Assessing the Extent of NCE Mathematics Education New Minimum Standard Implementation in Colleges of Education in Niger State, Nigeria

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Abstract

The study seeks to assess the extent to which NCE Mathematics new minimum standard is been implemented in colleges of education in Niger state, Nigeria. Two objectives with corresponding research questions guided the study. The study adopts mixed-methods research design. The population of study encompasses 126 lecturers in Colleges of Education in Niger State. Using a purposive sampling technique, a total of 17 lecturers were selected from the mathematics departments of the two colleges: 9 from the College of Education, Minna, and 8 from the Federal College of Education, Kontagora. To gather data, two instruments were utilized: the NCE Mathematics Programme Implementation Questionnaire (NCEMPIQ) and an interview protocol to capture the perspectives of lecturers regarding the extent of Minimum Standard implementation. Experts validated the questionnaire, and to establish reliability with Cronbach's alpha, data was organized for analysis using SPSS statistical software its internal consistency was evaluated yielding a reliability coefficient of 0.79. Mean and standard deviation were employed for data analysis, with a criterion mean of 2.5 serving as the basis for assessment. The findings revealed that the new minimum standards for NCE mathematics education in Colleges of Education in Niger State is found to be successfully implemented. Hence, it was recommended among others that National commission for Colleges of Education should establish a monitoring and evaluation framework to track the progress of curriculum implementation and address challenges promptly.

Keywords: College of Education, Minimum Standard, NCE Mathematics Implementation

Introduction

Nigeria, with its diverse population and rapidly growing economy, recognizes the pivotal role that mathematics education plays in preparing a skilled workforce, fostering technological innovation, and addressing socioeconomic disparities (Aliyu, 2023; Chineta, 2023). To this end, the Nigerian government has embarked on a series of educational reforms aimed at improving the quality of education, with specific emphasis on mathematics education.

The National Certificate in Education (NCE) programme is central to these efforts, as it is responsible for training the majority of teachers who will go on to educate future generations. The introduction of new minimum standards for NCE programs by the NCCE represents a significant

step forward in this endeavor (Magaji, & Nayaya, 2022; Bulama, 2014). These standards emphasize curriculum reforms, innovative teaching methodologies, and effective assessment strategies, all designed to enhance the preparation of mathematics educators.

Despite these well-intentioned reforms, Alumode and Onuma (2016) stress that there is a pressing need to assess the extent to which these new minimum standards have been effectively implemented in Colleges of Education. This assessment is vital for several reasons among which are: Quality Improvement, Alignment with Global Trends, Economic Competitiveness, Addressing Teacher Shortages and Enhancing Equity (De Wit & Altbach, 2021).

Literature on the implementation status of the New Minimum Standard (NMS) in NCE Mathematics Education within Colleges of Education in Niger State, Nigeria, offers diverse views and findings. To augment the ongoing study, a review of related works conducted across various regions was carried out. Studies within Nigeria have primarily focused on assessing the challenges and advancements in implementing NMS in NCE Mathematics Education. These studies often scrutinize aspects such as curriculum alignment, teacher readiness, and the availability of resources. For instance, Awofala (2012) specifically investigated the analysis of the new 9- year basic education mathematics curriculum in Nigeria. It describes and reflect on the changes in the new 9-year basic education mathematics curriculum in Nigeria i.e basic education level in Nigeria, the motivations for the revision of the focus here is on the development of the primary and junior secondary education mathematics curricula, the formulation process of the revised 9-year basic education mathematics curriculum, and the differences between the previous mathematics curricula and the updated version.

Additionally, Jacob and Samuel (2020) delved into the impediments faced during the effective implementation of NMS in the State's Colleges of Education, highlighting concerns related to infrastructure limitations, teacher training, and the necessity for tailored strategies. Comparative perspectives from countries renowned for strong educational systems outside Nigeria also contribute to the literature. For example, Adli, (2023) initiated study in Switzerland, Finland, Singapore, and South Korea similar. The findings showed that the policies implemented in the selected countries are different from each other in four cases. It is suggested that the policies in Iran be rewritten based on the policies of Singapore and South Korea. All this studies underscored

disparities and proposed potential improvement strategies derived from successful global practices.

Furthermore, Ogochukwu and Gbendu (2015) conducted a study aiming to assess the implementation of minimum standards for basic education, crucial for realizing the second millennium development goal. Utilizing a descriptive research design, the study encompassed a population of 1,566 teachers from both public and private primary schools across 102 institutions. The findings revealed that insufficient resources, encompassing qualified manpower and facilities/equipment, contributed to the suboptimal implementation of minimum standards for basic education, hampering the success of Universal Basic Education programs in achieving their objectives.

In a related development Samuel and Okodoko (2012) in his study seeks to evaluate the implementation of the NCE Primary Education Programme in Nigerian Colleges of Education. The sample included 83 lecturers from four institutions in the area. Results indicated a significant relationship between structural facilities, teachers' qualifications, and the text used in implementing the NCE Primary Education program. In the North Central region, Abdulrahman, Gimba, Hassan, and Jiya (2019) conducted research specifically focused on assessing the implementation of the curriculum content of mathematics education. The findings revealed that Mathematics lecturers acknowledged the adequacy of the curriculum content in achieving the program's philosophy and objectives. Respondents were in agreement regarding their knowledge and attitude toward the implementation of the mathematics program.

In the context of the difficulties surrounding the execution of educational policies in Nigeria, Jacob and Samuel's (2020) research concentrated on "Educational Policy in Nigeria: Implementation Challenges and Remedial Measures." The study utilized secondary data to compile information, revealing key obstacles to effective policy implementation. The identified challenges encompass inadequate funding, insufficient infrastructural facilities, a shortage of qualified teachers, institutional corruption, a lack of political commitment, security concerns, discontinuity in policy implementation commitment, political instability, suboptimal policy formulation, and poor communication between policy designers and implementers. These studies typically conclude with policy recommendations and actionable measures. For example, a comprehensive synthesis study by the Nigerian Ministry of Education (2020) proposed extensive

reforms in teacher training, curriculum development, and resource allocation based on insights derived from various assessments conducted at both national and international levels.

In sum, the reviewed literature, comprising studies conducted within Niger State, across Nigeria, and internationally, offers a comprehensive understanding of the challenges and progressions in implementing NCE Mathematics Education New Minimum Standards in Colleges of Education. These findings collectively emphasize the necessity for targeted interventions, policy overhauls, and ongoing evaluations to bolster mathematics education, align it with global benchmarks, and effectively tackle local hurdles. Thus, the minimum standards hold great promise for advancing mathematics education in Nigeria, questions remain regarding the extent to which they have been effectively implemented at the grassroots level, particularly in Colleges of Education in Niger State. The successful implementation of educational reforms requires careful planning, allocation of resources, faculty development, and a supportive institutional culture (Badran & Toprak 2020; Li & Li 2023; Hadjeris 2021; Shibankova, Ignatieva, Belokon, Kargapoltsev, Ganaeva, Beroeva & Kozlova 2019). Therefore, it is essential to critically examine the challenges, successes, and barriers encountered during the implementation of these standards, as well as their impact on mathematics teacher education in the state.

Hence, this research aims to address these critical issues by assessing the extent of the implementation of the NCE mathematics education new minimum standards in Colleges of Education in Niger State, Nigeria. Through rigorous examination, it seeks to identify both successful practices and areas that require improvement, ultimately contributing to the ongoing efforts to enhance mathematics education in the state and the nation as a whole.

Purpose of the study

The main objective of this study is to assess the extent of NCE Mathematics Education New Minimum Standard Implementation in Colleges of Education in Niger State, Nigeria. In particular, the stated objectives are to:

i. assess the extent of the implementation of the National Certificate in Education (NCE) mathematics education new minimum standards in Colleges of Education in Niger State, Nigeria.

ii. identify perspectives of lecturers regarding the extent the implementation of the new minimum standards for NCE mathematics education in Colleges of Education in Niger State.

Research Questions:

i. To what extent have the National Certificate in Education (NCE) mathematics education new minimum standards been implemented in Colleges of Education in Niger State, Nigeria?
ii. What are the perspectives of lecturers regarding the extent the implementation of the new minimum standards for NCE mathematics education in Colleges of Education in Niger State.

Methodology

This study utilizes a mixed-methods research design, incorporating both quantitative and qualitative research approaches. Harrison, Reilly, and Creswell (2020) and Dawadi, Shrestha, and Giri (2021) have endorsed the mixed-methods approach for its capacity to offer a comprehensive assessment of research studies. The study encompasses a population of 126 lecturers in Colleges of Education in Niger State. Using a purposive sampling technique, a total of 17 lecturers were selected from the mathematics departments of two colleges: 9 from the College of Education, Minna, and 8 from the Federal College of Education, Kontagora.

To gather data, two instruments were utilized: the NCE Mathematics Programme Implementation Questionnaire (NCEMPIQ) in a structured format and an interview protocol to capture the perspectives of lecturers regarding the extent of Minimum Standard implementation. Experts validated the questionnaire, and its internal consistency was evaluated using Cronbach Alpha, yielding a reliability coefficient of 0.79, to establish the reliability data was organized for analysis using SPSS statistical. Mean and standard deviation were employed for data analysis, with a criterion mean of 2.5 serving as the basis for assessment. For the interview protocol, data collected during interviews were meticulously recorded, transcribed manually, and then organized and coded to identify emerging themes and equally found to be reliable by the expert. The following methodological steps were followed:

Step 1: The recorded data were transcribed and coded by highlighting and extracting pattern themes to create an initial group of similarities. This process aimed to identify recurring responses and common items within each group of questions (pattern themes/similarities). The objective was to break down the data and

categorize them into subsequent groups to facilitate comparisons between responses (pattern themes/similarities) (Drake, Pytlarz & Patel, 2018).

Step 2: In this stage, the initially extracted pattern themes in the first category were refined to describe the participants' concepts and beliefs more precisely. This involved creating a verified or theoretically-based classification, which is more accurate in describing the data and brings it closer to the final stage of thematic classification. This step aimed to streamline the first group, making it smaller and more precise, as part of a theoretical or thematic strategy for concept refinement.

Step 3: This phase represents the researcher's synthesis of extracted subthemes and pattern themes, making it a more theoretical stage in the formation of themes that represent stages 1 and 2 of qualitative data analysis.

Results

In this section, Table 1 is presented with its interpretations tailored towards providing answers to the research questions one raised.

Research Question 1: To what extent have the National Certificate in Education (NCE) mathematics education new minimum standards been implemented in Colleges of Education in Niger State, Nigeria?

Table 1: Mean and Standard deviations of respondents on the extent of the implementation of the National Certificate in Education (NCE) mathematics education new minimum standards

S/N		N	Mean	SD	Decision
1	I'm aware of the new minimum standard for NCE mathematics education in Nigeria.	17	2.82	1.13	Agreed
2	I adopt the new minimum standard.	17	2.59	1.06	Agreed
3	I became uncomfortable using the new NCE minimum standard.	17	2.18	1.01	Disagree
4	All aspects of the new minimum standard were effectively implemented	17	3.06	0.89	Agreed
5	I face challenges which hindered the successful implementation of the new minimum standard	17	2.12	0.99	Agreed
6	I integrated the new minimum standard into my mathematics teaching practices?	17	2.88	0.99	Agreed
7	I noticed many changes in student performance or engagement since the implementation of the new minimum standard	17	2.88	1.05	Disagree
8	I received many professional development related to the new minimum standard	17	1.82	0.95	Disagree
	Grand mean		**2.54**		

Decision mean 2.50

The result obtained show that items 1 - 8 had mean ratings of 2.82, 2.59, 2.18, 3.06, 2.12, 2.88, 2.88 and 1.82 with standard deviations of 1.13, 1.06, 1.01, 0.89, 0.99, 0.99, 1.05 and 0.95 respectively. The table reveals further that, the grand mean score of responses to the 8 items is 2.54 which was greater than the decision mean score of 2.50 This implies that National Certificate in Education (NCE) mathematics education new minimum standards in Colleges of Education in Niger State, Nigeria were successfully implemented.

Research Question 2: What are the perspectives of lecturers regarding the extent the implementation of the new minimum standards for NCE mathematics education in Colleges of Education in Niger State?

Table 2: Qualitative Data Categories, Sub-categories and Themes

S/N	Categories	Sub-Categories	Themes
1.	various innovative teaching methodologies adopted by educator	Implementation of project-based learning techniques	Pedagogical Innovations
		Integration of technology to enhance math instruction	
		Emphasis on student-centered learning approaches	
2.	the role of policy and governance structures in implementation	Perspectives on the effectiveness of policy support	Policy and Governance
		Role of educational authorities in facilitating successful implementation	
	.	Areas requiring further policy attention or support	
3.	The importance of ongoing professional development for educators	Participation in workshops and seminars for skill enhancement	Teacher Professional Development
		Training sessions aimed at aligning teaching methods with new standards	

S/N	Categories	Sub-Categories	Themes
4.	obstacles encountered during the implementation process	Infrastructure-related challenges affecting the implementation of new standards	Challenges Faced
		Issues pertaining to teacher readiness and administrative support	
		Strategies implemented to address and overcome these challenges	

Table 2 shows the qualitative data categories, sub-categories and themes. The entire responses of lecturers on the perspectives of lecturers regarding the extent the implementation of the new minimum standards for NCE mathematics education in Colleges of Education in Niger State. Three strengths, and a weaknesses identified. The strengths identified are: Pedagogical innovation, new government policy and Teacher professional development. Contrary to this, Infrastructure-related challenges affecting the implementation of new standards, Issues pertaining to teacher readiness and administrative support were the challenges identified.

Discussion of Findings

The study's findings indicate that the implementation of the new minimum standards for National Certificate in Education (NCE) mathematics education in Colleges of Education in Niger State, Nigeria was successful. This aligns with previous research conducted Abdulrahman, Gimba, Hassan, and Jiya (2019) who conducted research specifically focusing on assessing the implementation of the curriculum content of mathematics education. The findings revealed that Mathematics lecturers acknowledged the adequacy of the curriculum content in achieving the program's philosophy and objectives. Respondents were in agreement regarding their knowledge and attitude toward the implementation of the mathematics program. Similarly, the finding is in consonant with the finding of Samuel and Okodoko (2012) that seeks to evaluate the implementation of the NCE Primary Education Programme in Nigerian Colleges of Education. The sample included 83 lecturers from four institutions in the area. Results indicated a significant

relationship between structural facilities, teachers' qualifications, and the text used in implementing the NCE Primary Education program. The result is also in agreement with the finding of Muhammed, Garbs, and Mutapha (2018), which showed significant coverage of the NCE Hausa curriculum. Likewise, Ibrahim (2017) discovered that the biology core curriculum for senior secondary education in Nigeria was adequately covered by biology teachers. It is possible that the mandate outlined in the National Policy on Education blueprint (NPE, 2004) influenced the biology lecturers' adherence to the recommended course content specified in the minimum standards for implementing the NCE biology curriculum.

The finding however contradicts the result of Ogochukwu and Gbendu (2015) who conducted a study aiming to assess the implementation of minimum standards for basic education, crucial for realizing the second millennium development goal. Utilizing a descriptive research design, the study encompassed a population of 1,566 teachers from both public and private primary schools across 102 institutions. The findings revealed that insufficient resources, encompassing qualified manpower and facilities/equipment, contributed to the suboptimal implementation of minimum standards for basic education, hampering the success of Universal Basic Education programs in achieving their objectives.

Furthermore, the research about lecturers' perspectives uncovered three strengths along with a weakness. The strengths highlighted were the utilization of project-based learning methods, the incorporation of technology to improve math education, and the focus on student-centered learning strategies. The study also shed light on perspectives regarding the effectiveness of policy support and the role of educational authorities in ensuring successful implementation. Moreover, it identified areas requiring additional policy attention and support, such as participation in skill-enhancement workshops, seminars, and training sessions aimed at aligning teaching methods with new standards. Conversely, challenges related to infrastructure affecting the adoption of new standards, issues regarding teacher preparedness and administrative backing were identified. The study also pinpointed strategies that were implemented to tackle and surpass these challenges.

The results of the study correspond to that of Jacob and Samuel's (2020) whose research centred on Educational Policy in Nigeria: Implementation Challenges and Remedial Measures. The study utilized secondary data to compile information, revealing key obstacles to effective policy implementation. The identified challenges encompass inadequate funding, insufficient

infrastructural facilities, a shortage of qualified teachers, institutional corruption, a lack of political commitment, security concerns, discontinuity in policy implementation commitment, political instability, suboptimal policy formulation, and poor communication between policy designers and implementers. The findings of the study are also in line with that of Jacob and Samuel (2020) who reported that teachers had performed better in the implementation of NCE programme if necessary, recommendation from previous studies are adequately addressed.

Conclusion

Researcher concludes that new minimum standards for NCE mathematics education in Colleges of Education in Niger State is found to be successfully implemented. While obstacles exist, there are also promising practices that demonstrate the potential for successful curriculum alignment. By addressing the identified challenges and adopting the recommended strategies, Colleges of Education can effectively equip students with the mathematical knowledge and skills needed for their future endeavours. This will contribute to the overall advancement of mathematics education in Niger State and Nigeria as a whole.

Recommendations

The following recommendations were made:

1. The National Commission for Colleges of Education should include evaluation techniques on the minimum standard for NCE Mathematics curriculum so as to provide uniform standard on which the student-teachers academic performance will be assessed.
2. National Commission for Colleges of Education should regularly organize seminars and workshops for the Mathematics lecturers on the need to use all the evaluation technique without exceptions as they are all vital instrument in teaching and learning process as well as essential for effective implementation of the curriculum planned.
3. Foster partnerships between Colleges of Education, government bodies, and industry experts to provide relevant resources and support.
4. Establish a monitoring and evaluation framework to track the progress of curriculum implementation and address challenges promptly.
5. Create platforms for continuous feedback from students, instructors, and administrators to ensure ongoing improvement.

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