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ENHANCING QUALITY ASSURANCE IN BIOLOGY EDUCATION PROGRAMME : STRATEGIES FOR EFFECTIVE IMPLEMENTATION OF NATIONAL COMMISSION OF COLLEGES OF EDUCATION (NCCE) BENCHMARK IN COLLEGES OF EDUCATION

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Abstract

The work was conducted in order to ascertain the extent of implementation of safety practices in Biology students in Enugu State College of Education (Technical), Enugu. Four specific purposes and four corresponding research questions guided the study. Pertinent literature was reviewed. The design for the study was descriptive survey research design and the population for the study was one hundred and twenty (120) students and the entire students (120) were used as the sample for the study. The instrument was researcher structured questionnaire, validated by three experts: two Biology experts and a Measurement and Evaluation expert. Data was collected and analysis were done using descriptive statistics. The findings revealed that students implement the following safety measures to a low extent; personal related safety practices (x =1,88), handling chemical related safety measures (x = 2.38) and environmental related hygiene practice (x2.38). However, students implemented equipment related safety practices to a high extent (x=2.95). based on the findings, the researcher recommend that the students should be taught safety practices, the importance of implementing these safety practices not as compulsion but as a lifestyle. The heads of the institution should review the nature of her programs to include enough laboratory instructions so as to prepare the student teacher for the profession and also organize seminars on safety practice s and implementation of these practices for the teachers, laboratory technicians and students. Curriculum planners should introduce and make laboratory safety course/subject a compulsory course for all Biology students in tertiary institutions irrespective of their level. It was concluded that the safety of all biology laboratory users should be treated as a priority.

Keywords: Biology education, Implementation of safety practice

Introduction

Education is the next to a thaumaturgical life because it is an agent of transformation. Education gives all round development to students and society. Education is highly cherished by all nations of the world and it has transformed people from nothingness to greatness (Etor, Mbon & Ekanem, 2019). The quality of the educational system of a nation is to a large extent dependent on the relevance of the objectives and adequacy of the contents of the schools' curricular of the nation as well as the effective implementation of the schools' curricula at various levels of education system. The National Commission for Colleges of Education, NCCE, was established by an Act in 1989 as the third leg of the tripod of excellence in the supervision of tertiary education in Nigeria. Its mandate includes, inter alia, the laying down of Minimum Standards for all programmes of teacher education and accrediting their certificates and other academic awards. The intentions of assessment are to increase the quality and value of teaching, as well as to discover and measure the performance of students in science-oriented subject like biology Education.

Biology is one of the aspects of science education. It is one of the important science subjects instructed in both secondary schools and higher institutions in Nigeria. Nwagbo (2018) stated that as a science subject in school curriculum, Biology is designed to produce individuals some of whom may or may not take biological studies in their professional pursuits. It is however hoped that in whatever profession they finally find themselves, the Curriculum is the sum total of all planned and organized programmes offered to the learner under the auspices of the school for the all-round development of the learner in tertiary institutions and colleges of Education.

A college of education is a specialized institution or a department within a university that focuses on training educators, conducting educational research, influencing policy development, and fostering excellence in the education sector. Darling-Hammond & M.R. Bransford (2015) described a college of education as an academic establishment dedicated to preparing individuals for careers as educators, teachers, school administrators, or other professionals in the education

field. A College of Education is a tertiary institution that focuses on training individuals to become professional teachers through specialized programs in education, pedagogy, and related fields. These institutions aim to equip prospective educators with the knowledge and skills needed for effective teaching and learning across various educational levels Okeke, (2020). This calls for effective implementation of NCCE benchmark for biology Educaiton Programme.

Implementation refers to the process of putting a plan, policy, or design into action. It involves taking the necessary steps to execute a project or initiative, often requiring careful planning, coordination, and resources. Okekeokosisi, Anaekwe and Okeke (2016) described implementation as the open use of a programme throughout an entire school system. Obialor (2021) NCCE implementation refers to the process by which the planned or documented curriculum is put into action by the teacher particularly in the classroom setting. Offorma (2024) described NCCE implementation as all the activities and experiences of teaching and learning which is directed at realizing the objectives of the contents of curriculum in order to bring certain changes in the behaviour of the learners and assess the extent to which the changes take place. The minimum benchmark or standard for teacher educators in colleges of education define the minimum that educators should know and be able to do as well as their expected minimum dispositions towards their work, if they are to remain and progress in their career (Nigeria Certificate in Education Minimum Standard, 2022).

The objectives of NCE biology programme according to NCCE in Nigeria Certificate in Education (2022) are to produce teachers who will be able to: 1) view biology as a process of inquiry into the living world; 2) critically analyze the activities of living things in their environment; 3) demonstrate practical skills in handling scientific apparatus; 4) demonstrate excellence and professional competence in teaching biology; 5) include positive scientific attitudes and values in the society and promote positive disposition towards biological science and the scientific enterprise; 6) apply concepts and methods acquired in the course in the new areas of study and in everyday situations; 7) make a successful career in

biology teaching; 8) Successfully qualify to undertake a B.ED/ B.Sc (ED) Degree programmes

The extent to which these objectives are attained every year by the products of the colleges is in doubt. As noted by Olorukooba (2017) noted that many science teachers in secondary schools have inadequate training in science disciplines, biology inclusive. The author further contended that the training programme of the prospective teachers should be comprehensive and there should be fusion between the content knowledge and pedagogical knowledge. The author went further to explain that teachers who possess subject matters expertise and ability to present the subject matter to their students usually engage them in those activities that will facilitate their understanding of the curriculum content. In contrast, teachers with weak knowledge of subject matter rely heavily on the textbook as the primary source of subject matter content which invariably affects science learning. Therefore, one of the ways to build competence in science (biology) teachers is to educate them confidently by providing the requisite professional training.

However, many lecturers are unable to assess all the domains of learning in students, has led to many people doubting the genuineness of internal classes assessment marks. The perception teachers have on assessment go a long way to explain the quality of assessment in colleges of education Shepard and Obialor, (2021). Hence, this study examined the implementation of NCCE benchmark of Biology Programme in Colleges of Education in Ebonyi State.

The main purpose of this study is to identify the implementation of NCCE benchmark of Biology Science Education Programme in Colleges of Education in Ebonyi State.

Specifically, the study sought to:

1. examine the extent to which Colleges of Education in Ebonyi State comply with the NCCE benchmark for Biology Education Programme,
2. investigate the factors that hinder the effective implementation of the NCCE benchmark for Biology Education Programme in Colleges of Education in Ebonyi State

The following research questions guided the study:

1. To what extent do Colleges of Education in Ebonyi State comply with the NCCE benchmark for Biology Education Programme?
2. What are the factors that hinder the effective implementation of the NCCE benchmark for Biology Education Programme in Colleges of Education?

Hypotheses

Ho_1: There is no significant difference between the mean rating of academic staff and students on extent to which colleges of Education comply to NCCE Benchmark

Ho_2: There is no significant difference between the mean rating of academic staff and students on factors that hinders the effective implementation of NCCE benchmark for biology Education programme.

Method

The research design used for the study was the descriptive survey research design. According to Ali, (2019) descriptive survey research design is one in which a group of people or items are studied by collecting and analyzing data from only a few people or items considered to be representative of the entire group. This design was considered appropriate and suitable for this study, because it focused on, obtained information and analyzing data from a group of biology lecturers and students considered to be representative of the entire population. The study was conducted in Ebonyi State. Ebonyi State is located in the South Eastern part of Nigeria, and it was chosen because it is home to several tertiary institutions, including Colleges of Education, which play a crucial role in the state's educational system. Colleges of Education has continued to be responsible for training teachers and educators at various levels, from primary to secondary education. The population for the study comprised 3942 respondents. In all, there was a total of 862 academic staff and 3080 students among the two Colleges of Education in Ebonyi State. The sample size for the study consisted of 394 respondents, carefully selected to ensure representativeness and balance. This sample included 86 academic staff and 308 students, drawn from various Colleges of Education. The instrument for data collection was a structured questionnaire developed by the researcher titled "Implementation of NCCE benchmark of

Biology Science Education Programme in Colleges of Education Questionnaire (INCCEBSEPCEQ)". The instrument was validated by three research experts. Two of the experts were from the Department of Science Education and one from the Department of Mathematics and Computer Science Education, all from Faculty of Education, Enugu State University of Science and Technology (ESUT), Enugu.

Cronbach alpha statistics was used to measure its internal consistency. The reliability index of the instrument was .85. The index showed that the instrument is reliable for data collection. The researchers, to be supported by a team of two research assistants trained, oversaw the distribution of the questionnaire to the respondents, comprising academic staff and students. The research questions were answered using mean and standard deviations. The null hypotheses were tested using the t-test statistic, with an alpha level set at 0.05. Therefore, to calculate the mean, each response option was assigned a numerical value based on real limit of numbers as follows: Very High Extent (VHE) = 3.50-4.00, High Extent (HE) = 2.50-3.49, Low Extent (LE) = 1.50-2.49, and Very Low Extent (VLE) = 0.00-1.49.

Results

Research Question 1: To what extent do Colleges of Education in Ebonyi State comply with the NCCE benchmark for Biology Education Programme?

Table 1: Mean scores with standard deviation of academic staff and students on extent do Colleges of Education in Ebonyi State comply with the NCCE benchmark for Biology Science Education Programme

	ITEMS	Academic Staff 86		Student 308		Overall 394		
S/N	**extent Colleges of Education in Ebonyi State comply with the NCCE benchmark for Biology Science Education Programme:**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Dec**
1	colleges of Education in Ebonyi State follow NCCE benchmark in Biology practical	2.97	.83	3.04	.83	3.02	.83	HE
2	NCCE benchmarks are only observed during accreditation	3.01	.79	2.99	.82	2.99	.81	HE
3	colleges of education adhere to NCCE benchmark in Biology	3.02	.81	3.02	.80	3.02	.80	HE
4	colleges of education in Ebonyi State do not fully engage in complying with the benchmark in Biology.	2.95	.80	3.02	.83	3.00	.82	HE
5	colleges of education manage to adhere to simple NCCE benchmark	2.97	.83	3.04	.83	3.02	.83	HE
	Cluster Mean/SD	**2.77**	**.83**	**2.78**	**.83**	**2.78**	**.83**	**HE**

Table 1 show that both academic staff ($\bar{x}$ = 2.77, SD = 0.83) and students ($\bar{x}$ = 2.78, SD = 0.83) agreed to a high extent that Colleges of Education in Ebonyi State comply with the NCCE benchmark for Biology Education Programme, colleges of Education in Ebonyi State follow NCCE benchmark in Biology practical, NCCE benchmarks are only observed during accreditation, colleges of education adhere to NCCE benchmark in Biology. The overall mean score of 2.78 with a standard deviation of 0.83 confirms this general agreement. Almost all the colleges of Education in Ebonyi State follow NCCE benchmark in Biology practical only ($\bar{x}$ = 3.02, SD = 0.80), promote NCCE benchmarks

are only observed during accreditation, skills 80 percent of colleges of education adheres to NCCE benchmark in Biology ($\bar{x}$ = 2.99, SD = 0.81), and few colleges of education in Ebonyi State do not fully engage in complying with the benchmark in Biology. Overall, the findings suggest that a wide range of Colleges of Education in Ebonyi State comply with the NCCE benchmark for Biology Education Programme, the standard deviations of the respondents show that they are homogenous in their responses.

HO_1: There is no significant difference between the mean rating of academic staff and students on extent to which colleges of Education comply to NCCE Benchmark.

Table 2: Mean, SD and t-test analysis of the ratings of academic staff and students on extent to which colleges of Education comply to NCCE Benchmark in Ebonyi State

Groups	N	Mean	SD	df	t-value	Sig. (2tailed)	Decision
Lecturers	86	17.26	2.15	392	1.758	.080	NS
Students	308	16.76	2.36				

Table 2 shows that there is no significant difference in the mean scores of academic staff and students on extent to which colleges of Education comply to NCCE Benchmark in Ebonyi State. With academic staff (M = 17.26, SD = 2.15 and students with (M = 16.76, SD = 2.36), t (392) = 1.758, P = .080 (P > 0.05). Therefore, the null hypothesis was not rejected. Thus, there is no significant difference between the mean scores of academic staff and students on extent to which colleges of Education comply to NCCE Benchmark in Ebonyi State.

Research Question 2: What are the and obstacles that hinder the effective implementation of the NCCE benchmark for Biology Education Programme in Colleges of Education?

Table 3: Challenges and obstacles that hinder the effective implementation of the NCCE benchmark for Biology Science Education Programme in Colleges of Education

S/N	ITEMS The following are the factors that hinder the effective implementation of the NCCE benchmark for Biology Science Education Programme in Colleges of Education	Academic Staff 86 Mean	SD	Student 308 Mean	SD	Overall 280 Mean	SD	Dec
6	Insufficient laboratory space, equipment, and materials can hinder practical sessions and hands-on learning experiences.	2.97	.83	3.05	.83	3.03	.83	HE
7	A shortage of qualified lecturers with relevant degrees and teaching qualifications can impact the quality of instruction and mentorship.	2.96	.84	2.96	.82	2.96	.82	HE
8	Inadequate funding can limit the availability of resources, including textbooks, equipment, and technology, necessary for effective program implementation.	2.45	.83	2.41	.81	2.42	.81	LE
9	Failure to update curriculum and teaching methods to align with current trends and best practices in Biology Science Education can hinder program effectiveness.	2.95	.81	3.02	.81	3.00	.81	HE
10	Insufficient or ineffective assessment and evaluation tools can make it challenging to measure student learning outcomes and program effectiveness.	3.07	.82	2.97	.80	3.00	.81	HE
	Cluster Mean/SD	**2.97**	**.82**	**2.97**	**.82**	**2.97**	**.82**	**HE**

Table 3 shows that academic staff (mean = 2.97, SD = 0.82) and students (mean = 2.97, SD = 0.82) agree to a high extent that challenges and obstacles that hinder the effective implementation of the NCCE benchmark for Biology Science Education Programme in Colleges of Education. The overall cluster mean of 2.97 with a standard deviation of 0.82 confirms a high extent (HE) of influence. Specifically, 4 out of the 5 items assessed were rated "High Extent" (HE), while only one item on inadequate funding (mean = 2.42, SD = 0.81) was rated "Low Extent" (LE). These findings suggest that failure to update curriculum and teaching methods to align with current trends and best practices in Biology Science Education can hinder program effectiveness. The standard deviations indicate that the respondents had similar or consistent views in their responses.

HO_2: There is no significant difference between the mean rating of academic staff and students on factors that hinders the effective implementation of NCCE benchmark for biology Education programme.

Table 4: Mean, SD and t-test analysis of the ratings of academic staff and students on factors that hinders the effective implementation of NCCE benchmark for biology Education programme in Ebonyi State

Groups	N	Mean	SD	df	t-value	Sig. (2tailed)	Decision
Lecturers	86	18.16	2.11	392	1.235	.218	NS
Students	308	17.77	2.76				

Table 4 shows that there is no significant difference in the mean scores of academic staff and students on factors that hinders the effective implementation of NCCE benchmark for biology Education programme in Ebonyi State. With academic staff (M = 18.16, SD = 2.11 and students with (M = 17.77, SD = 2.76), t (392) = 1.235, P = .218 (P > 0.05). Therefore, the null hypothesis was not rejected. Thus, there is no significant difference between the mean scores of

academic staff and students on factors that hinders the effective implementation of NCCE benchmark for biology Education programme in Ebonyi State.

Discussion

The result in table I revealed that Almost all the colleges of Education in Ebonyi State follow NCCE benchmark in Biology practical only, NCCE benchmarks are only observed during accreditation, 80 percent of colleges of education adheres to NCCE benchmark in Biology Few colleges of education in Ebonyi State do not fully engage in complying with the benchmark in Biology and that few colleges of education manage to adhere to simple NCCE benchmark. This is in link with the study of Offorma (2024) who described NCCE implementation as all the activities and experiences of teaching and learning which is directed at realizing the objectives of the contents of curriculum in order to bring certain changes in the behaviour of the learners and assess the extent to which the changes take place.

Results in table 2 clearly show that insufficient laboratory space, equipment, and materials can hinder practical sessions and hands-on learning experiences, a shortage of qualified lecturers with relevant degrees and teaching qualifications can impact the quality of instruction and mentorship, failure to update curriculum and teaching methods to align with current trends and best practices in Biology Science Education can hinder program effectiveness and Insufficient or ineffective assessment and evaluation tools can make it challenging to measure student learning outcomes and program effectiveness. Are challenges and obstacles that hinder the effective implementation of the NCCE benchmark for Biology Science Education Programme in Colleges of Education in Ebonyi State. The finding also concurs to the findings of Olorukooba (2017) who opined that many science teachers in secondary schools have inadequate training in science disciplines, biology inclusive. The author further contended that the training programme of the prospective teachers should be comprehensive and there should be fusion between the content knowledge and pedagogical knowledge.

Conclusions

The objectives of NCCE in colleges of Education Biology Science Education is to produce teachers who will be

able to: 1) view biology as a process of inquiry into the living world; 2) critically analyze the activities of living things in their environment; 3) demonstrate practical skills in handling scientific apparatus; 4) demonstrate excellence and professional competence in teaching biology; 5) include positive scientific attitudes and values in the society and promote positive disposition towards biological science and the scientific enterprise. Biology lecturers in Colleges of Education generally comply with the NCCE's recommended course content for NCE Biology curriculum by using use various evaluation techniques, including tests, class work, homework, assignments, projects, and examinations, but there's a need for standardization. In some cases, some colleges may struggle with providing adequate facilities and equipment and maintaining of qualified staff for effective program implementation; recent reforms allow Colleges of Education to offer degree programs independently, enhancing their capacity to train teachers.

Recommendations

The following were the recommendations for the study

1. Lecturers and students in Colleges of Education in Ebonyi State should be encouraged to comply with the NCCE benchmark for Biology Science Education Programme.
2. Government should help in recruiting lecturers to avoid the challenges and obstacles that hinder the effective implementation of the NCCE benchmark for Biology Science Education Programme in Colleges of Education in Ebonyi State

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