	49	4.27	0.93	71	.13	.90	NS
2. Practical exercises are very essential for sustainable academic growth of students	24	4.75	0.44	49	4.71	0.46	71	.32	.75	NS
3. Practical activities enhance students' intellectual ability	24	4.83	0.38	49	4.63	0.49	71	1.77	.08	NS
4. Through practical lessons, students learn to behave and work like scientists	24	4.08	1.14	49	4.37	0.49	71	-1.50	.14	NS
5. Through practical activities, students learn to appreciate the role of science and scientists	24	4.33	0.56	49	4.20	0.76	71	.74	.46	NS
6. Laboratory activity gives training in problem -solving, thus promoting self-reliance	24	4.38	0.49	49	4.39	0.49	71	-.10	.92	NS
7. Training in laboratory work helps students to develop skills necessary for more advanced study and research	24	4.71	0.46	49	4.61	0.49	71	.80	.43	NS
8. Laboratory activities promote better understanding and interest in science concepts	24	4.63	0.58	49	4.57	0.50	71	.41	.68	NS
9. Laboratory activities provide training in acquisition of science process skills	24	4.50	0.78	49	4.20	1.14	71	1.15	.25	NS
10. Practical activities do not have much effect on students' performance in Biology	24	2.25	0.99	49	1.69	0.87	71	2.45	.02	S
11. Students still perform well in exams even when they are not taught with laboratory method	24	2.96	1.04	49	2.53	1.17	71	1.52	.13	NS
12. Students can still learn science process skills without engaging in practical work.	24	2.46	.93	49	1.92	0.95	71	2.29	.03	S
13. Practical work is not very important in Biology	24	1.79	1.22	49	1.69	1.36	71	.30	.77	NS

Male and female teachers do not differ significantly on their perception of how essential practical exercise is to the teaching and learning of Biology as shown by the *t*-values (ranging from .13 to 1.77) of 11 out of the 13 items which were less than the table value of 1.99. The corresponding *p*-values were also greater than the 0.05 level of significant. The null hypothesis was therefore supported.

Hypothesis 4

Male and female biology teachers mean ratings on strategies for encouraging biology teachers to conduct practical exercises will not differ significantly.

Table 9. *t*-Test Analyses of Male and Female Biology Teachers' Mean Ratings on Strategies to Encourage Conduct of Practical

Strategies	**Male**			**Female**						
	N	**Mean**	***SD***	***N***	**Mean**	***SD***	**Df**	***t***	***p*-value**	**Remark**
1. Provision of adequate number of biology laboratory materials	24	4.63	0.58	49	4.80	0.46	71	-1.38	.17	NS
2. Making provision for well designed laboratory activities in the biology curriculum	24	4.58	0.50	49	4.43	0.65	71	1.03	.31	NS
3. Employment of laboratory assistants /attendants to assist the biology teachers	24	4.25	1.22	49	4.20	1.21	71	.15	.88	NS
4. Restoration of science /hazard allowance	24	4.08	0.93	49	4.35	0.86	71	-1.20	.23	NS
5. Organizing workshops for biology teachers on how to effectively combine theory with practical during lessons	24	4.33	1.13	49	4.53	0.79	71	-.86	.39	NS
6. Biology curriculum content should be reduced	24	3.25	1.45	49	3.37	1.52	71	-.31	.75	NS
7. Less emphasis should be placed on content coverage of syllabus to give room for effective teaching	24	4.00	1.10	49	3.37	1.36	71	1.97	.05	S
8. Adequate number of biology teachers should be employed to reduce work load.	24	4.54	0.59	49	4.73	0.49	71	-1.48	.14	NS

There was no significant difference between male and female Biology teachers regarding their perception of the strategies for encouraging biology teachers to conduct practical exercises. This is shown by the *t*-values for most of the suggested strategies which ranged from .15 to 1.48 and below the table values of 1.99. Their corresponding *p*-values were also greater than the 0.05 level of significance. Therefore, the null hypothesis of no significant difference was supported.

Discussion

The findings from this study showed that biology teachers most often utilize laboratory practical exercises in teaching biology to their students. This finding is quite interesting and a welcome development. It appears not to be in agreement with the findings of most related earlier studies, for example, Akubuilo (2004) and WAEC (2012). Akubuilo (2004) reported that biology teachers lack the competence, skills and creativity to organize practical classes in biology. Similarly, WAEC Chief Examiners' Report (2012) attributed the poor performance of students in biology in WASSCE to inadequate exposure of students to practical work. The contrary view portrayed by this study may imply that the efforts by WAEC and other researchers to highlight these lapses in teaching of biology are yielding fruit. West African Examinations Council (WAEC) usually releases its chief examiners' annual report in all subjects taken in the Senior Secondary Certificate Examination (SSCE) every year. These reports usually highlight the areas of strengths and weaknesses of students in different subjects in order to enable all stakeholders (students, teachers, parents, school owners and government) to be aware of the situation. It is likely that biology teachers have improved in their laboratory skills and competence through conferences, workshops and seminars organized by STAN and information gathered from chief examiners' reports and are now able to engage students more in hands-on laboratory practical exercises. This study also revealed that biology teachers perceive practical exercises as being very essential for

effective teaching and learning of biology. These are evidence that biology teachers are embracing the use of laboratory or practical activities as the best practices to achieve functional biology education.

In addition to their accepting all the strategies listed as being the strategies that will enhance their usage of laboratory methods, they also suggested additional strategies they think will be of help. The major ones are related to revision/reformation of biology curriculum, improvement of teaching methods used in teaching biology and provision of relevant instructional materials. The importance of arranging the biology topics to be in line with the seasons of the year as they suggested cannot be over-emphasized. They buttressed this point by giving the example that one should not expect to see toad or algae during the dry season. By this they are suggesting that topics involving these organisms should be taught during rainy season when the organisms can be seen in abundance. Also of note is their indication of the importance of instructional materials to them. This is in line with Okeke's (2004) observation that the teaching of science needs to be with well-equipped laboratories and workshops capable of giving the students adequate scientific experiences with practical and demonstration classes. This study also revealed that male and female Biology teachers did not differ significantly in their conduct of biology laboratory practical exercises.

Conclusion

Biology like other sciences is a practical- oriented subject and teaching it with methods that are not in tune with this norm cannot be acceptable. Laboratory method of teaching is practical- oriented and activity-based. The findings of this study show that biology teachers see it as a method that can make biology teaching and learning relevant, not only to the students but to the society in general. Like Egbunonu & Okeke (2005) stated, if the teaching of biology is to make its maximum contribution to the education and well-being of the students and the society, the teacher must make it a practical process in which the students at every stage are active participants. Therefore, everything that needs to be done to encourage biology teachers to teach theory with practical must be done by all concerned.

Recommendations

1. To make biology education meaningful, government at all levels should make conscious efforts to provide adequate funding for the procurement of the required learning materials in the schools.
2. Curriculum designers should incorporate guides for practical activities that go with each topic in the curriculum so as to encourage the teachers to teach theory with practical as a unified whole and not teach them in isolation. This will help to increase students' understanding and internalization of the facts and ideas taught.
3. Supervisors, who should be Biology specialists as suggested by the respondents, should monitor the conduct of practical by biology teachers and not just classroom delivery of theory.

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