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ASSESSMENT OF PRE-SERVICE MATHEMATICS TEACHERS AND LECTURERS' NEEDS IN THE IMPLEMENTATION OF MATHEMATICS EDUCATION PROGRAMME IN SOUTHWEST, NIGERIA

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Abstract

Mathematics is a major subject at the secondary school level that have implication for daily routine of every human being. It importance to individual and society cannot be over emphasised. However, students' poor performance in the subject which has been blamed on the teachers suggest that all is not well the teacher training that produces Mathematics teachers. Thus, the study assessed pre-service mathematics teachers and lecturers' needs in the implementation of Mathematics education programme in Nigeria**.** The study adopted a qualitative survey research design. Purposive sampling technique was adopted to select twelve (12) pre-service teachers (100 level), twelve (12) Mathematics lecturers and twelve (12) Mathematics education lecturers for interview purposes. Qualitative data for the study were obtained through interviews. Lecturers' Needs Interview Guide (LNIG) is semi-structured interview guide designed by the researcher to elicit the needs and concerns of facilitators of Mathematics education programmes. The guide contains instrument contains eight (8) open-ended questions. Data was analysed using Thematic Analysis. Result shows that the lecturers' needs and expectations are good facilities and equipment, quality graduates, good remuneration and curriculum review, but majority revealed that it has not been met due to several challenges. Also, pre-service teachers' needs are good grades, conducive learning environment and quality learning, which have not been met due to several challenges. Drawing from the findings the expectations of the lecturers and students were not met due to several challenges. It is recommended that Government should release funds to the university system to revitalise the university system which would help in the procurement of instructional material, equipment, construction of more good facilities.

Introduction

Mathematical knowledge cannot be overemphasized not only because it helps individuals to think critically and creatively but also because mathematics knowledge helps in taking decisions that require precision (Otun and Olaoye, 2019). However, to implement Mathematics education in Nigeria, the teacher who is the implementer of the curriculum through classroom instruction is an important factor for consideration. Sardauna and Yusuf (2016) viewed teachers' activities teaching as an activity consisting of a body of actions intended to induce learning through the conscious and deliberate efforts of a matured and experienced person to impart knowledge, information, attitudes, skills, beliefs to an immature and inexperienced individual. It was posited by Ntuli *et al.*, (2018) for teacher education programme to achieve it's set objectives, there is need to emphasize on the global objectives of education and contents that infuse 21st century skills and pedagogical knowledge which will facilitate change in attitude, knowledge and skills. Despite the values of Mathematics , it is disliked by many students despite the fact that it is the bedrock of science and social science subjects and adequate knowledge in it boosts reasoning faculty of students (Brown, Brown & Bibby, 2008) and its consequence dislike by students leads to poor performance in the subject (Sardauna & Yusuf, 2016).

Teacher education comprised two main components: in-service teacher education and pre-service teacher education (Allen, 2011). In-service teacher education refers to programs or learning opportunities designed for practicing teachers, whereas pre-service teacher education aims to provide prospective teachers with the pedagogical skills and knowledge required for effective content delivery in their respective areas of specialization (Bamidele and Akanmu,2023). However, concerns have been raised regarding the quality of teachers, both in terms of completing their teacher education courses and in relation to pre-service teachers in general. Additionally, teacher education has faced criticism for its failure to adequately prepare graduates with the requisite knowledge and skills to effectively teach mathematics and bring about educational reform in the classroom (Allen, 2011)

According to the WASSCE (May/June edition) Chief Examiner's report for Mathematics examination (on school-based Candidates) from 2016 to 2019, the yearly consistent weaknesses highlighted are: Inadequate knowledge of drawing graphs and reading from it, Non adherence to rubrics, Inability to differentiate between frequency and cumulative frequency, Failure to express

answers to the required degree of accuracy, Inability to identify the principles or concepts to be used in solving a problem, and Poor interpretation of questions and inability to apply mathematical principles correctly. Furthermore, the suggested solution include that teachers should endeavour to pay more attention to topics that requires drawing of graphs such as trigonometry graph and cumulative frequency graphs; Teachers should lay emphasis on writing final answers in the required units while teaching; Teachers and candidates are encouraged to cover the teaching curriculum while preparing for examination so as to enhance performance; Teachers should rise up to their responsibility and make learning interactive. Therefore, these identified candidates' weaknesses and the proposed solutions reflects the poor quality of the teaching of secondary school Mathematics. The problem of poor teaching of Mathematics leading to consistent students poor performance in the subject may have link with teachers training process (teacher education). Okori and Jerry (2017); Yew and Razak (2020) argued that teacher education institutions in the country might not be able to train and produce adequate and qualified Mathematics teachers who would assist government in providing quality education at secondary school level. This was as a result of the shortcoming attached to implementation of mathematics Education programme. Also, Adeosun (2011) identified that most young people are not interested in teaching. They pick courses in education if all else fails in terms of securing admission into popular courses. In addition to this, the expectations of those who voluntarily choose educational courses might not be met while on the programme as a result of inherent challenges.

Research Questions

1. What are the needs of Mathematics education programme from the Lecturers' perspective?
2. What are the learning needs of pre-service Mathematics teachers at the commencement of their programme?

Methodology

The research design used was the qualitative design, case study approach. Cases are bounded by time and activity and researchers collect detailed information using a variety of data collection procedures over a sustained period. In a case study design, the case selected becomes the basis of holistic and in-depth exploration of the programme to be investigated. Therefore, Case study design represents an approach where a selected case or a few selected cases was studied comprehensively. Population comprised all Pre-service Mathematics teachers and lecturers of

Mathematics department and Lecturers of Mathematics education department from six (6) universities in southwest, Nigeria. Purposive sampling technique was adopted to select twelve (12) pre-service teachers (100 level), twelve (12) Mathematics lecturers and twelve (12) Mathematics education lecturers for interview purposes.

A sub sample of twelve (12) pre-service teachers (100 level) was selected (2 from each university) from the initial sample using purposive sampling technique. The selection was done based on the following conditions. Furthermore, purposive sampling technique was used in the selection of twenty-four (24) Lecturers of Mathematics (i.e. 12 lecturers each from Mathematics science and Mathematics education departments, 4 from each university)

Qualitative data for the study were obtained through interviews. Lecturers' Needs Interview Guide (LNIG) is semi-structured interview guide designed by the researcher to elicit the needs and concerns of facilitators of Mathematics education programmes. The guide contains instrument contains eight (8) open-ended questions. Also, Pre-Service Mathematics Teachers Needs Interview Guide (PSTNIG) is semi-structured interview guide designed to measure the learning needs and concerns of Pre-Service Mathematics Teachers for Mathematics Education Programmes. The researcher constructed PSTNIG and the instrument contains six (6) open-ended questions designed to collect information on learners' (pre-service teachers) needs and concerns for Mathematics education programmes. The validation of the instruments involved the researcher administering the instruments on two different respondents outside the sample frame. Responses of the respondents were used to identify and correct any flaws and unclear statements in the interview guide. In addition, the functionality of the recording device was checked. Also, participant check procedure was adopted by the respondents as they allowed the respondents to hear the recorded version of their voices to verify the truthfulness of the data. Data was analysed using Thematic Analysis.

Results

1: What are the expectations of Mathematics education programmes from the Lecturers' perspective?

The data collected and analysed under this research question involved the interview of fourteen (14) lecturers. The data transcribed were analysed into themes and sub-themes, which was described in table Table.1

Table.1: Summary of lecturers' expectations of Mathematics education programme

Themes	Sub-themes	Frequency of responses*
Lecturers' needs and expectations	Good facilities & equipment	5
	Quality graduates	6
	Good remuneration	1
	Curriculum review	1
Achievement of expectations	No	10
	Yes	4
Challenges Experienced	Truancy	2
	Poor conducive environment	2
	Lack of equipment & Materials	4
	Poor study habit	2
	Insufficient lecturers	2
	Poor career choice	1

* The frequency of responses is not a reflection of the aggregate responses due to multiple responses which cut across the themes.

Table 1 shows the analyses of the data transcribed into three (3) themes and their respective sub-themes.

a. Lecturers' needs and expectations

The theme covers the aspiration, needs and expectations of lecturers when considering the implementation of Mathematics programmes and several needs were identified. Firstly, lecturers identified quality graduates as their main expectation is to produce quality graduates who would help to reach the goal of education. Some excerpts are:

> "To see graduates of Mathematics Education actively participate in solving problems facing the country." (Lecturer 13)

> "My expectation in this institution is to build and develop genius in Mathematics and meet the societal needs." (Lecturer 4)

Another need highlighted by the respondents is good facilities and equipment for teaching Mathematics. Some excerpts are:

> "…I'm expecting good teaching facilities and equipment in the institution" (Lecturer 1)
>
> "My expectations are that, we still need more instructional materials and classroom facilities in the institutions…" (Lecturer 2)

Furthermore, increment remuneration is highlighted as another expectation from the lecturers.

> "…better students' performance and good remuneration" (Lecturer 6)

Lastly, Curriculum review is seen as a need of lecturers for the implementation of Mathematics programme.

> "…something must be done to the curriculum to provide a competent Mathematics teacher, give prominence to conduct rather than pedagogy" (Lecturer 8)

b. Achievement of expectations

The theme revealed several opinions of respondents on whether their expectation have been achieved. Related opinions were themed together to give the result as some participants revealed that their expectations have been fulfilled or met. Some excerpts are:

> "Yes, my expectations had been met to an optimum level because virtually all the students in the institutions studying Mathematics had developed and gotten innovations in applying Mathematics" (Lecturer 4)
>
> "Yes, many of our graduates are into teaching of Mathematics in schools, some are working in industries …" (Lecturer 14)

However, majority of the respondents revealed that their expectations have not been met. Some excerpts are:

> "No, review the curriculum and remove unnecessary courses for math Edu students, let math Edu students also offer all pure Mathematics courses" (Lecturer 7)
>
> "No, the institution has not provided good equipment" (Lecturer 2)

(1) Challenges Experienced

This theme highlights the challenges affecting the Mathematics programme implemented in schools. Firstly, the respondents revealed that lack of equipment and materials is a challenge affecting the implementation of Mathematics programme. Some excerpts are:

> "… Lack of Mathematics laboratory, lack of software to solve mathematical problems, poor background knowledge of students" (Lecturer 14)
>
> "… students are not provided with enough materials" (Lecturer 5)

Another challenge is the poor conducive environment for learning which is a challenge to learning Mathematics:

> "The problems facing the running of Mathematics education programme is lack of conducive environment for learning" (Lecturer 2)

Other factors include insufficient lecturers, truancy, poor study habit and poor career choice. Excerpts of respondents on the challenges are:

> "The problem encountered in this institution is students' absence from Mathematics class and un-readiness to study" (Lecturer 4)
>
> "Mathematics is not mostly students' choice because of admission quarters without proper students' orientation " (Lecturer 10)
>
> "There are few lecturers" (Lecturer 8)

Overall, the lecturers' needs and expectations are good facilities and equipment, quality graduates, good remuneration and curriculum review, but majority revealed that it has not been met due to several challenges.

2: What are the learning needs of pre-service Mathematics teachers at the commencement of their programme?

Table 2 Summary of pre-service teachers' needs

Themes	Sub themes	Frequency of responses*
Pre-service teachers' needs and expectations	Good grades	6
	Conducive learning environment	4
	Quality learning	7
Achievement of expectations	Not achieved	14
Challenges Experienced	Unconducive classes	11
	Inadequate furniture	2
	Lack of materials	3
	Poor electricity	1

* The frequency of responses is not a reflection of the aggregate responses due to multiple responses which cut across the themes

Table 2 presents the summary of pre-service teachers' needs and expectation for Mathematics education classes. From the table, several themes were highlighted. Firstly, the pre-service teachers reflected that they wantessd good grades, Learning in a conducive environment and experience quality learning at the beginning of their programme. Some excerpts of their responses are:

> "My aim is achieving good grades" (Pre-service teacher 9)
> "I want to learn in a conducive environment" (Pre-service teacher 13)
> "My expectation is to experience quality learning" (Pre-service teacher 14)

Furthermore, they revealed that their expectations were not met. Some excerpts are:

> "No, simply because my school does not have enough equipment" (pre-service teachers 12)
> "No, there are no adequate equipment to improve Mathematics education programme" (pre-service teachers 5)

Finally, the pre-service teachers experienced several challenges such as poor teaching, unconducive classes, inadequate furniture, lack of materials and poor electricity.

> " … Lack of quality teaching" (Pre-service teacher 10)
> "…the class is not always conducive and at times student are more than the class[chairs]" (Pre-service teacher 9)
> "no proper Mathematics equipment to lecture in class, no proper materials for student to fill in e.g. table, chairs, graph book" (Pre-service teacher 14)
> "… there is poor electricity" (Pre-service teacher 5)

Overall, pre-service teachers' needs are good grades, conducive learning environment and quality learning, which have not been met due to several challenges.

Discussion of findings

The finding of the study shows that the needs and expectations of lecturers are good facilities and equipment, quality graduates, good remuneration and curriculum review. These needs and expectations have not been met due to challenges like truancy, poor conducive environment, lack of equipment and materials, poor study habits, insufficient lecturers, and poor career choice. This result also underscores the findings of second research question where students also expressed similar needs in terms of good grades, conducive learning environment and quality learning but are also confronted with similar challenges hindering their expectations which are unconducive classes, inadequate furniture, lack of materials and poor electricity. This situation provides information on what lecturers were expected in performing their duties and the problems or challenges could go a long way in affecting the programme implementation negatively. The lecturers' expectations are good but since their expectations were not met, it could reduce their effectiveness when performing their duties. The study supports the report of Adeosun (2011) and Azuka (2015) because they revealed that poor service conditions led to shortage of Mathematics teachers. Many students would rather neglect a more lucrative job in another profession with better pay.

Also the study finds that the needs of the pre-service teachers are good grades, conducive learning environment and quality learning, which were not met due to unconducive classes, inadequate furniture, lack of materials and poor electricity. This result also underscores the findings of research question one where they revealed that their needs which are good facilities and equipment, quality graduates, good remuneration and curriculum review were not met due to truancy, poor conducive environment, lack of equipment and materials, poor study habit, insufficient lecturers and poor career choice. The expectations of the pre-service teachers are good because it shows how ambitious the students are but not meeting their expectations could adversely affect their learning as a result of the challenges they experience. This finding corroborates the reports of Oris (2015) where it was submitted that poor facilities, equipment and poor funding led to poor state of school facilities (classrooms, offices, laboratories & libraries)

Conclusion and Recommendations

This study assessed lecturers and mathematics teachers' needs in the implementation of Mathematics education programmes in universities situated in south-west, Nigeria. Drawing from the findings the expectations of the lecturers and students were not met due to several challenges. It is recommended that Government should release funds to the university system to revitalise the university system which would help in the procurement of instructional material, equipment, construction of more good facilities.

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