

EVALUATION OF PRE-SERVICE PHYSICS TEACHER EDUCATION PROGRAMME IN UNIVERSITIES IN SOUTHEAST NIGERIA

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Abstract

This study evaluated the pre-service physics teacher education programmes in universities in the South-East Zone of Nigeria. Evaluative survey research was adopted for the study. The population was made up of 141 physics Education Teacher Educators and 504 physics education students. The sample for the study was comprised 52 physics teacher Educators (Lecturers) and 140 students drawn through stratified random sampling technique. Physics Teacher Education programme implementation Questionnaire (PTEPIQI) for lecturer, Physics Teacher Education Programme Implementation Questionnaire (PTEPIQ II), for students, and documents were use as instrument for data collection in the study. Both checklist and questionnaire were face validated by three experts in the area of physics Education and Measurement and Evaluation of University of Nigeria, Nsukka and were trial tested in two Universities in North Central Zone of Nigeria. The reliability coefficients calculated for the Questionnaires were 0.79 and 0.86. Data collected were analyzed using percentages, ratio, mean ratings, standard deviation, while analysis of variance (ANOVA) was used to test null hypothesis at 0.05 level of significance. The result indicated that there are many major and minor problems affecting the implementation of pre-service physics teacher education programmes in Universities in South-East, Nigeria. There are many instructional materials, equipment and facilities available for effective teaching of physics education. The admission and graduation figure from 2011/12 to 2014/15 academic sessions varies in all the universities under study. Based on the finding, conclusions were drawn, and educational implication were highlighted.

Keywords: Evaluation, Physics Teachers, pre-service, teacher education programme, universities

Introduction

Pre-service physics teacher education is an educational and training programme conducted for physics student teachers with the aim of developing or reinforcing knowledge and teaching skills in them before they can be certified to teach physics as a subject in the classroom. A university is an institution of higher education and research which grants academic degree in a variety of subjects and provides both undergraduates and postgraduate education. However, teacher education programme is peculiar to the

faculty of education in every university. Pre-service refers to activities which take place before a person takes up a job which requires specific training. i.e. before a person 'enters service. Pre-service teacher education on the other hand refers to the training and education that individuals undergo before they officially become teachers in schools. This phase typically involves programmes designed to prepare aspiring teachers with the knowledge, skills, and experiences they need to effectively teach and manage classrooms once they enter the profession.

A well-designed Physics teacher education programme has the following objectives: offers the learner the opportunity to acquire the necessary skills and competence for successful teaching of physics curriculum content at the senior secondary school level; encourages the spirit of inquiry and creativity in physics curriculum content at the senior secondary school level; provides the candidates with the intellectual and professional background adequate for their assignments; makes them adaptable to technological changes not only in the life of their country but in the wider society (FRN, 2004:38). In order to achieve the above objectives in the universities, the National Universities Commission (NUC) has provided an approved minimum academic standard of facilities, equipment and other resources to be provided by the University that offers Pre-service programme in physics education. The minimum standard in the area of personnel, method of instruction, admission mode, evaluation procedure and course content offered is also stipulated by NUC (FRN, 2007).

Nevertheless, teaching of physics as a science subject in the secondary schools in South-East Zone seems to have suffered a setback due to lack of qualified physics teachers. It may be that the physics education programmes in the universities in South-East do not produce adequate physics graduates to teach in the secondary schools. Hildegard (2012) states that in spirit of importance of physics as requirement for many specialized science and technology course at the university, it is sad to note that student's performance at the secondary school level in the subject is not encouraging. Hence there is need for evaluation of pre-service physics education programme. Evaluation is a systematic determination of a subject's merit; worth and significance, using criteria governed by a set of standards. We evaluate educational activities for two reasons:

- to obtain information that can inform the ongoing design and development process (often referred to as formative evaluation).
- to decide whether an innovation is worth retaining (often referred to as summative evaluations).

For effective implementation of any educational programme such as the pre-service physics education, there is need to conduct a periodic evaluation as recommended by National universities commission (2004). It is against this backdrop that the present study seeks to embark on the evaluation of pre-service physics teacher education programmes in universities in South-East Zone of Nigeria.

Statement of the Problem

There appears to be discrepancies among universities in the South-East Zone Nigeria on the extent and mode of implementation of the pre-service physics teacher education programme. This trend has led to shortage of qualified physics teachers in the secondary schools in South-East Zone. Physics education programmes in the

universities seem not to produce good physics graduates to teach in secondary school. Also, the level of performance of students in physics at the senior school certificate examination (SSCE) seems to be very poor. Physics still appear to be the school subject in which students experience the greatest learning problem and continue to have low level of achievement.

The abysmal failure of senior secondary school students in physics as a science subject in South-East Zone of Nigeria is an unpleasant situation and a source of worry to all and sundry. Therefore, there is need to critically evaluate the ongoing pre-service physics teacher education programmes in universities in South-East Zone of Nigeria in a bid to decipher the predicament and seek for way forward.

Purpose of the Study

The main purpose of this study was to evaluate the Pre-service physics teacher education programmes in universities in the South-East Zone of Nigeria.

Specifically, the study sought to:

- 1 identify the problems affecting the implementation of pre-service physics teacher education programmes in universities in South-East Nigeria.
- 2 determine the instructional materials, equipment and facilities available for effective teaching of physics education.
- 3 ascertain the admission figures of students into the pre-service physics education degree programme from 2018/19 to 2021/22 academic sessions.
- 4 ascertain the graduation figure of students from pre-service physics teacher education degree programme from 2018/19 to 2021/22 academic sessions.

Research Questions

The following research questions were posed for the study:

- 1 What are the problems affecting the implementation of pre-service physics teacher education programmes in universities in South-East Nigeria?
- 2 What are the available instructional materials, equipment and facilities for effective teaching of physics education?
- 3 What is the admission figure of students into the pre-service physics education degree programme from 2018/19 to 2021/22 academic sessions?
- 4 What is the graduation figure of students of pre-service physics teacher education degree programme from 2018/19 to 2021/22 academic sessions?

Hypothesis

This hypothesis was formulated to guide the study and was tested at 0.05 level of significance.

Ho: The mean rating scores of the lecturers and students on the problems affecting the implementation of pre-service physics teacher education programmes do not differ significantly.

Methods

Design of the Study

The design of the study was an evaluative design. Hillman (2010) defined evaluative design as a study in which the major thrust is the collection of data in their natural and un-manipulated setting, concerning an event, programme, project, process, input and output so as to determine the status concomitant to the aims and objectives. This design is considered appropriate for the study because it helps to accomplish the objective of the present study.

Area of the study

The area of study is South-East Zone of Nigerian. The South-East Zone is made up of these states: Abia, Anambra, Ebonyi, Enugu and Imo.

Population of the study

The target population of the study consisted of staff and students of the nine universities in the South-East Zone of Nigeria. The population was made up of all the Physics Education lecturers numbering 141, and all Physics Education students numbering 504.

Sample and Sampling Technique

The sample for the study was made up of 192 subjects consisting of 52 Physics Education Teachers (Lecturers) and 140 students from four out of the nine universities in the Zone. A stratified random sampling technique was used to compose the subjects for the present study. The nine universities were stratified in respect to Federal, State and Private Universities. This is to ensure representation of the universities for this study. The four universities composed after stratification were University of Nigeria, Nsukka (UNN), Godfrey Okoye University (GOU) Enugu, Abia State University (ABSU), Uturu and Ebonyi State University (EBSU), Abakaliki.

Instruments for Data Collection

Data for the study were collected using the following instruments:

- 1 Physics Teacher Education Programme Checklist (PTEPC)
- 2 Physics Teacher Education Programme Implementation Questionnaire (PTEPIQ I) for lecturers and (PTEPIQ II) for students.

The checklist was developed by the researchers, and it was titled Physics Teacher Education Programme Checklist (PTEPC). It was divided into three (3) sections: A, B and C sections. Section A was on availability of instructional Facilities/equipment for Pre-service Physics Teacher Education Programme. Section B contains Admission figure of students into the Physics Teacher Education Degree Programme from 2018/19 to 2021/22 and section C contains the output figure of students from 2018/19 to 2021/22.

The real limits of number scale to be applied in various clusters in taking decisions are:

Cluster one

Very major problem (VMP) ranges from 3.50 to 4.00, Problem (P) ranges from 2.50 to 3.49, Not a Problem (NP) ranges from 1.50 to 2.49, while No Idea (NI) ranges from 0.01 to 1.49.

Cluster two

Very often used (VOU) ranges from 3.50 to 4.00, Often used (OU) ranges from 2.50 to 3.49, Sometimes used (SU) ranges from 1.50 to 2.49 while Not used (NU) ranges from 0.01 to 1.49

Documents

Information was also collected from Nigeria University Commission's (NUC) Official documents on NUC Minimum standard with respect to Personnel and Facilities for Degree Physics Education Programme.

Validation of the Instruments

Both the checklist and questionnaire were face validated by three experts in the area of Physics Education and Measurement and Evaluation of University of Nigeria, Nsukka.

Reliability of the Instruments

Thirty copies of Pre-service physics Teacher Education Programme Implementation Questionnaire (PTEPIQT I and II) were trial tested on 30 lecturers and 30 students from two universities in North Central Zone. This is to avoid any form of undue influences with the study area because they are not part of the study area but are deemed to possess similar characteristics with the area of study. The universities used include Benue State University, Makurdi and Kogi State University, Anyingba. The data collected from the trial testing were subjected to statistical analysis using Cronbach alpha (α) reliability indices of various sections of the questionnaire. The internal consistency reliability coefficients calculated were 0.79 and 0.86 for cluster A and B.

Method of Data Collection.

The data collection procedure for this study involved a mixed-methods approach, incorporating both quantitative surveys and qualitative interviews to ensure comprehensive evaluation. A structured questionnaire was designed and administered to pre-service physics teachers across selected universities in Southeast Nigeria to gather quantitative data on their experiences and perceptions of the education programme. The questionnaire included sections on curriculum content, teaching methodology, assessment strategies, and the availability of instructional resources in the teacher education programme. In addition to the surveys, semi-structured interviews were conducted with lecturers and programme coordinators to gain deeper insights into the strengths and challenges of the programme. Data collection was carried out over a three-month period, allowing sufficient time for respondents to complete the survey and for follow-up interviews with faculty members. Ethical considerations were adhered to, with informed consent obtained from all participants, ensuring voluntary participation and confidentiality of responses.

Method of Data Analysis

The responses from the respondents were scored in terms of the modified Likert-type four-point rating scale values. The following statistical tools: percentage, mean,

standard deviation, and analysis of variance (ANOVA) were used in answering the research questions and testing hypotheses at $p = 0.05$.

Results

The results are presented based on the research questions and hypotheses that guided the study.

Research Question 1: What are the problems affecting the implementation of pre-service teacher education programmes in universities in South-East Nigeria?

Table 1: Mean Responses on the Problems Affecting the Implementation of Pre-service Physics Teacher Education Programme in Universities under Study

S/N	Questionnaire item	Respondents		
		X	SD	D
1	Facilities and equipment are not enough	3.08	0.95	P
2	Electricity supply is irregular	3.25	0.83	P
3	Journals in Physics Education are not available	2.97	1.02	P
4	Inadequate funding of the programme by governments	3.12	1.00	P
5	Inadequate number of teaching staff	1.61	0,76	NP
6	Time allocated is not adequate	1.74	0.84	NP
7	Teaching Practice Period is inadequate	3.10	0.93	P
8	Lack of lecturer's Motivation	3.03	0.90	P
9	Laboratories are not adequate	1.90	0.81	NP
10	Lecture rooms are small in size, and students are overcrowded	1.83	0.62	NP
11	Promotion of lecturer is not regular	1.74	0.78	NP
12	Offices are inadequate for lecturers in the department	1.74	0.78	NP
13	The programme course contents are too extensive	1.81	0.82	NP
14	Lecturers lack knowledge of ICT in teaching	3.18	0.75	NP

Key: X = mean, SD = standard deviation, D = decision, P = Problem, NP = Not a Problem.

With respect to the four-point scale in the questionnaire, acceptance level for the mean will be 2.50 and above. Items which have score of 2.50 and above shows acceptance while mean score below 2.50 shows non-acceptance. Table 1 shows the mean and standard deviation of the problems affecting the implementation of pre-service Physics teacher education programmes in universities in South-East Nigeria.

The analysis indicated that items 5,6,9,11,12 and 13 with mean below the criterion mean of 2.50 were rejected as the problem affecting the implementation of pre-service physics teacher education programmes, rather they can be seen as not affecting the implementation of pre-service physics teacher education programmes, whereas other items have the criterion mean of 2.50 and above were therefore accepted as the problems affecting the implementation of pre-service physics teacher education programmes. The

standard deviation of each item ranged from 0.62-1.02, indicating that the respondents were not too far from the mean and from one another in their responses.

Research Question 2: What is the availability of instructional materials, equipment and facilities for effective teaching of physics education?

Table 2: Mean responses on the availability of instructional materials, equipment and facilities for effective teaching of Physics Education.

University	Total No of Instructional Materials on the Checklist (PTEPC)	Number	Available
UNN	137	104	√
GOU	137	114	√
ABSU	137	99	√
EBSU	137	87	√
Total		104	

Table 2 above shows the availability of instructional materials, equipment and facilities for effective teaching of physics education programme. The table shows that the number of instructional materials, equipment and facilities available for effective teaching of physics education in university UNN was 104. The number of instructional materials, equipment and facilities available for effective teaching of physics education in university GOU was 114. The number of instructional materials equipment and facilities available for effective teaching of physics education in university ABSU was 99. That of university EBSU was 87.

Research Question 3: What is the admission figure of students into the pre-service physics education degree programme from 2011/12 to 2014/15 academic sessions?

Graph 1. The admission figure of students into the pre-service physics education degree programme from 2018/19 to 2021/22 academic sessions.

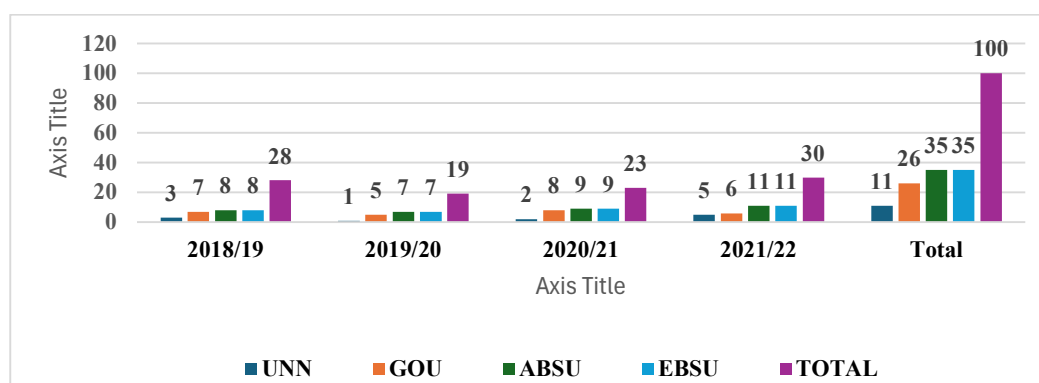


Fig 3: Admission Figure for Students from 2018 – 2022

Table 3: The admission figure of students into the pre-service physics education degree programme from 2018/19 to 2021/22 academic sessions.

University	2018/19	2019/20	2020/21	2021/22	Total
UNN	10	8	8	4	30
GOU	12	10	11	8	41
ABSU	9	13	10	6	38
EBSU	6	8	7	10	31
Total	37	39	36	28	140

Table 3 shows the admission figure of students into the pre-service physics education degree programme from 2018/19 to 2021/22 academic sessions. The table shows GOU admitted the highest number of students in 2018/2019 (12) and in 2020/21. ABSU admitted the highest number of students in 2019/20. EBSU admitted the highest number of students in 2021/22, and UNN admitted the lowest number of students in 2021/22 (4). The total number of students admitted in UNN was 30. The total number of students admitted in GOU was 41. For ABSU it was 38 and for EBSU it was 31. The total students admitted in the four universities in 2018/19 were 37, in 2019/20 it was 39, 36 in 2020/21, and 28 in 2021/22. The total number of students admitted in the four universities from 2018/19 to 2021/22 academic a session was 140.

Research Question 4: What is the graduation figure of students from pre-service physics teacher education degree programme from 2018/19 to 2021/22 academic sessions?

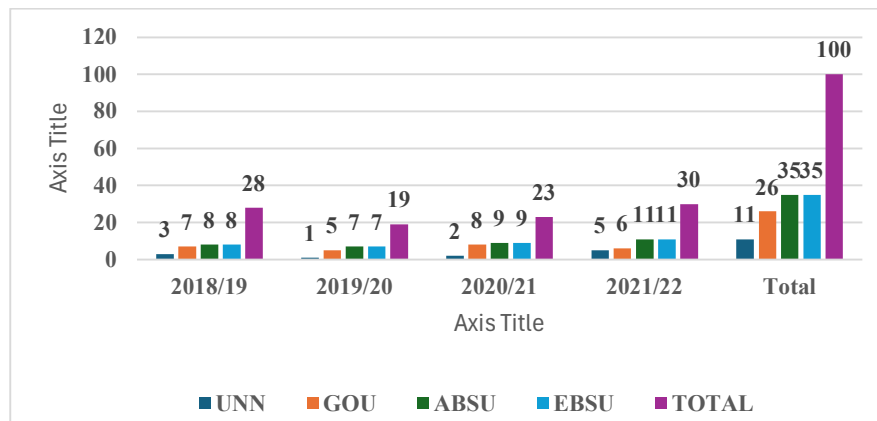


Fig 2: Graduation of Students from 2018 – 2022.

Table 4: The Graduation figure of students from Pre-service Physics Teacher Education Degree Programme from 2018/19 to 2021/22.

University	2018/19	2019/20	2020/21	2021/22	Total
UNN	3	1	2	5	11
GOU	7	5	8	6	26
ABSU	8	7	9	11	35
EBSU	8	7	9	11	35
TOTAL	28	19	23	30	100

Table 4: Shows the graduation figures of students from the pre-service physics education degree programme from 2018/19 to 2021/22 academic sessions. The table shows that ABSU graduated the highest number of students in 2018/2019 (10). EBSU graduated the highest number of students in 2021/22 (11). UNN graduated lowest number of students in 2018/19 (3), 2019/20 (1), 2020/21 (2), and 2021/22. GOU also graduated (5) students in 2019/20. The total number of students graduate in UNN from 2018/19 to 2021/22 academic sessions was (11). The total number of students that graduated in GOU from 2018/19 to 2021/22 academic sessions was (26). ABSU it was (28) and that for ABSU was (35). The total number of students that graduated in the four universities in 2018/19 was (28), in 2019/20 it was (19) (23) in 2020/21, and 30 in 2021/22. The total number of students that graduated in the four universities from 2018/19 to 2021/22 academic sessions was 100.

Ho: The mean rating scores of the respondents from universities under study on the problem affecting the implementation of pre-service physics teacher education programmes do not differ significantly ($p < .05$).

Table 5: The ANOVA on Mean Scores of the Respondents from universities under study on the problems affecting the implementation of pre-service physics teacher education programmes.

	Sum of squares	df	Means Square	F	Sig
Between Groups	.007	3	.002	.005	1.000
Within Groups	24.703	52	.475		
Total	24.710	55			

Table 5 shows that the F- value for hypothesis is .005 with significance value of 1.000, which is greater than .05. Thus, the test was not significant at 5% level of significance. We therefore do not reject the null hypothesis, so we conclude that the mean rating of respondents from various universities on the problems affecting the implementation of pre-service physics teacher education programmes do not differ significantly.

Discussion

There are major problems affecting the implementation of pre-service physics teacher education programmes in universities in South-East Nigeria, such problems include:

Facilities and equipment are not enough. Electricity supply is irregular, Journals in physics Education are not available, inadequate funding of the programme by governments, teaching practice period is inadequate and lack of lecturers' motivation. However, there are some minor problems affecting the implementation o pre-service physics teacher education programme in universities in South-East Nigeria. They include inadequate number of teaching staff, time allocated is not adequate, laboratories are not adequate, promotion to teaching staff is not regular, and offices are inadequate for lecturers in the department.

There is availability of instructional materials, equipment and facilities for effective teaching of physics education in universities in South-East Nigeria. The table shows that only one out of the four universities under study does not have the number of available facilities and equipment that is above averages, namely ABSU. The table also reveals that the university with highest number of available facilities and equipment is GOU, followed by EBSU, and UNN. The university that has the least number of available facilities and equipment is ABSU.

Conclusion

The present study was on evaluation of pre-service physics teacher education programme in the four out of the nine existing universities in South-East Nigeria. These universities are University of Nigeria, Nsukka (UNN), Godfrey Okoye University (GOU), Abia State University, Uturu (ABSU), and Ebonyi State University (EBSU), Abakaliki. The outcome of the study revealed that; there are many problems affecting the implementation of pre-service physics teacher education programmes in universities in South-East Nigeria. There are many instructional materials, equipment and Facilities available for effective teaching of physics education. The mean rating scores of respondents from various universities on the problems affecting the implementation of pre-service physics teacher education programmes do not differ significantly.

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