

STUDENTS' PERCEIVED QUALITY OF BIOLOGY CURRICULUM IMPLEMENTATION PRACTICES AMONG PUBLIC SECONDARY SCHOOLS IN LOKOJA METROPOLIST, KOGI STATE

¹ABDULLAHI A., ²IDRIS U.S.B. & KOROKA M.U.S

Department of Science Education

Federal University of Technology Minna, Niger State, Nigeria.

Corresponding Author : +2347037172511 abduladamu2230@gmail.com

Abstract

Curriculum implementation is a core and most significant event in educational system as it determines the achievement of educational goals, and by extension, the national development. Nigeria is one of those nations with huge achievements over decades in educational investments. However, research indicates some gaps that need more attention in order to enhance smooth curriculum delivery in learning institutions across the state. This study adopted a descriptive survey research design, adapting Stuff Lebam's CIPP Model to evaluate the implementation of the Biology Curriculum among Public Secondary Schools in Lokoja Metropolis of Kogi State, Nigeria. The population comprised 3,943 Biology students drawn from eleven (11) secondary schools. Using a random sampling technique, a sample of 346 Biology students was randomly selected to ensure equal representation of all respondents. Biology Curriculum Evaluation Questionnaire (BCEQ) which was validated by experts and was found reliable using Cronbach Alpha formula, and 0.872 coefficient was obtained. Data was analyzed using mean, standard deviation and Mann-Whitney U-test respectively. The findings of the study revealed that Biology curriculum objectives are rich and relevant to students' needs in secondary schools in Lokoja Metropolis (Grand Mean= 4.22, SD=0.67). Biology students agreed that resources necessary for the effective implementation of Biology curriculum in Secondary schools in Lokoja metropolis are available and adequate, with a (Grand Mean= 4.23, SD=0.66). findings of the study further revealed that, Biology students agree that the teaching methods are poorly applied in the biology curriculum implementation in secondary schools in Lokoja Metropolis (Grand Mean=1.51, SD=0.52). Biology students agreed that inactive participation, infrastructural inadequacy, poor implementation of practical contents, cultural bias of Biology curriculum, negative attitudes among teachers (Grand Mean= 3.06, SD=0.14). It was recommended among others that Biology teachers should be encouraged and trained on innovative teaching pedagogies as to meet up with the 21st century demands in secondary schools in Lokoja metropolis, Kogi State

Keyword: Curriculum, CIPP Model, evaluation, implementation and students

Introduction

Science and technology have been identified as the key drivers for growth and sustainable social development and transformation of nations, which could lead to industrialization (Uza, 2019). Science education aims at helping individual learner to gain a functional understanding of scientific concepts and principles linked with real life situations and acquire scientific skills, attitudes and values necessary to analyze and solve day-to-day problems.

The deficiencies in science teaching range from teachers' negative attitudes towards teaching such as poor coverage of syllabuses, limited funding, inadequate infrastructure, inadequate instructional materials and many more (Theophilus, *et al.* 2023). Again, all these tend to suggest that teachers are to be held responsible for the lack of interest of students in science which results in poor learning outcomes among the science students. Among these science subjects are biology, chemistry, integrated science and physics that are taught in Nigerian secondary schools.

Curriculum is a document containing educational idea and ways of translating this educational idea into hypothesis testable in practice (Blenkin, 2018). In Nigeria, secondary school curriculum is designed to encourage all students to achieve their spiritual, intellectual and social potential as well as to understand the relevance of learning in their daily lives. It is important to note that, it is one thing to design curriculum, it is another thing to implement it effectively.

Biology curriculum was first introduced in 1977. At that time the duration for secondary school education was five years. The biology teaching started in class four and in class five the students took the West African School Certificate Examination. In keeping with the dynamics of social change and demands on education, there was the need to broaden the curriculum. The quest for improving the method of teaching and learning of secondary school biology began in 1982 as reported by the Nigerian Educational Research and Development Council (NERDC, 2016). The Federal Government in collaboration with Esselte (Swedish non-governmental organization) initiated the National Secondary Science and Mathematics Project (NSSMP). They worked hand in hand with the federal government of Nigeria. The basic aim of that project was to inculcate learning through the use of a wide variety of instructional materials. The outcome of this was the emergence of the new biology curriculum in 1985 published by the Federal Ministry of Education. In 1985 curriculum, many more topics in biology were introduced and the number of years to be spent in secondary school increased from five years to six years.

The biology curriculum has a spiral arrangement of content which include: Concept of living; Basic ecological concepts; Plant and animal nutrition; Variations and variability; Evolution and Genetics. Based on this spiral arrangement, the concepts to be taught are arranged in such a way that topics are repeated yearly, throughout the three years of the course; to cover the 62 units in the biology curriculum. Any repeated concept is discussed in greater complexity and depth as the course matures over the three-year period. The contents of the senior secondary school biology curriculum places emphasis on field studies, guided discovery, laboratory techniques and skills. The curriculum for teaching biology in senior secondary schools emphasized the relationship between living and non-living things; relevance of biology to agriculture; the structure and physiology of organisms; some basic ecological concepts; the use of natural resources; lands, plants and animals-their variations, populations and implications, adaptation; theories of evolution and application of the principle of heredity in agriculture and medicine.

Curriculum can be evaluated in a number of ways using the different evaluation models. However, in the present study, the Stufflebeam's (1971), Context, Input, Process and Product (CIPP) model of evaluation was used. The CIPP framework detects the presence of any defects or weaknesses in the context, input, process and product as these would be identified and remedial or adjustment measures would be provided. This model is chosen because it is comprehensive, purposeful and accepted and used by curriculum evaluators in different parts of the world. For example, such indicators as curriculum, teaching staff, rate of students' participation, implementation of programmes, teaching materials and organization of programmes are all part of Stufflebeam's model that are categorized into facilities in-put, process and products.

Context evaluation helps in the diagnosis of the programme and problems in relation to the determination of programme objective. The achievement of the objectives results into programmes improvements. Input evaluation provides information for determining how to utilized resources to achieved project designs. (Stufflebeam's, 1971). Process evaluation is needed to provide periodic feedback to persons responsible for implementing plans and procedures. It also provides information for interpreting project outcomes. Product evaluation has the purpose of measuring and interpreting the qualification of graduates at the end of a project cycle. It is

expected to provide a measure to see more of the number of candidates passing biology at credit level and going into science-oriented courses after their secondary school programme.

One of the major goals of science education in Nigeria is to produce scientists for national development. In spite of Nigerian government's desire to promote science education in the country, the quality of science students produced by the secondary schools seems to be deteriorating. Despite the importance of Biology as a science subject, it has been observed that students in Kogi State still perform poorly in this subject at national examinations. The WASSCE result analysis between 2021 – 2025 revealed that only 32.18%, 38.72%, 40.63%, 43.17%, and 45.98%, of the candidates who sat for the examination had credit pass and above in Biology (Kogi State Educational Recourse Center, Lokoja, 2025). From this data, it can be seen that from 2021 to 2025, the average percentage of candidates that passed Biology at the credit level and above was below 50% has shown in the table below. This could be attributed to challenges related to implementation of the national Biology Curriculum. Consequently, there is need to empirically evaluate the implementation of the National Curriculum for Secondary School Biology.

Objectives of the Study

The objectives of the study centered on the evaluation of Biology Curriculum implementation of secondary schools in Lokoja metropolis. Specifically, the study intends to:

1. evaluate the quality of Biology curriculum objectives of secondary schools in Lokoja metropolis;
2. determine the availability of resources necessary for the effective implementation of biology curriculum in Lokoja metropolis
3. determine the quality of teaching methodology in the implementation of biology curriculum in Lokoja metropolis.
4. determine the productivity of students taught using Biology curriculum in secondary school in Lokoja metropolis?

Research Questions

1. What is the quality of Biology curriculum objectives of secondary schools in Lokoja metropolis;
2. To what extent is the availability of resources necessary for the effective implementation of biology curriculum in Lokoja metropolis
3. What is the quality of teaching methodology in the implementation of biology curriculum in Lokoja metropolis.
4. What is the quality of students being taught with biology curriculum in secondary schools in Lokoja metropolis?

Results

Demographic Information

Table 1: Sample Distribution by Gender

Teachers	Frequency	Percent (%)
Male	173	50.0
Female	173	50.0

Total	346	1.0
--------------	-----	-----

Table 1 describes the sample distribution by gender in the study. There were 173 male biology students (50.0%) who participated in the study. On the other hand, there were 173 (50.0%) female biology students who actively participated, which gave a total of 346 (100%) biology students in the study. This equal gender distribution ensures balanced representation of both male and female perspectives regarding biology curriculum implementation in secondary schools in Lokoja Metropolis.

Answering Research Questions

Research Question One: What is the quality of Biology curriculum objectives of secondary schools in Lokoja metropolis? To answer the research question, mean and standard deviation were used as indicated in Table 2

Table 2: Mean and Standard Deviation of Quality of Biology Curriculum Objectives of Secondary Schools in Lokoja Metropolis

S/N	Items	Mean	Std. Deviation	Remark
1.	The current Biology curriculum addresses the specific environmental and health challenges of Nigeria (e.g., infectious diseases, agriculture, pollution).	4.23	0.62	Agreed
2.	The objectives of the curriculum are clear and well-defined.	4.26	0.73	Agreed
3.	The curriculum prepares students with relevant knowledge and skills for further studies in biological sciences.	4.17	0.59	Agreed
4.	The curriculum promotes scientific literacy and critical thinking skills necessary for 21ST Century.	4.23	0.73	Agreed
5.	The biology curriculum provides the required needs to push for the development of our community.	4.20	0.70	Agreed
Grand Mean		4.22	0.67	Agreed

Table 2 describes the mean and standard deviation of students' responses on quality of Biology curriculum objectives of secondary schools in Lokoja metropolis. Based on the criterion mean score of 3.00, it is evident that all the items have mean scores above 3.00, ranging from 4.17 to 4.26. From the responses, it appears that students agreed that the current Biology curriculum addresses the specific environmental and health challenges of Nigeria (mean = 4.23, SD=0.62), has clear and well-defined (mean = 4.26, SD=0.73), prepares students knowledge and skills in Biological sciences (mean = 4.17, SD=0.59), promotes scientific literacy and critical thinking skills (mean = 4.23, SD=0.73) and provides the required needs to push for the development of our community (mean = 4.20, SD=0.70). The Grand Mean Score was 4.22, with a Standard Deviation

of 0.67, simply revealed that that biology students agreed that the biology curriculum objectives are good enough in secondary schools in Lokoja Metropolis.

Research Question Two: To what extent is the availability of resources necessary for the effective implementation of biology curriculum in Secondary schools in Lokoja metropolis?

To answer the research question, mean and standard deviation were used to describe the adequacy and relevance of resources for teaching and learning biology as shown in Table 3:

Table 3: Mean and Standard deviation of Students' Response on the Availability of resources for Curriculum Implementation in Secondary Schools in Lokoja Metropolis

S/N	Items	Mean	Std. Deviation	Remark
1	The current Biology teachers are highly qualified to teach in my school	4.17	0.586	Agreed
2	There are enough number of Biology teachers teaching Biology subject in my school	4.26	0.70	Agreed
3	There are adequate teaching and learning materials in my school	4.20	0.702	Agreed
4	My school has enough and well-equipped classes, library, offices for effective academic activities	4.26	0.63	Agreed
5	There adequate ICT facilities in my school for effective teaching and learning activities	4.26	0.682	Agreed
6	There are well-equipped Biology laboratories in my school	4.23	0.617	Agreed
	Grand Mean	4.23	0.658	Agreed

Table 3 describes the mean and standard deviation of students' responses on quality of Biology curriculum objectives of secondary schools in Lokoja metropolis. From the table, using criterion mean score of 3.00, it shows that all the items have mean scores above 3.00, ranging from 4.17 to 4.26. From the responses, it indicates that students reported that the c current Biology teachers are highly qualified to teach (mean = 4.17, SD=0.59), There are enough number of Biology teachers (mean = 4.26, SD=0.70), There are adequate teaching and learning materials (mean = 4.20, SD=0.70), have well-equipped accommodation (mean = 4.26, SD=0.63), possess enough ICT facilities (mean = 4.26, SD=0.68) and there conducive Biology laboratories (mean = 4.26, SD=0.63).The Grand Mean Score was 4.23, with a Standard Deviation of 0.66, denotes that biology students agreed that resources necessary for the effective implementation of biology curriculum in Secondary schools in Lokoja metropolis are available.

Research Question Three: What is the quality of teaching methodology in the implementation of Biology curriculum in Lokoja Metropolis To answer the research question, mean and standard deviation were used to describe the effectiveness of teaching methods and techniques as shown in Table 4:

Table 4: Mean and Standard deviation of Students' Response on the Quality of Teaching Methodology for Curriculum Implementation in Secondary Schools in Lokoja Metropolis

S/N	Items	Mean	Std. Deviation	Remark
-----	-------	------	----------------	--------

1	Biology teaching methods are student-centered and encourage active participation (e.g., group discussions, projects, inquiries) in my school.	1.47	0.50	disagreed
2	Practical Biology classes are conducted regularly and effectively to reinforce theoretical concepts in my school.	1.53	0.54	disagreed
3	Teachers use continuous assessment (tests, quizzes, projects) effectively to monitor student progress in my school.	1.48	0.51	disagreed
4	The teaching process links biological concepts to real-life situations and examples in Nigeria	1.49	0.52	disagreed
5	There is adequate supervision and support from school administration for effective Biology teaching in my school.	1.54	0.51	disagreed
6	The scheme of work used in my school effectively covers the curriculum within the school term/year.	1.56	0.52	disagreed
Grand Mean		1.51	0.52	Disagreed

Table 4 reports the mean and standard deviation of teachers' responses on the effectiveness of teaching methods and evaluation techniques used in implementing the biology curriculum. Based on the criterion mean score of 3.00, it is clear that all the items have mean scores below 3.00, ranging from 1.47 to 1.56. From the results, it is clear that students disagreed that Biology teaching methods are student-centred (mean = 1.47, SD= .50), disagreed that practical Biology classes hold regularly (mean = 1.53, SD= .54), disagreed with teachers effective use of continuous assessments (mean = 1.48, SD= .51), disagreed with teaching process linking concepts to the real-life situations (mean = 1.49, SD= .52), disagreed with adequate supervision in schools (mean = 1.49, SD= .52), disagreed with adequate supervision (mean = 1.54, SD= .51) and effective use of scheme of work (mean = 1.56, SD= .52). The Grand Mean 1.51, with a Standard Deviation of 0.52, revealed that Biology students agree that the teaching methods are poorly applied in the biology curriculum implementation in secondary schools in Lokoja Metropolis

Research Question Four: What is the quality of students being taught with biology curriculum in secondary schools in Lokoja metropolis? To answer this question, mean and standard deviation were used to describe the level of quality and performance of students taught Biology as shown in Table 5:

Table 5: Mean and Standard Deviation of Quality and Performance of Students Taught with biology curriculum in secondary schools in Lokoja metropolis

S/N	Items	Mean	Std. Deviation	Remark
1	As a student, I demonstrate a strong understanding of basic and key biological concepts	2.07	0.74	Disagreed

2	I can apply biological knowledge to solve everyday problems.	1.9	0.64	Disagreed
3	As a student, I perform well in tests and internal examinations consistently in Biology	2.01	0.64	Disagreed
4	The curriculum has successfully stimulated my interest in pursuing careers in Biology-related fields (e.g., Medicine, Agriculture, Biotechnology) in my school.	2.02	0.70	Disagreed
5	I developed necessary practical skills (e.g., microscopy, dissection, scientific drawing) in my school.	1.91	0.60	Disagreed
6	Overall, the Biology curriculum has opened my eyes in to scientific world	1.73	0.65	Disagreed
	Grand Mean	1.94	0.66	Disagreed

Table 5 describes the mean and standard deviation of students' responses on the quality and performance of students taught with biology curriculum in secondary schools in Lokoja Metropolis. Based on the criterion mean score of 3.00, it is evident that all the items have mean scores less than 3.00, ranging from 1.73 to 2.02. By implication, the students self-reported that they disagreed with the facts that they demonstrate basic understanding of Biology concepts, apply biological knowledge to practical problems, stimulated for future career, perform better in tests and examinations have necessary practical skills and got exposed to scientific world. The Grand Mean Score was 1.94, with a Standard Deviation of 0.66, indicating that biology students generally disagreed that they demonstrate good performance in secondary schools in Lokoja metropolis.

Table 6: Mean and Standard Deviation of Students' Response on the Basic Challenges of Biology Curriculum Implementation in Secondary Schools in Minna Metropolis

S/N	Items	Mean	Std. Deviation	Remark
1	Teachers are not allowed active participation in curriculum development	2.42	0.50	Disagreed
2	There is infrastructural inadequacy for effective curriculum implementation.	3.99	0.11	Agreed
3	There is a poor motivational strategy for teacher to effectively implement biology curriculum.	2.00	0.05	Disagreed
4	There is poor implementation of practical contents of biology curriculum in the state.	4.00	0.05	Agreed
5	There is negative attitude among teachers towards curriculum.	4.99	0.16	Agreed
6	Biology curriculum is complex which hinders effective implementation.	2.00	0.10	Disagreed
7.	There is cultural bias in the current Biology curriculum.	2.01	0.12	Disagreed
	Grand Mean	3.06	0.14	Agreed

Table 6 describes the mean and standard deviation of Students' responses on the Basic Challenges of Biology Curriculum Implementation in secondary schools in Lokoja Metropolis. Based on the criterion mean score of 3.00, it is evident that half of the items have mean scores less than 3.00, while others have above the bench mark. The students agreed that there is infrastructural inadequacy (mean= 3.99, SD=0.11), poor implementation of practical contents (mean= 3.99, SD=0.11) and negative attitudes among teachers (mean= 4.99, SD=0.16). On the other hand, They disagreed with the fact that teachers are disallowed active participation in curriculum development (mean= 3.99, SD=0.11), disagreed with poor motivational strategies for teachers (mean= 2.00, SD=0.05), cultural bias of Biology curriculum (mean= 2.01, SD=0.12) and complexity of Biology curriculum (mean= 2.00, SD=0.10). The Grand Mean Score was 3.06, with a Standard Deviation of 0.14, indicating that biology students agreed that inactive participation, infrastructural inadequacy, poor implementation of practical contents, cultural bias of Biology curriculum, negative attitudes among teachers, complexity of Biology curriculum are the basic challenges of implementing Biology curriculum in secondary schools in Lokoja Metropolis.

Discussion of Results

The study appraised secondary school students perceived quality of Biology curriculum implementation practices in Lokoja Metropolis, Kogi State. From the findings of the study, Agboghroma and Oyovwi (2020), who found that the biology curriculum content was moderately relevant to students' everyday life experiences in Delta State, Nigeria, though with a lower mean of 3.12. The higher rating in the present study suggests that the biology curriculum as designed by NERDC (2018) effectively addresses contemporary scientific trends and students' needs in the Minna context. This is consistent with Nwosu and Ibe (2022), who discovered that the Nigerian senior secondary school biology curriculum only partially incorporated 21st-century skills, with weaker representation of creativity (mean = 2.84) and digital literacy (mean = 2.31). This indicates that while the curriculum content is generally relevant, there is a need for continuous review to strengthen provisions for innovation and creativity, as recommended by Agboghroma and Oyovwi (2020).

The findings of the study revealed that Biology students agreed that resources necessary for the effective implementation of Biology curriculum in Secondary schools in Lokoja metropolis are available and adequate. The students have positive perception regarding the adequacy and relevance of resources for teaching and learning biology in secondary schools in Lokoja Metropolis, this finding strongly corroborates previous research. Olaniran and Obadara (2020) found only 42% availability of required laboratory equipment in Ogun State schools, while Mohammed and Ismail (2021) reported that only 38% of required standard laboratory equipment was available in Niger State schools, with only 29% of biology laboratories adequately equipped for effective practical sessions.

The inadequacy of laboratory facilities is particularly concerning given that practical work is fundamental to effective biology education (Igbokwe and Eme, 2021; Ogunleye and Olajide, 2022). This situation forces teachers to rely on theoretical instruction rather than practical demonstrations, undermining the curriculum's objective to develop students' practical and investigative skills.

The findings revealed that Biology students agree that the teaching methods are poorly applied in the biology curriculum implementation in secondary schools in Lokoja Metropolis

The findings revealed that biology students agreed that the teaching methods and evaluation techniques used in implementing the biology curriculum are not effective and appropriate in

secondary schools in Lokoja metropolis, this negative finding suggests that despite resource availability, Biology teachers in Lokoja metropolis are not effectively utilizing innovative and appropriate teaching methods in the implementation of biology curriculum in the metropolis. There is element of poor technology integration in teaching despite the fact that ICT facilities are available. This is truly unwanted experience in terms of ensuring the best practice in curriculum implementation. This finding aligns with Olasehinde and Olatoye (2019), who found that lecture method was most frequently used (71.9%) in Kwara State, with teacher-centered approaches and student-centered approaches are relatively disregarded.

Conclusion

The researcher therefore made the following conclusions as follow:

1. That there are adequate resources necessary for Biology curriculum implementation in secondary schools in Lokoja Metropolis.
2. That students have low self-esteem in terms of their performance based on the poor teaching methods applied by the biology teachers.
3. Biology teachers do not appropriately adopt teaching methods and strategies for enhanced curriculum implementation in secondary schools in Lokoja metropolis.

Recommendations

Based on the findings of this study, the following recommendations are proposed:

1. Biology teachers should receive comprehensive and continuous professional development focused specifically on practical biology instruction, innovative pedagogy, technology integration, inquiry-based teaching methods, formative assessment techniques, and strategies for teaching higher-order thinking skills, with particular emphasis on maximizing learning outcomes despite resource constraints.
2. There should be strict monitoring of teaching activities in the schools as to ensure adherence to the stated objectives of teaching and learning of Biology among secondary schools in Lokoja, Kogi State.
3. Students should be counseled on their self-concept despite the challenges enumerated, so that once the challenges are addressed, fast learning can take place
4. Educational stakeholders should prioritize ICT infrastructure development in secondary schools by ensuring reliable internet connectivity through partnerships with telecommunications providers, providing computers and tablets for biology instruction, installing interactive whiteboards and multimedia projectors, and ensuring reliable electricity supply through alternative energy sources such as solar panels where necessary.

References

- Ali, A. A., & Ajibola, M. A. (2015). Curriculum development and implementation in Nigerian secondary schools: Issues and challenges. *Journal of Education and Practice*, 6(34), 81–86.
- Blenkin, G. M. (2018). Curriculum as a specification of educational practice. In G. M. Blenkin & A. V. Kelly (Eds.), *The language of education* (pp. 23–38). London: Sage Publications.
- Igbokwe, D. O., & Eme, O. E. (2021). The relevance of biology education to Nigeria's national development. *Journal of Educational Research and Policy*, 16(1), 77-86.

- Mohammed, A., & Ismail, H. (2021). Assessment of laboratory facilities for biology practical activities in public senior secondary schools in Niger State, Nigeria. *African Journal of Educational Studies in Science and Mathematics*, 17(1), 121-136.
- Nigerian Educational Research and Development Council. (2018). Implementation of senior secondary school curriculum in Nigeria. Abuja: NERDC.
- Ogunleye, A. O., & Fasakin, A. F. (2020). Science education and national development in Nigeria. *European Journal of Scientific Research*, 62(3), 409–420.
- Olaniran, S. O., & Obadara, O. E. (2020). Availability and utilization of instructional resources for effective teaching of biology in senior secondary schools in Ogun State, Nigeria. *Journal of Science Education and Technology*, 29(4), 542-557.
- Olasehinde, K. J., & Olatoye, R. A. (2019). Teaching methods and students' academic performance in biology: A case study of selected senior secondary schools in Kwara State. *Journal of Education and Practice*, 10(7), 134-144.
- Stufflebeam, D. L. (1971). The relevance of the CIPP evaluation model for educational accountability. *Journal of Research and Development in Education*, 5(1), 19–25.
- Theophilus S. C., JohnBosco, O. C. & Samuel, A. B. (2023). Challenges of teaching and learning basic Science in Junior Secondary Schools in Nigeria. *South Eastern Journal of research and Sustainability Development*, 13(1). [http://www. Sejrdr.org/ind](http://www.Sejrdr.org/ind).
- Uza, D. V. (2020). Science and technology as tools for national transformation. *African Journal of Science Education*, 3(2), 67–75. <https://www.africanjournalofscience.com>
- West African Examinations Council. (2021, 2022, 2023, 2024 & 2025). Chief examiners' report: Biology: WAEC Press