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RESEARCH ARTICLE

AN EVALUATION OF THE NATIONAL TEACHERS' INSTITUTE NIGERIA CERTIFICATE IN EDUCATION MATHEMATICS PROGRAMME

***, [1]Dr. Lucy Eraikhuemen and [2]Dr. I. K. Oteze**

[1]Department of Curriculum and Instructional Technology, Faculty of Education, University of Benin, Benin City, Edo State, Nigeria
[2]University Demonstration Secondary School, University of Benin, Benin City, Edo State, Nigeria

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ABSTRACT

This study is informed by the researchers' concern for the government's determination to upgrade all Teachers' Grade II certificate holders in the teaching field to holders of the Nigeria Certificate in Education (NCE), since NCE is now the minimum qualification for entry into the teaching profession in Nigeria. The study is designed to evaluate the extent to which the programme objectives are being achieved. The focus of the evaluation is on the content of the Mathematics modules, the educational qualifications of Mathematics Course Tutors, the adequacy of the materials and facilities for programme implementation and the way the entire programme is being coordinated. A total of fifty five subjects (2 centre managers, 7 Mathematics Course Tutors and 46 Students) from five study centres of the National Teachers' Institute (NTI) in Edo State, Nigeria, participated in the study. The data for the study were collected with the aid of three questionnaires (questionnaire for Teacher Trainees, questionnaire for Mathematics Course Tutors and questionnaire for centre Managers). Analysis of data was done with the aid of percentage, pie chart, Kendall co-efficient of concordance (W) & Friedman (T), and t-test of difference of means. The results showed that the NCE programme have adequate number of Mathematics Tutors who have relevant qualifications and the content of the NCE Mathematics Modules is not significantly adequate for the realisation of the objectives of the programme.

INTRODUCTION

The education system of a nation is most often a reflection of the nation's beliefs, culture, attitudes, values and her level of social, economic and political development. As stated by the Federal Republic of Nigeria in the National Policy on Education (**FRN, 2004**), the Federal Government of Nigeria has adopted education as an instrument "par excellence" for effecting national development. **Nwagwu (2002)** have also rightly observed that Nigerian governments and people have abiding faith in education as an instrument for social, economic and political transformation of the country. It is often said that teachers holds the key to education. In the words of **Afe (2002)** "since the teacher is considered the key factor in the entire education programme, his programme of training must seek to assist him to grow and develop as a person, provide him with the necessary skills and professional abilities that will help him become an effective teacher". The role of the primary school teacher is even more fundamental in the education system. Primary education is the education given in institutions for children aged 6 to 11 years plus (**FRN 2004**). This level of education is regarded as the key to the success or failure of the whole education system because the rest of the education system is built upon it. Discussing the role of the primary school Mathematics teacher, **Odili (2005)** expressed the fact that:, teachers at the primary level of education are the ones with whom children make their crucial initial contact as regards Mathematics and other subjects in the school curriculum. Since, it is this stage that triggers off the intellectual process of early concept development in every subject, it becomes clear that primary Mathematics teachers occupy a vital position in the teaching and learning of Mathematics . By implication, Mathematics teacher education programmes targeting the primary level must be a serious business in any country.

Speaking in more general terms, **Eniayeju (2005)** expressed the view that if a nation wishes to develop technologically, she must as a matter of policy focus on the training, retraining and retention of her Mathematics teachers at all levels of her education system. The training of Mathematics teachers in Nigeria is done in tertiary institutions. The National Teachers' Institute (NTI) is one of such institutions. Since 1976 the NTI has offered the Nigerian Certificate in Education (NCE) programme by Distance Learning System (DLS). As explained in the students' Handbook (**NTI 2005**), the NCE by DLS of the NTI is a training programme for teachers who already have a

Corresponding author: Dr. Lucy Eraikhuemen,
Department of Curriculum and Instructional Technology, Faculty of Education, University of Benin, Benin City, Edo State, Nigeria.

Teacher's Grade II (TC II) qualification. It is offered part-time over a period of four years. It adopts a combination of Saturdays and holiday contact sessions for tutorials at study centres and independent private study from self-instructional materials.

In Nigeria, NCE is the minimum teaching qualification. NCE holders teach at the Universal Basic Education (UBE) levels. That is Lower Basic Primaries (1-3), Middle Basic-(Primaries 4-6), and Upper Basic (junior secondary school 1-3). At these levels of education, Mathematics is one of the core subjects and Mathematics teachers have always been in short supply (**Lassa, 2000**). Apparently, the preparation of Mathematics teachers to implement the UBE curriculum is crucial. According to **Omo-Ojugo (2005)**, the teacher factor has always been a major issue in whether an educational programme is successful or not. He stated that available statistics indicates that many teachers are needed for the nation's primary schools if any meaning would be made of the UBE programme. To attain the goals of UBE, especially in Mathematics which is a core subject, a high quality teaching workforce in Mathematics is required. Therefore, attention should be focused on the supply of quality Mathematics teachers for UBE, teachers who will be able to teach and equip their pupils/students with the opportunities and experiences they need to optimise their potentials and contribute to the growth and development of the society and humanity. For this goal to be achieved, the programme for the training of the teachers must be well articulated and implemented to equip the teacher trainees with the competencies needed for the work after graduation. If any part of a programme is defective, then, the programme is most unlikely to achieve the target goals. It is therefore of utmost importance that education programmes be evaluated at regular intervals in order to identify the strengths and weakness of the programme which will form the basis for programme revision or modification.

Statement of the Problem

Every educational programme needs the right quality and quantity of teachers to achieve its goals. In recognition of this fact, the National Policy on Education (2004, 39 – 40) states that "all teachers in the educational institution shall be professionally trained and that teacher education programmes shall be structured to equip teachers for the effective performance of their duties". NTI runs a number of Teacher Training programmes through DLS leading to the award of various certificates. This includes the Nigeria Certificate in Education (NCE) , Special Teacher Upgrade programme (STUP), Post Graduate Diploma in Education (PGDE) and the Teachers' Grade II (TC II). A programme cannot be static. At regular intervals evaluation ought to be conducted on an ongoing programme in order to identify the programme's strength and weaknesses. It is the result of the evaluation that will inform revision or modification in the programme. It therefore becomes imperative to ask: What are the strengths and weaknesses of the Mathematics education component of the NCE programme? Which area(s) of the programme needs revision or modification? The successful implementation of any educational programme is dependent on a number of factors which include curriculum content, educational qualification of tutors, the adequacy of the materials and facilities available for the programme implementation and the way in which the entire programme is coordinated. The questions that come to mind at this junction are: What percentage of the Mathematics course tutors have relevant qualifications? How adequate are the materials and facilities available for the implementation of the programme? How adequate is the general co-ordination of the programme? These constitute the problem of this study.

Research Questions

The following four research questions were raised to give focus for the study.

1. What percentage of the Mathematics Course Tutors have relevant qualifications?
2. Is there any difference among the Mathematics course Tutors in their opinions of the adequacy of the content of the Mathematics Modules?
3. To what extent are the available facilities and materials for the implementation of the Mathematics education component of the NCE programme adequate?
4. To what extent is the general co-ordination of the Mathematics education component of the NCE programme adequate?

Hypotheses

Three hypotheses corresponding to research questions two, three and four were formulated to direct the study.

1. There is no significant difference among the Mathematics course Tutors in their opinions of the adequacy of the content of the Mathematics Modules.
2. The adequacy of the available facilities and materials for the implementation of the Mathematics education component of NCE programme is not significantly less than an obtainable mean.
3. The adequacy of the general co-ordination of the Mathematics education component of the NCE Programme is not significantly less than an obtainable mean.

MATERIALS AND METHODS

Participants: A total of fifty-five subjects participated in the study. Of this number, seven are course tutors, two are centre managers, while forty-six are teacher trainees. Five of the seven course tutors are males while two are females. For the venue managers one is a male while the other is a female. The student population cuts across different levels of the NCE programme as follows: NCE 1(5 students), NCE 2 (2 Students), NCE 3 (9 students) NCE 4 (30 students).

Procedure: The study is a survey. Three questionnaires (one for each category of subjects) were developed by the researchers and validated by an expert in Mathematics Education and an expert in Measurement and Evaluation. The subjects completed the instruments which were retrieved and analyze by the researchers. The subjects were located in five study centres (Benin-Edokpolor, Ubiaja, Uromi, Ekpoma and Igarra) of the NTI.

Data Source: Based on the research questions, demographic data of Tutors, data on available facilities and materials as well as data on the content of the Mathematics modules were collected from Mathematics course tutors. Centre managers and students supplied data on the general co-ordination of the programme and ways to improve on the current level of co-ordination.

Data Analysis: Research question 1 was analyzed using descriptive statistics. Specifically, percentage and pie chart were used. Hypothesis 1 was tested using Kendall coefficient of concordance. This was used to establish the difference among the tutors in their opinions of the adequacy of the content of the Mathematics modules. Furthermore, item by item analysis was done to determine the index of consensus ($1\text{-}S^2$) of the tutors on each aspect of the Mathematics modules.

Hypotheses 2 and 3 were tested using the t-test for sample means. The likert-type scale which measured perceived adequacy of facilities and materials for programme implementation and general co-ordination of programme has four options. Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD), with assigned scores 4,3,2,1 respectively. This is the case for the positively worded items, while the reverse is the case for negatively worded items. 2.5 is taken as the midpoint of the scale and 2.5 multiplied by 11 (number of items on the instrument) which is 27.5 is taken as the minimum acceptable score (obtainable mean) of perceived adequacy. Similarly, for the general co-ordination of the programme 22.5 is taken as the minimum acceptable score, since the scale has 9 items. The mean score, standard deviation and t score were computed in each case. Decision taken is based on the relationship between t calculated and critical value of t at 5% level of significance.

RESULTS AND DISCUSSION

Research Question 1: What percentage of the Mathematics course tutors have relevant qualifications?

To investigate this question, the qualifications and fields of specialisation of the course tutors were examined. All seven course tutors specialized in Mathematics . Their qualifications are as shown in Table 1:

This is represented in a pie chart as shown in Figure 1.

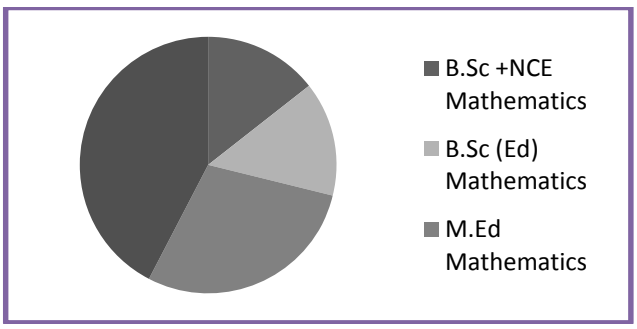

Fig 1. Qualification and Field of Specialization of Mathematics Course Tutors

In response to reseach question 1, one can say that 100% of the Mathematics course Tutors have relevant qualifications. From the information generated also, one of the tutors have been on the job for eleven years, two have been in it for seven years and another for four years. The other three have been teaching in the programme for three years. By implication, the NCE Mathematics content is being taught by seasoned professionals. This will ensure the achievement of programme goals.

Hypothesis 1: There is no significant difference among the course Tutors in their opinions of the adequacy of the content of the mathematics modules? This hypothesis was tested using the Kendall coefficient of concordance (w). As shown in table 2, this was found to be 8.09. To evaluate the significance of W, Friedman T was calculated and found to be -8.07 which is less than the table chi-square (X^2) value of 12.59. The null hypothesis was therefore accepted as stated. It was concluded that there is no significant difference among the Tutors in their opinions of the adequacy of the content of the Mathematics modules. The consensus of the Tutors on each aspect of the Mathematics Modules was therefore examined. The results are as shown in Table 3. From Table 3, it is evident that some aspects of the Mathematics modules needs revision. These are aspects with either low mean scores (below 2.50) or low index of consensus (below 0.50). Item 5 has relatively high index of consensus and a very low mean socre. By interpretation, there is a high degree of agreement among the tutors that they are not able to cover the units wihtin the specifield periods. Item 6 has a low mean score and a very low index of consensus. This can be interpreted as: the content of the moudles is not adequate for UBE Mathematics teachers.

This finding needs to be reconciled with the results of items 1 - 4 which revealed that: objectives are clearly stated, content is adequate for realising the objectives, units reflects recent development and contemporary ideas dominant in the field of Mathematics and that the units are free from obsolate concepts. The inadequacies in the content of the modules as indicated by item 6, therefore, are as revealed in items 7 and 8. Item 7 has low mean score and relatively high index of consensus indicating that the units are not self-instructuional. The low mean score and low index of consensus of item 8 indicates that the units are not sturctured and sequenced to make reading systematic. Moreover, responding to item 9 in the instrument (tutor's questionniare) which required respondents to indicate the percentage of the content they are able to teach in a particular NCE level, it was found that no course tutor is able to cover more than 50% of the course work. Also responding to items 10 and 11 on the instrument which required respondents to indicate the error(s) they have noticed in the modules, the tutors reported a number of errors they noticed in the modules.

In response to item 12 on the instrument which asked respondents to make suggestions for the overall improvement of the content of the Mathematics modules, the following were given

Suggestions for Improvement of Modules

1. Number of units in a module should be reduced.

Table 1. Qualification of Mathematics Course Tutors

Qualification	No of Tutors	%	Degree
B.Ed	3	42%	151.2°
B.Sc (Ed)	1	14.3%	51.48°
B.Sc+NCE	1	14.3%	51.48°
M.Ed	2	28.6%	102.9°

Table 2. Adequacy of the Content of the Mathematics Modules

No. of sample to sample size	No of Subjects	Degree of freedom	Coefficient of concordance (w)	Friedman calculated T	X^2 table value
8	7	6	8.09	-8.07	12.59

Table 3. Consensus of Tutors on the Adequacy of the Content of the Mathematics Modules

S.No.	Item	$\bar{X}$	S^2	Index of Consensus ($1-S^2$)
1	The objectives are clearly stated	3.57	0.25	0.75
2	Content is adequate for realising the objectives of NCE programme	3.57	0.25	0.75
3	The units reflect recent development and contemporary ideas dominant in the field of Mathematics	3.43	0.24	0.76
4	The units are free from obsolete concepts and ideas	3.14	0.12	0.88
5	I am able to cover the units within the specified periods	1.86	0.41	0.59
6	The content of the modules is adequate for UBE Mathematics Teachers	2.29	1.34	-0.34
7	The units are self-instructional.	2.14	0.41	0.59
8	The units are structured and sequenced to make reading systematic.	2.43	0.81	0.19

Table 4. Adequacy of Available facilities and materials for programme implementation

No of respondents	Sample total score	Sample mean	Sample standard deviation	Obtainable mean	t_{cal}	df	Significant t table value
7	209	29.85	6.34	27.5	0.78	6	**0.47**

Table 5. Adequacy of General coordination of programme

No of respondents	Sample total score	Sample mean	Sample standard deviation	Obtainable mean	t_{cal}	t-table value	Degrees of freedom
2	31	15.5	4.5	22.5	0.59	9.93	1

2. Reduced emphasis on educational concepts.
3. Emphasize the application of educational theories to Mathematics .
4. Reduce the number of examples that are taching the same concept.
5. Topics and methods of teaching them should be in close succession.
6. Some units are too wide to be covered in a period. Such units should be pruned.

Hypothesis 2: The adequacy of the available facilities and materials for the implementation of the Mathematics education component of the NCE programme is not significantly less than an obtainable mean. This hypothesis was tested using the t-test for sample means. As shown in Table 4, the value of t calculated is 0.78 and the table value of t is 0.47. Since $t = 0.78 > 0.47$ t table value, hypothesis is rejected. It is therefore concluded that the adequacy of the available facilities and materials for the implementation of the Mathematics education component of the NCE programme is significantly less than an obtainable mean. That is, there exist inadequate facilities and materials for the running of the programme.

Hypothesis 3: The adequacy of the general coordination of the Mathematics education component of the NCE programme is not significantly less than an obtainable mean. As shown in table 5, the value of t calculated is 0.59 while the table value of t is 9.93. Since $t = 0.59 < 9.93 =$ t table value, hypothesis is accepted. It is concluded that the adequacy of the general coordination of the Mathematics education component of the NCE programme is not significantly less than an obtainable mean. That is the general coordination of the Mathematics education component of the NCE programme is adequate.

The respondents however, suggested ways of improving on the current level of coordination of the Mathematics education component of the NCE programme. Their responses are as recorded below.

Suggestions for Improving Programme Co-ordination

1. Increase the contact periods from 40 hours to 80 hours
2. Increase the honorarium of the course tutors and centre managers to serve as incentive.

3. Number of students on roll is small. There is need for advertisement to have more students in the field of Mathematics
4. The course modules should be sent to the centres directly to avoid late supply to the students.
5. Examination of students should be on-line to avoid examination malpractice.
6. Course modules for students should be supplied in sufficient number.
7. The number of courses per circle should be reduced.
8. Results of assessment should be released on time.
9. Course tutors should be monitored to ensure that they teach their lessons as expected.

Conclusion

This study, revealed the following;

- The NCE programme have adequate number of Mathematics tutors who have relevant qualifications.
- The content of the NCE Mathematics modules is not adequate for the training of UBE Mathematics teachers.
- There are inadequate facilities and materials for the implementation of the Mathematics education component of the NCE programme.
- The general coordination of the Mathematics education component of the NCE programme is adequate but can be improved upon.

As existing literature (**Lassa, 2000; OMo-Ojugo, 2005; Odili, 2005; Eniayeju, 2005**) have emphasized, to produce quality teachers, a quality teacher education programme must be put in place. If any aspect of the programme is defective, the purpose of the programme will most likely be defeated. This study therefore concludes that except the content of the Mathematics modules are revised, adequate materials and facilities are provided for the implementation of the programme and the general co-ordination of the programme improved upon, the objectives of the NTI NCE by DLS are not likely to be fully achieved.

Recommendations

Based on the findings of this study the following recommendations are made.

1. The Mathematics modules should be properly edited. This study revealed that there are errors (both in spellings and in solved problems) in the modules. The modules should be properly edited so that these errors can be corrected. Furthermore, there should be a reorganization of some modules (like putting concepts and methods of teaching such concepts in the same module). This will make the content of the modules systematically arranged and self instructional.
2. The programme should be adequately funded so that tutors and centre managers can be well paid and paid as and when due. This will motivate the tutors and centre managers thereby enhancing their productivity. Adequate funding will also guarantee provision of adequate facilities and materials for programme implementation.
3. The general coordination of the programme should be improved upon, based on the suggestions given.

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