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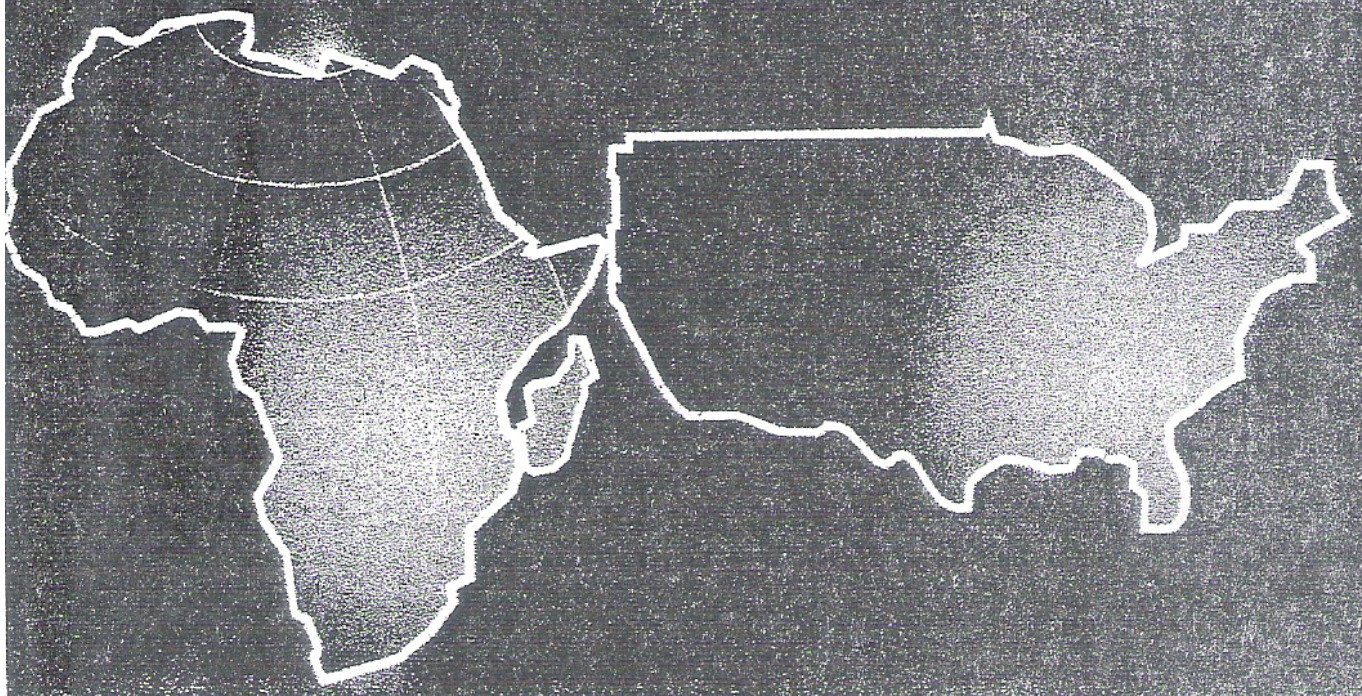

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Mathematics Teacher Education Programme

By

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Abstract

The study was carried out to evaluate Mathematics teacher education programme at the Colleges of Education in Nigeria. As an expost-facto study using Stufflebeam CIPP model where independent variables were not manipulated, the study contained four research questions and two hypotheses at significant level of 0.05. In the six Colleges of Education chosen through purposive random sampling techniques one hundred and sixty-five 300 level students of Mathematics and thirty Mathematics lecturers were chosen through stratified sampling techniques. Four instruments were adapted, validated and employed for the study. These included Input Questionnaire (IQ, r = 0.75), Process Questionnaire (PQ, r = 0.72), Product Questionnaire (PDQ, r = 0.86) and Inventory of Mathematics resources in the colleges. Study lasted for three and half months. Data collected were analyzed through simple percentages, frequency count, bar chart, mean and standard deviation, and t-test. Findings showed that there was problem in the Mathematics teacher education programme with mean marks and standard deviation (x, s)

equals (1.08, 1.10) which was lower pass compared to criterion referenced score. It was discovered that mean and standard deviation (x, s) of students in pedagogical practice were 3.45, and 0.67 respectively. There were problems of grossly inadequate Mathematics textbooks in some areas of Mathematics and the Mathematics lecturers' teaching effectiveness was not in the best interest of the learners. The mean and standard deviation (x, s) of Mathematics lecturers' teaching effectiveness were 49.7% and 7.66 respectively. There was significant difference in the mean scores of male and female students in Mathematics with 13.74 and 12.76 respectively, and significant t-value = 2.18, d.f = 163 and p-value = 0.031. Similarly male students performed better than female students in the pedagogical practice with mean scores of 59.73 and 56.56 respectively, and significant t-value = 3.18, df = 163 and p-value = 0.00. Study concluded that comprehensive evaluation in Mathematics teacher education programme should be targeted towards Mathematics textbooks in those areas that are shortfall and manpower training. This becomes imperative if only to prevent dismal multiplier effect of half-baked teachers on the pupils, since no educational system can rise above the quality of her teachers.

Introduction

Education is a broad concept that cannot be given a straightjacket explanation except one looks at its components. In any society, three forms of education often exist such as informal, non-formal and formal with each complementing one another. This is why we must not ask where education is taking us but rather how we can manage the education so that it takes us to where we want to go. Apart from that, the forms of education, which any society embraces, depend on the nature of such a society in relation to her citizens. One of the objectives of education is to prepare the young ones and to educate them through their lives while part of the objectives of teacher education is to develop all hidden potentialities in man.

At informal education level in Africa and Nigeria in particular, the development of teacher education is as old as man since the training is often done through instinct and imitation. Learners are not confined to a definite place before teaching and learning take place. e.g. greetings and proper hygiene among the people. Different scholars have properly

documented the historical development of informal education (Solaru, 1964; Ikejani, 1964; Taiwo, 1980; Fafunwa, 1982 and Osokoya, 1997). At the non-formal level, the training, though not documented, was based on apprenticeship system, whereby learners spend considerable period in the acquisition of skills and knowledge at the discretion of the master that determines the learner's freedom based on his level of competence. e.g. carpentry, bricklaying and masonry.

These two systems of education complement the formal one as not everyone could have opportunity of passing through it but everyone is expected to contribute meaningfully to the progress of the community. No wonder the secret of education is to respect the learner and that is why every prospective educator should see the learner in pursuit of knowledge and not knowledge in pursuit of the learner.

The formal education came to Africa and Nigeria, in particular, through the influx of the early missionaries who had the sole aim of spreading the gospel, which was an avenue to introduce and interpret the Bible to the people. Prominent missionaries involved were Church Missionary Society, Wesley Methodist Missionary Society and Presbyterian Church of Scotland to mention a few. The curricula of the then missionaries were mainly theology and teaching methods with syllabus in testament criticism, Christian faith, school method and management, preaching and theology, geography (foreign ones), History, English, Geometry and Arithmetic. The major weakness of the then formal education was lack of funds, equipment and trained tutors among the missionaries as well as ill-conceived needs of the people.

Many laudable educational initiatives have failed mainly because they did not take sufficient account of the 'teacher factor', as creativity refers to the ability in learners to go beyond the well-trodden path in thinking with teacher's role indispensable. The then Nigerian teacher-training institute weakness was identified through Phelps-stokes report of 1925, thus leading to the 1929 merger types: Elementary Training College (ETC) and Higher Elementary Training College (HETC) with grades three and two certificates respectively. The successful completion of the grade three and grade two coupled with mandatory two years of teaching led to the admission into grade three courses until the practice was stopped in 1945 as reported by the Elliot commission due to teacher's

factor that was ill-conceived. Like other professions, teachers are the professionals that have undergone special trainings and certified to have mastered the skills in executing the profession's ethics on one hand, and are directly involved in the task of promoting teaching and learning. As a result Elliot report recommended among others that out of every two teachers in a secondary school, there should be a graduate, hence the production of grade I teachers called qualified non-graduate teachers, who were to be admitted into the two-year degree programme in the then existing Universities.

There are five categories of teachers in education: (i) practice classroom teachers. (ii)-practice administrators within schools.(iii)-practice administrators between schools.(iv)-practice administrators in system wide and (v)-practice researchers .From these it is a common fact that no educational system can rise above the level of its teachers. In order to satisfy the quantities of personnel needed at the primary and secondary education's explosion in Nigeria between 1961-76 various Advanced Teacher Training Colleges were established in different parts of the country (Ichukwu, 1998). The weakness of the system was noticed in the varying admission criterion into the then existing Universities until 1989 when National Commission for Colleges of Education (NCCE) was established via decree 5 numbers 3 section(c) and (d) to ensure uniformity of standard. The then Advanced Teacher Training Colleges were renamed Colleges of Education with sole responsibility of producing professional non-graduate teachers in arts/sciences/social-sciences disciplines. Among the science subjects is Mathematics that cut across all disciplines, and it is the same subject that could be regarded as the language through which science and technology are coded. There is no aspect of human endeavours that mathematics is not needed and this has justified its compulsory stance and exalted position among other subjects in the school. The need for students to learn and pass, and as admission criterion for studying some courses at the higher level of education.

To actualize the objective of science education in the realm of modern science and technology, emphasis is placed on the teaching of Mathematics in terms of personnel and period allocation compared to others but the outcome of students still remain dismal as corroborated by different scholars (Adamolekun, 2002; Olowojaiye, 2004). Diverse

reasons have been advanced for dismal performance of students in Mathematics that ranged from teacher's factor to students among others (Yee, 1990; Gage, 1994; Wharton MacDonald, Pressley & Hampston, 1998 and Adegoke, 2004). Not until recently that Adeye-Oluwa (2003) called for the review of teacher education due to dismal syndrome in the programme and related subject, prominent among teacher education programmes at the Colleges of Education is Mathematics education with the primary goal of producing professional non-graduate teachers for the existing primary and junior secondary schools. As a result, the programme is expected to make students: (i) discuss with confidence the historical development of Mathematics as a discipline, (ii) solve abstract problems using Mathematics functions and formulae (iii) motivate pupils' interest in Mathematics by the use of appropriate strategies, particularly at the primary and junior secondary schools; (iv) analyze relationships in quantitative terms, (v) apply the computer to data processing and (vi) demonstrate convincing enthusiasm and intellectual ability for further studies in Mathematics. (NCCE, 1996)

As recommended by the NCCE every professional non-graduate mathematics teacher is expected to register and pass the prescribed courses in table one with breakdown of mathematics areas in table two as preconditions to attain the goal of mathematics education programme

Table One: Nigeria Colleges of Education Mathematics Curriculum and Credit Allocation

Courses	M	Second teaching Subject Arts / Science / Social science.	E	General study	Teaching practice	Tota l
Credit	36	36	36	12	06	126
Minimum						126
Maximu m						130

Source: NCCE Manual (1996) **KEY:** M Mathematics; E Education

Table Two: Mathematics areas per level of Nigeria Colleges of Education

Year One	Year Two	Year Three
Algebra, Trigonometry, History of Mathematics, Basic concepts in Mathematics, Differential Calculus, Coordinate Geometry, Mathematics Methodology and Introduction to computer studies	Number Theory, Problem solving, Mathematics laboratory practical, Statistics and Probability, Integral Calculus and Vector analysis	Dynamics, Real analysis I, Linear Algebra, Real analysis II, Differential equation and Abstract Algebra

Source: NCCE Manual (1996)

The course structure in table two came as a result of the report of the NCCE's syllabus review committee in 1994 when it was observed that some courses were overloaded in contents and their coverage within academic session was a dream which invariably led to the dismal performance of students in those courses. This has demonstrated a call for comprehensive evaluation of mathematics education programme at the Colleges of Education since the existing Universities cannot cater for the large number of people seeking admission. Apart from this, production of teachers should not be synonymous to mere activities oriented courses, for half-baked teachers can make mistakes that would be great enough to take qualified teachers many months to correct.

However, critical study of students' performance in mathematics of the selected Colleges of Education that ran through 10 mathematics subject combinations out of approved 20 subject combinations revealed that much evaluation is needed as shown in the classification table three of a decade of performance in mathematics at that level.

Table 3: Students' Academic performance in Mathematics for a decade

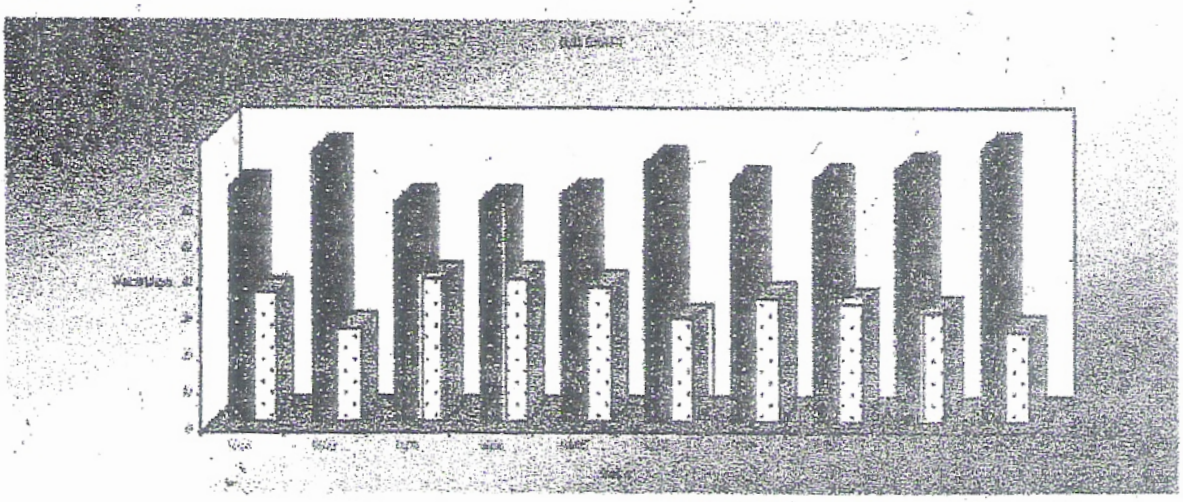
Session	A	B	C	D	E	F	G	H	I	J
% below grade C	64.8	74.8	60.6	60.9	62.8	71.6	66.4	67.0	69.7	75.6
% grade C & above	35.2	25.2	39.4	39.1	37.2	28.4	33.6	33.0	30.3	24.4
Total	301	361	403	322	307	425	357	388	320	242

Source: Academic Offices of selected Colleges of Education

KEYS: A – 90/91; B - 91/92; C – 92/93; D – 93/94; E – 94/95; F – 95/96; G – 96/97; H – 97/98; I – 98/99; J – 99/00

Table 3 is further represented by the bar chart below in order to give a detailed interpretation of the dismal performance of students in Mathematics at the training level, for no nation can afford to commit large resources to teaching a particular subject when their teachers still cannot understand the excellent use of the subject, based on their performance.

Bar Chart showing Academic Performance of Students in Mathematics from 1990/91 1999/2000.



The quality of education which any society could give to her citizens depends on the quality of her teachers. Nowadays, it appears every society wants to be associated with modern science and technology which serve as indices of modern development, Mathematics education programme therefore needs to be evaluated. Infact the evaluation

needed in teacher education programme in general and in mathematics education in particular should be a pragmatic one.

Theoretical Framework

A critical examination of the available literature indicates that there were diverse evaluation models before the researcher decided to use Stufflebeam (1971; 1985) CIPP – Comprehensive model due to the phases it encompassed that were left out by other models. The first of these models are the Achievement of Desired Outcomes (Tyler, 1968). This model contains three stages: Planning, implementation and evaluation. At the planning stage: diagnostic and planning activities, statement of objective outcome and plan of operation are carried out. In the implementation stage, plan of operation and changes in the entity value upon which the programme is designed are determined. At the evaluation stage, data are collected and analyzed on the measures of the entity leading to the comparison of new values of criteria set in the objectives at the planning stage and judgement on the success or failure of the programme is made. The major weaknesses of this model lie in the non – taking cognizance of the unplanned outcomes. No attention to the process variables in the implementation which determines the quality of the outcomes; and lastly, the threat it gives to the programme participants as a result of negative attitude among the concerned (Dave, 1979). These weaknesses have been taken care – of by the CIPP model of curriculum evaluation, which considers a process vital to the evaluation on one hand and the individual phases of evaluation on the other hand; that leads to credible judgement.

Secondly, Stufflebeam (1971; 1985) accepts Scriven's (1967) suggestion of a goal free evaluation, not as a substitute for, but as a valuable supplement to a goal – based evaluation. The difference between Scriven's (1967) formative and summative evaluation is also maintained in the CIPP model. In comparing the two models, Gagne and Briggs (1979) state that

> *Continuous planning is a major emphasis*
> *In the Stufflebeam model whereas*
> *Verified performance is emphasized in the*
> *Scriven's system.*

The rationale for the preference of CIPP model over Scriven (1967) formative and summative model is as a result of making evaluation continuous process where context questions the rationale for a programme as well as the conditions under which it works. The input questions the enabling factors and constraints like resources in terms of human and non – human ones to the programme's success. The process takes note of actual implementation in terms of variable such as effectiveness and interaction among the participating personnel and resources, while product examines the performance of the students in Mathematics. Product evaluation serves to guide decision about continuation, modification, recycling or termination of the programme after assessing the extent to which it has met the stated objectives.

Other models include decision oriented approach evaluation model (Alkin, 1970), Antecedents, Transaction and Outcomes (ATO) responsive, evaluation model (Stake, 1967), Environmental, Input, Process, Outcome (Immediate) and Long range outcomes (EIPOL) otherwise called discrepancy evaluation model (Provus, 1971), Context, Input, Process, Outcome and Impact (CIPOI) evaluation model (Yoloye, 1978). CIPP evaluation model was applied because it is comprehensive in terms of the:

(i) Needs to achieve
(ii) Objectives in terms of outcome, processes and other relevant inquiries about the programme
(iii) Data and information to be derived – (a) in line with learners who would require and to whom the information would be most useful. (b) nature of the information each learner would need. (c) time and conditions each specific data and information item would be needed. (d) means by which specific information should be formulated for each learner at each instructional unit.
(iv) Individuals to be included through sampling selection process assignment.
(v) Instrumentation such as the means and manners in which data and information were to be collected.
(vi) Data processing and analysis.
(vii) Defining and programming of other curriculum project activities; and finally
(viii) Personal and budget to accomplish the evaluation process of the NCE Mathematics curriculum.

Statement of Problem

The study was conducted to evaluate the Mathematics curriculum of teacher education programme via students' performance and the policy provision in Nigerian Colleges of Education, which are specifically established for the sole purpose of teacher education programme. It sought answers to the following questions:

What is the performance of Mathematics Students in training?

What is the performance of Students in training in the teaching practice?

Are the available resources meeting the policy provisions for the teaching and learning of mathematics?

Are the teaching-learning processes in Mathematics students' centred towards attaining the goal of teacher education programme especially in mathematics?

The following two hypotheses were tested at 0.05

H_{01}: There is no significant difference in the academic performance in Mathematics of male and female students in training

H_{02}: There is no significant difference in the pedagogical practice of male and female students in training

Methodology

Design

The study employed an expost-facto research design via Stufflebeam CIPP model of evaluation where there was no manipulation of independent variables (teacher's effectiveness and teaching-learning facilities) and dependent variable of students' learning outcome.

Population

All the forty-six Colleges of Education that run Mathematics Education Programme of Teacher Education with an approved 20 subject combination, constituted the study's population.

Sample and Sampling technique

Six Colleges of Education that ran 10 - subject combinations of Mathematics programme out of the 20 subject combinations approved and accredited by the National Commission for Colleges of Education were selected. The selection had multi-selection pattern in the sense that the selection was based on cluster sampling technique while subjects (i.e. students and lecturers) selection was done through stratified sampling technique.

One hundred and sixty five Mathematics teachers-in-training of 300 level and thirty Mathematics lecturers were chosen. The 300 level students' selection was due to high attrition rate in mathematics at levels below 300 level as well as their exposure to over 90% of Mathematics syllabus, while the lecturer's selection was based on policy provision of course accreditation of 5 – man personnel of Mathematics education programme in the College of Education.

Instruments

Four instruments were adapted, validated and used for the study, which included Input Questionnaire (r = 0.75), Process Questionnaire (r = 0.72), Product Questionnaire (r = 0.86) and Inventory of Mathematics Resources in the colleges in line with the standard minimum guide. Input Questionnaire (IQ) was used to elicit the mathematics lecturers' biodata and other relevant information about mathematics education programme, Process Questionnaire (PQ) was used by two trained evaluators in line with Flander (1970) pattern, to rate individual mathematics lecturers in the course of teaching. Product Questionnaire (PDQ) consisted of 30 multiple choice questions in mathematics covering all mathematics areas of the National Certificate in Education Programme, and the Inventory Guide on Mathematics Resources which served as part of the condition of programme accreditation.

Validation of Instruments

All the instruments were given to Mathematics Education expert to ensure their content validity with minor modifications effected on them. They were thereafter trial tested on smaller sample of subjects outside the main subjects used for the study.

Reliability of Instruments

The internal consistencies of the aforementioned instruments were carried out to ensure their usability and consistency within interval of two weeks before subjected to Kuder – Richardson (KR-21) formula. They showed the reliability coefficient of 0.75, 0.72 and 0.86 for the Input, Process and Product questionnaires respectively.

Procedures

Input Questionnaire was administered to the mathematics lecturers by the researcher and two trained research assistants to rate individual

Mathematics lecturers while they were teaching but not allowing these lecturers to know that they were being observed in order to prevent pretence of teaching used Process Questionnaire. Product Questionnaire was indirectly administered by the researcher via prospective mathematics lecturers to the students under a specified time of two hours and they were collected on the spot. Inventory of mathematics Resources was personally used by the researcher to know on–the-spot the quantity and quality of mathematics resources available in line with the standard minimum guide of Colleges of Education for teacher education programme.

Data Coding and Scoring

In the input questionnaire lecturer with an education biased qualification was rated 2 points and anyone with academic qualification was rated one (1) point. The teaching effectiveness of mathematics lecturers carried a maximum rating of four points and minimum rating of one point in the Process Questionnaire. Each correct answer of multiple choice of product questionnaire had one mark. The availability and non-availability of Mathematics resources were rated in line with the standard minimum guides.

Data Analysis

Descriptive statistics like mean and standard deviation, percentages and frequency counts and inferential statistics like t – test at significance level of 0.05 were used to test the two hypotheses raised in the study.

Findings

In order to ensure qualitative teacher education programme outside University level National Commission for Colleges of Education emphasized on the criterion referenced scores of the product of these colleges so as to keep the tempo of teacher education programme with the contemporary period.

Table 4: Criterion Referenced Scores of NCE Teacher Education

Scores Interval	70-100	60-69	50-59	45-49	40-44	0-39
Letter Grade	A	B	C	D	E	F
Point	5.00	4.00	3.00	2.00	1.00	0.00
Level of Pass	Distinction	Credit *	Merit	Pass	Lower Pass	Failure
% Equivalent	70%	60%	50%	45%	40%	39%

Source: NCCE Manual (1996) (* Criterion level for admission into Universities as expected by the NCCE)

Though there were discriminating yardsticks used by some existing universities in the then admission process, and upon this was the criterion reference of the existing study was based on. Table 4 shows the classification of grades given to the prospective students based on their performance at the end of the programme. Though all the students that passed through the Colleges of Education were potential professional non-graduate teachers in their chosen field, the classification was necessary in order to know/assess the extent to which these students had actually attained in their various discipline and as a pre-condition for the admission into the same discipline at the university level. This has been recommended by the policy provision to have measured the adequacy of students in the chosen field and the education courses so as to have smooth flow of the academic career at the higher level. This explains why some students are often denied admission into higher level due to their non–attainment of the specified grade at the college's final examination level.

Table 5: Students' Performance in Mathematics

Scores (%)	70%	60%	50%	45%	40%	39%	Mean	Std.Dev.
Point	5.00	4.00	3.00	2.00	1.00	0.00		
Frequency	0	2	20	36	38	69		
Percentage	0	1.21	12.12	21.82	23.03	41.82	21.6	-

Findings also revealed that 1.81% of the total of 165 students used for the study had credit level in the achievement test in Mathematics with 41.82% failure as shown in table 5. The implication of the finding is that these students have not mastered much content in Mathematics which resulted in their dismal performance. Moreso, mean mark of 1.08 and standard deviation of 1.10 were observed, and by close comparison to the criterion referenced scores, this fall within the lower pass. What one could deduce from this dismal performance is that much of the poor performance in Mathematics at the elementary levels of the nation's educational system can be attributed to the quality of teachers in that system. Blaming pupils to have failed Mathematics should not be the issue but correcting the dismal performance of their trainers should be the focus of the education stakeholders. . These sets of students after graduation are expected to teach Mathematics when in actual sense they cannot understand the excellent use of the subject. In summary, there was general low performance of Mathematics teachers-in-training and its multiplier effect is bound to show on the academic performance of the pupils at the lower level of the educational sector. An investment on education especially teacher education and mathematics in particular is an everlasting one because a damage caused in a few minutes by a half–baked teacher may be so great that it would take qualified and competent teacher many years to equal it. Things are better corrected from the root rather than at the final stage.

Table 6: Students' Teaching Practice Grades

Scores (%)	70%	60%	50%	45%	40%	39%	Mean	SD
Frequency	2	86	66	07	04	0	3.45	0 .67
Percentage	1.21	52.12	40.00	4.24	2.43	0	69	-

On the pedagogical tenets as shown in table 6 1.21% of students had distinction, 52.12% had credit, 40% had merit, 4.24% had pass and 2.43% with lower pass. The mean and standard deviation were 3.45 (69%) and 0.67 respectively. The result, which showed that these students were good in their primary aim of their chosen career i.e., they were able to teach very well at the elementary level as attested to in the approved final teaching practice grade. There is a slight difference in

this result with what was obtained in the table 5 that showed students' competence in mathematics content areas and table 6 which showed the pedagogical competence of the students in the field. It should be emphasized here that these students, though trained to be professional non – graduate teachers for the primary and junior secondary levels yet they are expected to advance their studies if they wish to go beyond college level to the university so as to become professional graduate teachers. This necessitates the emphasis of credit level average. In summary, these students were good in terms of pedagogical competence of teaching mathematics contents of the primary and secondary schools level though deficient in the upper contents of mathematics especially in their course system as put together in the administered mathematics achievement test.

Table 7: Text materials on Mathematics available in relation to Policy Provision

Year One		Year Two		Year Three	
Textbooks On:	Short fall %	Textbooks on:	Short fall %	Textbooks on	Short fall %
Algebra	(-)	Number Theory	33%	Dynamics	83%
Trigonometry	(-)	Problem Solving	83%	Real Analysis I	(-)
History of Mathematics	17%	Mathematics Lab. Practical	100%	Static	67%
Basic Concepts in Mathematics	67%	Statistics& Probability	(-)	Linear Algebra	(-)
Differential Calculus	(-)	Integral Calculus	17%	Real Analysis II	33%
Coordinate Geometry	(-)	Vector Analysis	(-)	Differential Equation	(-)
Mathematics Methods	67%			Abstract Algebra	(-)
Introduction to computers	33%				

(-) means re lative quantities available in line with the policy provisions in colleges

Furthermore, it was found that there were grossly inadequate text materials in mathematics as shown in table 7 where (-) showed those areas of mathematics where available text materials were relatively adequate and the corresponding percentage of short fall of each of these materials stated against. What the findings emphasized based on policy provision was that these text materials on each broad topic in mathematics should be prepared and not made minor as it is in some text materials so that students could have ample materials to consult for clarification in the course of study. For instance in the Year One of study text materials on History of Mathematics, Basic Concepts in Mathematics Methods and Introduction to Computers had short fall percentages of 17%, 67%, 67% and 33% respectively. In the year two text materials on number theory, problem solving, Mathematics laboratory practical and integral calculus had short fall percentages of 33%, 83%, 100% and 17% respectively. In the third / final Year of the study text materials on Dynamics, Static and Real Analysis II had shortfall percentages of 83%, 67% and 33% respectively.

The implication of these was that students had no enough text materials in these areas of mathematics and as such they could not perform better in the questions related to those areas. What is currently going on is that whatever their lecturers taught those in these areas was taken without further knowledge advancement through relevant text materials in such topics. Infact, this might be one of the contributing factors to their dismal performance in the achievement test on Mathematics because virtually all the text materials that were short fall constituted more than 50% of the total mathematics text materials needed for the programme. Apart from that, knowledge advancement in these topics is limited to the few materials available, which are not enough for the students on ground. In summary, 52.4% of the Mathematics text materials were in short fall compared to the remaining 47.6% that were relatively adequate for the programme.

At this juncture, it should be emphasized that teaching is a necessary condition for learning while learning is a necessary and sufficient condition for teaching. Learning could take place between learner and the object to learn without the human teacher but teaching cannot take place unless teacher, learner and concept to be taught are ready and available. The inference being made is that mathematical knowledge

could be enhanced whenever adequate and relevant text materials on the topics are provided with logical and relevant examples / exercises.

Table 8: Mean & Standard Deviation of Observed Teaching Process

Colleges	Count(n) Code	Mean	Standard Deviation	Minimum	Maximum	Difference
A	5	54.8	12.85	50.0	67.5	17.5
B	5	48.0	5.15	44.2	53.3	9.1
C	5	49.2	8.31	41.7	58.3	16.6
D	5	49.0	5.63	41.6	54.2	12.6
E	5	48.7	3.44	45.8	52.5	6.7
F	5	48.3	5.34	43.3	53.3	10.0
Total	30	49.7	7.66	41.7	67.5	25.8

Table 8 showed the observed teaching process of the selected Mathematics lecturers in the course of their teaching. This is to ensure their level of effectiveness at teaching and in line with the policy provision of student centred teaching. The mean and standard deviation (x,s) ranged from (54.8, 12.85) for college code A, (48.0, 5.15) for college code B, (49.2, 8.31) for college code C, (49.0, 5.63) for college code D, (48.7, 3.44) for college code E and (48.3, 5.34) for college code F respectively. The same table also showed the minimum rating difference between two teachers teaching the same topic. These ratings showed the competence levels of Mathematics lecturers of the students while the teaching was going on and in relation to the policy provision that teaching should be student centred. The traditional belief was still much on ground in the pattern of disseminating mathematical knowledge to the students, and this might have contributed to the dismal understanding of Mathematical topics and Concepts at this level. In general, mean and standard deviation (x, s) of the teaching process in the classroom were 49.7 and 7.66 respectively which was below 50%. The scores showed that much understanding of Mathematics could be a dream due to the manner through which these ideas are being passed across to the students.

In summary, the table showed the minimum and maximum ratings in terms of the lecturers' level of effectiveness as well as the overall difference amongst colleges. Meanwhile teaching and learning of

Mathematics could be exciting whenever there is a meaningful interaction between the tutor and the students, and this is possible when the teaching is much more student centred. This is in line with the study of Moschkovich (2001) that meaningful interaction / strategy employed by the teachers enhanced learning mastery of mathematics among the students.

Table 9: t–test on students' performance in Mathematics

Gender	Count(n)	Mean	Standard Deviation	Df	t - value	Significant at P<.05
Male	94	13.74	2.87			
Female	71	12.76	2.87			
Total	165	-	-			

* Significant at P<.05

Table 9 showed the genders' achievement of students in Mathematics with mean marks of 13.74 and 12.76 for male and female students respectively though with the same standard deviation. (t – value = 2.18; df = 163; $P_{..}$ = 031) which was significant showing that male students performed better than female in the achievement test in Mathematics. This has confirmed similar studies like that of Adesoji (1999), of gender performance in favour of male in the science related courses especially Mathematics. In summary, the finding has demonstrated that male seemed to have shown positive academic performance in Mathematics than their female counterparts and this might have been responsible for the dwindling number of female students and professionals in Mathematics world wide in general.

Table 10: t–test on students' teaching practice grades

Gender	Count(n)	Mean	Standard Deviation	Df	t - value	Significant at P<0.05
Male	94	59.73	4.35			
Female	71	56.56	6.33			
Total	165	-	-			

* Significant at P<0.05

Table 10 showed the students' gender performance in their teaching practice grade with male and female students' mean and standard deviation (x,?) of (59.73, 4.35) and (56.56, 6.33). The values which were significant (t-value = 3.18, df = 163; P_{sig} = .00) which showed that male students performed significantly in their teaching practice grade than their female counterparts. In fact, this looks contrary to the belief that female tends to be patient in teaching due to their feminine affection to the pupils.

Conclusion and Recommendation

Programme on teacher education at any level should not be given a lip attention as such programme determines the quality of such a nation's advancement in all fields of human endeavours. The kind of evaluation as earlier stated in teacher education programme is not that a school coach should be better horsed, but that it should be turned right round and starts on a new track. Secondly, the question of where education is taking us to does not arise but rather how we can manage the education so that it can take us to where we want to go. Science education is an integral part of teacher education of which Mathematics education plays a prominent role. Dismal performance in Mathematics means retrogression in science education that has multiplier defect in the science and technology that are the symbols of modern development.

Apart from that, education is to see that students are in pursuit of knowledge and not knowledge in pursuit of the student. The laudable educational initiatives do fail because they do not take into account the 'teacher factor'. More emphasis should be placed on the training and re – training of teachers even at the training ground of their trainers to make teaching a students' centred. Teaching and learning processes should be strictly at the mercy of students who actually need this knowledge for their meaningful contribution to societal goal.

Also there should be urgent attention on the provision of adequate and relevant text materials in Mathematics, which should be at the level of understanding of these students. The more the text materials are available the more it enhances creativity. Creativity itself refers to the ability of the learners to go beyond the well – trodden path of thinking as well as action. Teachers' role is indispensable. As a result, these materials stimulate learners to have positive interest and be positively disposed

towards learning Mathematics, thereby making science education a reality in particular; and teacher education programme in general. Horse is better placed before the cart so is the evaluation imperative in the teacher education programme along materials and pedagogical provisions to suite the learners' need.

Suggestion for further study

At this point, similar study is recommended in the science / arts / social – science related subjects of the teacher education in a similar environment on the need to evaluate the programme as no educational system can rise above the level of its teachers. Apart from this an extrapolative study could be carried out at the university level to assess the extent of goal attainment of such programme, which makes the nation's educational system mirror the society it is expected to serve.

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