

**EVALUATION OF IMPLEMENTATION OF NATIONAL
CURRICULUM FOR SECONDARY SCHOOL BIOLOGY IN BIU
LOCAL GOVERNMENT AREA, BORNO STATE, NIGERIA**

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Abstract

The study was on evaluation of implementation of national curriculum for secondary school Biology in Biu Local Government Area in Borno State, Nigeria. This was necessitated by the poor performance often experienced by the students in the study area in external examinations and the need to investigate possible causes. Six research questions guided the study which employed a descriptive survey design. The population of the study was made up of all the 16 private and public secondary schools writing Senior School Certificate Examinations in Biu Local Government Area and all the 42 Biology teachers in the schools. No sampling was done as the size was considered manageable by the researchers. All the schools and Biology teachers in them were involved in the study. A questionnaire and a checklist constructed by the researchers were used for data collection. Three experts, one from Educational Measurement and Evaluation and two from Science and Technology (Biology) Units, Faculty of Education, University of Jos, judged the content validity of the instruments to be adequate. The internal consistency reliability coefficients for the questionnaire and checklist using Cronbach-Alpha method, were 0.71 and 0.89 respectively. Frequency counts, percentages, means and standard deviations were used to answer the research questions. The findings of the study showed lack of qualified teachers for Biology in schools in the study area. While instructional materials were available in the schools to a high extent, infrastructural facilities were available to a moderate extent. The findings of the study also showed that teachers employed the recommended teaching methods to a low extent and assessment methods to a high extent. The findings equally showed the challenges militating against proper implementation of the curriculum to include; lack of qualified Biology teachers, inadequate infrastructural facilities in schools, crowded classrooms, activities of insurgents and poor background from Basic Science. It was recommended that more qualified

Biology teachers be employed, instructional materials and infrastructural facilities be provided where they were lacking and that government should make concerted efforts to end insurgency.

Keywords: *Evaluation, Biology curriculum, curriculum implementation, national development, assessment techniques.*

Introduction

Science provides a body of knowledge for use in addressing various forms of human, material and environmental problems. It can also be viewed as composed of two major complementary modes; accumulation of knowledge through exploration and discovery efforts about the world, and the use of such knowledge for human and material development. Nigeria being a developing nation with an increasing demand for science-based skilled manpower, needs to prepare would-be scientists early enough to take up challenges in that field. The achievement of this, starts with learning and application of science subjects such as Biology, Chemistry, Physics, Agricultural Science, Basic Science and others in schools.

Biology is a life science and provides contents in training of students who want to study Medicine, Nursing, Pharmacy, Forestry, Fisheries and Medical Laboratory Sciences, among others. Many Senior Secondary School students register for Biology in Senior School Certificate Examinations (SSCE). Educating students in Biology prepares them to play the following roles in national development: promotion of good health practices, management of refuse and household wastes, reduction of ecological problems, promotion of good nutritional practices, conservation of natural resources, overcoming misconceptions and myths (Akpeli, 2019). Many of the roles above can be considered as nonpharmaceutical methods for prevention of covid-19. The study of Biology can also prepare upcoming scientists who will find solutions to aftermaths of Covid-19 and similar health problems. A well-articulated national curriculum for Biology guides what is taught in the subject.

Curriculum is about the planned and unplanned programme of events in the school setting directed towards learning in the process of formal education, the purpose being to educate learners to become sound persons that can contribute meaningfully to the society (Ogunyemi in Eze, 2016). Curriculum can also be defined as a blue print, a plan of educational activities, designed in such a way that students will attain certain educational objectives. It consists of objectives, subject matter, materials, teaching methods and evaluation procedures (Sanda, 2015).

Biology curriculum has undergone many modifications with inclusion of more topics. The curriculum has a spiral arrangement of content; the topics taught are repeated but in greater depth yearly, throughout the three years of senior secondary school, to cover its sixty-two units. Biology curriculum is designed to provide balanced coverage of some topics to broaden the perspective of the students as well as in-depth study in some other topics to prepare students for further study in particular areas. It is recommended that teachers adopt a range of learning and teaching strategies; like contextual approach, scientific investigations, problem-based learning and issue-based learning to enhance students' understanding of various contemporary issues in Biology. The curriculum provides means to ensure that learning content and activities are relevant to students' everyday life.

It is in the proper implementation of a curriculum that its well articulated purpose and objectives are achieved. Onyeachu (2008) viewed curriculum implementation as the process of putting what has been planned as a document into practice in the classroom through the efforts of teachers, learners, school administrators and parents as well as interaction with physical facilities, instructional materials, psychological and social environment. Curriculum implementation takes place as learners acquire the intended experiences, knowledge, skills, ideas and attitudes and can be influenced by human and material resources, facilities, school environment, instructional supervision and assessment. Poor curriculum implementation however, is said to be a problem in Nigeria. Some of the challenges of curriculum implementation include; lack of finance, frequent turnover of teachers, frequent changes in educational policies, rapid increase in knowledge and need to update, shortage of qualified teachers, poor ICT culture, uncondusive learning environment, poor infrastructural facilities, unwelcoming attitude to change (Arthur & Athanasius, 2017; Ejike & Oke, 2018).

Given that curriculum moves with changing trends in the society, its evaluation from time to time is necessary. Evaluation, the process of making value judgment about the worth of a thing is central to teaching and learning process. It includes searching, obtaining and analysing data with a view to making value judgement about programmes, products or procedures. The two major types of evaluation are formative and summative. When evaluation is done in the course of running a programme to determine the extent of implementation, it is formative, if done at the end of the programme to determine its impact, it is summative. Curriculum evaluation can help discover areas that need attention and in facilitating decision-making about the

curriculum. Areas of concentration during such venture can be the objectives, content, methods, instructional materials and performance (Eze, 2016).

There are many models and theories of programme evaluation, however, the Context, Input, Process and Product (CIPP) model by Daniel Stufflebeam and his team in 1960s is more frequently used. Context evaluation assesses what needs to be done. It addresses goals identification of the project. Input evaluation addresses how the project should be done. It identifies procedural designs, methods and strategies for achieving the desired result. Process evaluation monitors implementation. It asks, is it being done? It aims at documenting the process and providing feedback regarding; extent to which planned activities are carried out appropriately, extent to which participants carry out their roles and whether adjustment plan is necessary. Product evaluation assesses output of a programme. It tries to answer the question did the programme succeed? The feedback provided is used to judge the merits, impacts, sustainability and transportability of a programme (Zhang, Zeller, Griffith, Metcalf, William, Shea & Misulis, 2011). Boulmetis and Dutwin (2005) posited that CIPP is the best decision making model.

A few studies have been carried out on curriculum evaluation and some are discussed here. The study of Hassan (2019) on extent of implementation of Biology curriculum in public secondary schools in Maiduguri metropolis revealed that teachers use mainly demonstration, lecture, team teaching and discussion methods in teaching, while the recommended assessment methods were utilized to a high extent. However, Ifeobu (2014) posited that Biology teachers utilize available instructional materials only to a less extent, comply with recommended teaching methods to a moderate extent and also use the recommended evaluation techniques to a moderate extent in Anambra State. Ifeobu rated implementation of biology curriculum to be moderate and problems militating against its proper implementation to include; students' poor background from basic science, underfunding of education and inadequate coverage of Biology syllabus. However, Salami, Popoola, Mudideen and Akinwumi (2019) revealed that Biology curriculum is properly implemented in Colleges of Education in Osun State, Nigeria.

Mimi and James (2014) on the other hand, found about 60% of Biology teachers in secondary schools in Benue State of Nigeria to be unqualified and not using teaching methods recommended in the curriculum to a high extent. Ogungbesan (2012) found infrastructural facilities and students' achievement in Basic Science to be inadequate though course materials for the subject were

available. Again, most teachers preferred lecture method to other methods for implementation of the Basic Science curriculum component of the Universal Basic Education programme in south-west, Nigeria.

Despite the importance of Biology as a science subject, evidences have shown that students in the study area are not doing well in the subject in Secondary School Certificate Examination. For example, from 2014 to 2018, the results were generally poor in public schools in Biu Local Government Area of Borno State. A total of 2963 students registered for WASSCE Biology in 2014, only 908 (30.64%) had credit pass and above. Similarly in 2015, 2017 and 2018 only 556 (33.47%), 268 (15.34%) and 728 (28.85%) respectively obtained credit and above in WASSCE Biology (Educational Resource Centre, Maiduguri, Borno State, 2014-2018). The North East Zone has been labelled as one of the educationally disadvantaged states in Nigeria (Ibrahim, 2010) and Borno State (Biu Local Government Area inclusive) is one of the States in the North East that has consistently recorded poor performance in Biology (Hassan, 2019). This poor performance in SSCE examination can lead to students having low self-esteem, it can also cause significant stress to the parents and aborted dreams which often times lead to youths joining bad groups and becoming nuisance to the society. Efforts to mitigate the massive failure of students have been made by some NGOs like UNICEF and World Bank by providing instructional materials and infrastructural facilities in few schools in the study area, yet mass failure persists. Could it be that the curriculum is not being well implemented? Some science educators like Ali (2003) have also expressed doubts as to whether the secondary school Biology curriculum is being well implemented. This issue ought to be empirically investigated hence, the need for evaluation of implementation of Biology curriculum for secondary schools in Biu Local Government Area of Borno State.

The following research questions guided the study

1. To what extent are there qualified teachers for the teaching of Biology in Biu Local Government area?
2. To what extent are there instructional materials for Biology teaching in Biu L.G.A?
3. To what extent are there infrastructural facilities for teaching Biology in Biu L.G.A?

4. To what extent do teachers comply with recommended teaching methods in the Biology curriculum in the study area?
5. What assessment techniques are used by Biology teachers in assessing students' learning outcome in the study area?
6. What are the problems militating against the implementation of national curriculum for secondary school Biology in Biu L.G.A?

Method

The design for the study was descriptive survey research design. Uzoagulu (2011) stated that a descriptive survey deals with the methods and techniques of summarizing and describing information which is intended to describe incidence in educational phenomena. The population of the study was made up of all the 42 Biology teachers across the 16 senior secondary schools currently writing SSCE in Biu L.G.A of Borno State. All the 42 Biology teachers made up the sample for the study. Two instruments, Secondary School Biology Curriculum Implementation Evaluation Questionnaire (SSBCIEQ) and Biology Instructional Materials and Infrastructural Facilities Checklist (BIMIFC) were used for data collection. The structured questionnaire was divided into four sections. Section A, elicited information on Biology teachers' qualifications, Section B, on teaching methods used by the teachers, Section C, on Biology teachers' assessment techniques while section D, elicited information on problems militating against implementation of Biology curriculum. The questionnaire was in form of modified Likert scale with response code of Strongly Agreed (SD), Agreed (A), Disagreed (DA) and Strongly Disagreed (SD), having weights of 4, 3, 2 and 1 respectively. The four response options and their weights gave a criterion mean of 2.50. Items on the questionnaire with mean response scores of 2.50 and above were considered accepted by the respondents while those with mean response scores below 2.50 were rejected. The checklist provided information on availability and unavailability of instructional materials and infrastructural facilities. The percentages of schools in which each item was available out of the 16 schools studied were calculated as well as the average percentage availability to determine extent. Extent of availability was categorized into three; 0-49% low, 50-59% moderate and 60% and above high.

Three experts, one from Educational Measurement and Evaluation and two from Science and Technology Education (Biology) Units, Faculty of Education, University of Jos, scrutinized the instruments to determine their face and content validity by examining the appropriateness, relevance and

representativeness of items of the instruments. The suggestions of the experts were incorporated into the final draft of the instruments. Internal consistency reliability coefficients of the instruments were calculated using Cronbach Alpha method after item try out on 10 Biology teachers in 4 schools in Kwaya-kusar L.G.A of Borno State. The values were 0.71 for the questionnaire and 0.89 for the checklist. According to Ugodulunwa (2008), a reliability coefficient of 0.65 and above is generally acceptable range for data-collection instruments.

Results

The information obtained were analysed and tabulated to answer the research questions.

Table 1: Biology Teachers' Qualifications

Educational Qualification	Frequency	Percentage
NCE (Biology)	12	29%
NCE (other areas)	7	17%
B.S.c Ed. (Biology)	6	14%
B. Ed. (other area)	3	7%
B.Sc. (Biology)	8	19%
M. Ed. (Biology)	4	9%
M. Ed. (Other Area)	2	5%
Total	42	100%

Table 1 showed that only 30 teachers read Biology, out of these, 12 were NCE holders while 8 were B.Sc holders without teaching qualifications. By implication, only 10 (23.8%) of the teachers studied were qualified to teach the subject as NCE teachers are not meant to teach senior secondary school classes. Qualified Biology teachers were therefore available to a low extent in schools in the area of study.

Table 2: Availability of Instructional Materials for Biology Teaching in Biu LGA

S/N	Instructional material	Number of schools available out of 16 schools	Percentage Extent
1.	Mammalian bones	7	44%
2.	Slide of specimen	11	69%
3.	Projectors	1	6%
4.	Microscope	14	88%
5.	Mammalian skeleton	12	75%
6.	Biology textbook	6	38%
7.	Flip chart	12	75%
8.	Dissecting kits	14	88%
9.	Litmus papers	16	100%
10.	Crucible	12	75%
11.	Tripod stand	11	68%
12.	Hand lens	16	100%
13.	Conical flask	14	88%
14.	Test tube	15	94%
15.	Thermometer	12	75%
16.	Anemometer	5	31%
17.	Wind vane	6	38%
18.	Rain guage	6	38%
19.	Biological garden	0	0%
	Mean		62.6% High

Table 2 revealed that 12 out of the 19 instructional materials investigated were available in most of the schools. On the average, instructional materials were available in 62.6% of the schools. The implication is that instructional materials were available in schools to a high extent. However, a few materials like projectors, anemometer, wind vane and rain gauge were not available in many secondary schools in Biu LGA. None of the schools had Biological garden.

Table 3: Availability of Infrastructural Facilities for Biology Teaching in Biu LGA

S/N	Infrastructural facilities	Number of school available out of 16 schools	Percentage Extent
1.	Electricity	10	62%
2.	Water tank	10	62%
3.	Refrigerator	5	31%
4.	Gas cylinder	3	19%
5.	Video recorder	0	0%
6.	Bulbs	8	50%
7.	Generator	8	50%
8.	Incinerator	6	38%
9.	Chairs	16	100%
10.	Tables	16	100%
11.	Toilet	16	100%
12.	Library	8	50%
13	Laboratory	12	75%
Mean			56.7%
			Low

Table 3 revealed all the 16 secondary schools had chairs, tables and toilets, while video recorders were not available in any of the schools. Most infrastructural facilities were available in 56.7% of the schools and so can be said to be available to a moderate extent for Biology teaching.

Table 4: Biology Teachers and Use of Recommended Teaching Method for Biology

S/N	Teaching Method	Mean(\bar{x})	SD	Decision
1.	Lecture	2.31	1.16	Reject
2.	Project	1.40	0.70	Reject
3.	Demonstration	3.12	1.10	Accept
4.	Discovery	1.79	0.87	Reject
5.	Individualized	1.95	1.08	Reject
6.	Discussion	3.10	1.03	Accept
7.	Inquiry	2.17	1.06	Reject
8.	Laboratory/Practical	2.76	0.93	Accept
9.	Programmed instruction	1.74	0.89	Reject
10.	Team teaching	2.21	1.22	Reject
11.	Role playing	2.05	1.13	Reject
12.	Simulation and game	1.86	1.14	Reject
13.	Cooperative learning	2.21	1.09	Reject
14.	Excursion/field trip	1.71	0.86	Reject
15.	Delegation/Group	1.60	0.94	Reject

Table 4 showed that only items 3, 6 and 8 had response mean scores equal to or greater than the criterion mean of 2.50 and were accepted. This means that the teachers mainly adopted demonstration, discussion and laboratory (20%) methods out of the fifteen. Therefore, Biology teachers complied with recommended teaching methods to a low extent in the study area.

Table 5: Biology Teachers and Use of Recommended Assessment Techniques for Biology

S/N	Assessment Technique	Mean (\bar{x})	SD	Decision
1.	Quizzes	2.29	1.09	Reject
2.	Oral questioning	1.98	2.12	Reject
3.	Essay test	3.33	1.03	Accept
4.	Multiple choice	3.07	0.97	Accept
5.	True or false	2.67	0.98	Accept
6.	Matching items	2.07	1.02	Reject
7.	Completion of blanks	2.67	1.05	Accept
8.	Assignment	3.24	0.88	Accept
9.	Practical assessment	2.79	1.00	Accept
10.	Laboratory work	2.60	1.08	Accept

Table 5 showed that items 1, 2 and 6 had mean response scores less than the criterion mean of 2.50 and were rejected. The remaining 7 (70%) methods were utilized by Biology teachers. This means that teachers utilized recommended assessment techniques to a high extent.

Table6: Problems Militating Against Implementation of National Curriculum for Secondary School Biology

S/N	Implementation problems	Mean (\bar{x})	SD	Decision
1	Students always crowd together to receive lesson	3.07	1.11	Accept
2.	Students' poor background from Basic Science make understanding difficult	3.33	0.72	Accept
3.	Influence of local language on the learning of biology concepts	2.90	0.91	Accept
4.	Lack of sufficient supervision by Ministry of Education	2.52	1.02	Accept
5.	Activities of insurgents leading to merging of schools and abrupt closures	3.19	1.02	Accept
6.	No motivation for teaching staff	2.76	1.14	Accept
7.	Problem of coping with continuous assessment due to large classes	2.95	1.01	Accept
8.	There is no job satisfaction among Biology teachers	2.60	0.99	Accept
9.	Lack of growth and development of academic staff in Biology	2.43	1.11	Reject
10.	Vast syllabus to cover in three years	2.76	1.01	Accept
11.	Inadequate textbooks for Biology	2.38	1.13	Reject
12.	Unavailability of facilities for meaningful laboratory activities	2.93	0.97	Accept
13.	Teachers' lack of knowledge of subject matter	1.86	1.12	Reject
14.	Unavailability of well-equipped library	2.98	1.02	Accept
15.	Inadequate instructional material	2.81	0.94	Accept

Table 6 showed that items 9, 11, and 13 had response mean scores less than the criterion of 2.50 and were rejected. The accepted items were problems militating against the implementation of national curriculum for secondary school Biology in Biu LGA.

Discussion

The findings of the study revealed that qualified Biology teachers are lacking in schools in the study area. This confirms the finding of Mimi and James (2014) who found that 60% of Biology teachers in schools in Benue State are not qualified to teach the subject. This, Arthur and Athanasius (2017), Ejike and Oke (2018) found to be one of the problems militating against curriculum implementation. How then can the Biology curriculum be adequately implemented in schools in the study area?

The findings also indicated that instructional materials for Biology teaching are available to a high extent in schools except for few materials which included; projectors, Biological garden, anemometer, wind vane and rain gauges. This concurs with the findings of Ogungbesan (2012) that course materials were available for teaching Basic Science. However, materials if not properly and adequately utilized by Biology teachers as Ifeobu (2014) posited, will not and cannot produce the desired result.

The findings of the study equally showed that infrastructural facilities for teaching Biology are available to a moderate extent. This also confirms the position of Ogungbesan (2012) that infrastructural facilities were inadequate in schools. This was also identified as one of the problems of implementation of curriculum (Ejike & Oke, 2018) as it can affect teaching and learning of the subject.

The findings of the study also revealed that the recommended teaching methods were not used by the Biology teachers to a high extent in Biu LGA of Borno State. Methods utilized were mainly demonstration, discussion and laboratory methods. This supports the finding of Hassan (2019) and Mimi and James (2014) that teachers did not comply with recommended teaching methods. As revealed by Ogungbesan (2012), teachers preferred lecture method which does not involve hands-on activities and is not the best method of teaching a science subject. Ifeobu (2014) however found Biology teachers' compliance with recommended teaching methods to be moderate in secondary schools in Anambra State.

The findings equally revealed that to a high extent, Biology teachers made use of the recommended assessment techniques for assessing their students' learning outcomes in Biu LGA of Borno State. This contradicts the position of Ifeobu (2014) that teachers utilized assessment techniques moderately but confirms the position of Hassan (2019).

The findings of the study showed problems militating against implementation of the national curriculum for secondary school Biology in the study area to be overcrowded classes, students' poor background in Basic Science, activities of insurgents, influence of local language on learning Biology concepts, lack of sufficient supervision by ministry of education, lack of teachers' motivation, problem of coping with assessment in large classes and no job satisfaction for teachers. Others were; problem of wide syllabus, unavailability of equipped library, lack of laboratory facilities, and inadequate instructional materials. Some of these were included in the implementation problems identified by Ifeobu (2014), Arthur and Athanasuis (2017) and Ejike and Oke (2018). For implementation level to improve in the study area, the problems need to be reduced to the barest minimum.

Conclusion

From the findings of this study, it can be concluded that qualified Biology teachers were lacking in senior secondary schools in the study area. Again, although instructional materials for teaching Biology were available in schools to a high extent, infrastructural facilities were available only to a moderate extent. Biology teachers utilized recommended teaching methods to a low extent but recommended assessment techniques to a high extent. It was discovered that many problems militate against the implementation of the Biology curriculum in the study area, these include; students' poor background from Basic Science, large class size, activities of insurgent, lack of qualified teachers, lack of adequate infrastructural facilities and others. Going by the findings, Biology curriculum cannot be said to be properly and adequately implemented in the study area. How then can teaching of Biology play its role in the fight against covid-19?

Recommendations

The following were recommended based on the findings of the study:

1. Qualified teachers should be recruited for the teaching of Biology in senior secondary schools in Biu L.G.A of Borno State. Those who have been recruited but lack minimum qualification for teaching Biology in senior secondary schools should be sent for in-services training by the State Government.
2. Effort should be made by government, school authority and Biology teachers to improvise where possible the instructional materials that are lacking in the schools.
3. Few schools that lack infrastructural facilities should be provided with such facilities.

4. School management should encourage Biology teachers to utilize the recommended teaching methods and assessment techniques.
5. Government (both at state and federal levels), should make concerted efforts towards ending insurgency in order to allow smooth academic activities in every schools.

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