

STRATEGIES FOR ENHANCING COMPETENCE OF PRE-SERVICE TEACHERS IN ELECTRICAL/ELECTRONIC DEPARTMENT IN COLLEGE OF EDUCATION IN RIVERS STATE

ABSTRACT

The study was carried out to determine strategies for enhancing the competence of pre-service teachers in Electrical/Electronic Department in College of Education in Rivers State. Four purpose of the study and four research questions guided this study. A survey research design was used. The population for the study was twenty-one Electrical/Electronic department lecturers/instructors. A census sampling was employed. The instrument used for data collection was a structured questionnaire. Mean was used to analyze the data collected. The study found out that eight computers aided teaching strategies, six training activities, nine training facilities were required for enhancing the pre-service teacher's competence in Electrical/Electronic technology. It was also found that training and work environment can be organized in to enhance the pre-service teachers' competence in Electrical/Electronic Department in Colleges of Education in Rives State. Based on these findings, it was recommended that teachers of Electrical/Electronic Department in Colleges of Education in Rivers State should adopt strategies for enhancing the competences of the pre-service teachers; Government should organize workshops and seminars for the Electrical/Electronic teachers on how to enhance competence of students in electrical /electronic Department and Pre-service teachers of Electrical/Electronic Department in Colleges of Education in Rivers State should be retrained for effective teaching in schools and colleges.

Keywords: Pre-service Teacher, Competence, Training facilities

Introduction

The College of Education (COE) is principally a teacher training institution in the country established to produce teachers to teach at the secondary schools. College of Education (COE) was established to train individuals to become competent in teaching subjects in arts and science; science, Agriculture, Woodwork, Home Economics, Metalwork, Auto Mechanics and Electrical/Electronic technology. Colleges of Education, according to Ellah (2007), are tertiary educational institutions that prepare intermediate level teachers for a minimum of three years to make them qualify to teach their respective subjects. Bakare, Zakka and Fittoka (2010) stated that Colleges of

Education (Technical) run various technical education programmes such as Automobile Technology, Technical Drawing, Woodwork Technology, Metalwork/Mechanical Technology, Building Technology, Electrical/Electronic Technology and many other courses.

According to Attama (2011) stated that Colleges of Education (Technical) in Nigeria run the Nigeria Certificate in Education (NCE) programmes in vocational and technical courses. They are under the control of the National Commissions for Colleges of Education (NCCE) which uses the minimum standard to monitor the implementation of programmes in the colleges. Bakare, et al (2010) also explained that Colleges of Education were established for producing graduates who can teach and practicalize what they have learnt. Colleges of Education (Technical) as referred to in this study are specialized and conventional colleges that offer Technical Education programmes that is Federal Colleges of Education (technical) and states Colleges of Education that offer's technical education departments which have been accredited by the National Commission for Colleges of Education (NCCE) to train pre-service teachers. Pre-service teachers as referred to in this study are the NCE III candidates that are in Electrical/Electronic Department. The NCE III are chosen because it is at this level of study that the pre-service teachers chose their area of specialization, and the Electrical/Electronic Department is an area of specialization at the NCE III (NCCE 2008).

Electrical/Electronic technology is one of the technical education options offered at Colleges of Education that exposes students to practical knowledge and skills. It is concerned with the acquisition of practical knowledge and skills by pre-service teachers in areas such as measuring electrical quantities, magnetism and electromagnetism, electrical circuits, Electrical/Electronic drawing, electrical machines and power, telecommunications, and maintenance and repair of electrical equipment, (NCCE, 2008). According to Onifade (2009), Electrical/Electronic Department is designed to produce Electrical/Electronic personnel for manufacturing, assembling, servicing of power generator, transmission, distribution and utilization in industries.

Training activities could be described as the duties performed by a teacher at the particular period in the school system in achieving organizational goals. However, training activities as referred to in this study are the various tasks or duties to be performed, employing both human and material resources to achieve the objectives of

training pre-service teachers to acquire practical skills. Specifically, the activities include Student's Industrial Work Experience Scheme (SIWES), field trips/excursions and teaching practice. These are training activities performed outside the school settings, and are mostly been carried out with less attention by pre-service teachers. Therefore, this study sought to determine the competence of pre-service teachers in Electrical/Electronic department in Colleges of Education.

Statement of the Problem

Technical teachers' ineffectiveness in managing Basic Technology laboratory and preventing wastage of materials is an issue (Akinola, 2001). He further stated that the teachers' knowledge and skills in the subject matter is low. Similarly, Ede (2001) believed that technical teachers have deficiencies in planning and implementation of instruction in Basic Technology. Nigeria Educational Research and Development Council (NERDC, 2004) reported that 50% of the teachers in the Nigerian school system were found unqualified to teach. Also, World Bank report (2004) on Africa revealed that most of the teachers recruited into teaching position in Nigeria do not meet the qualification required for effective teaching. These reports have revealed that, there is general inefficiency of teachers, particularly the Nigeria Certificate in Education programme which is the minimum teaching qualification in the country.

The researcher is worried that, the methods employed in training pre-service teachers are no longer relevant, due to the technological changes and development in the country. And the activities which are expected to expose the pre-service teachers to actual training have not been able to, due to lack of commitment by the pre-service teachers, and lecturers. Therefore, this study sought determine the strategies to enhance the competence of pre-service teachers in Colleges of Education in Rivers State.

Purpose of the Study

The major purpose of this study was to determine strategies for enhancing the competence of pre-service teachers in Electrical/Electronic Department in Colleges of Education in Rivers State. Specifically, this study sought to determine:

1. teaching strategies aided by the computer for enhancing the competence of pre-service teachers in Electrical/Electronic Department in Colleges of Education in Rivers State.
2. the training activities adopted to enhance the competence of pre-service

teachers in Electrical/Electronic Department in Colleges of Education in Rivers State.

3. training facilities appropriate for enhancing the competence of pre-service teachers in Electrical/Electronic Department in Colleges of Education in Rivers State.
4. training environment adopted to enhance the pre-service teachers' competence in Electrical/Electronic Department in Colleges of Education in Rivers State.

Research Questions

The following research questions guided this study:

1. What are the teaching strategies aided by the computers used to enhance the competence of pre-service teachers in Electrical/Electronic Department in Colleges of Education in Rivers State?
2. What are the training activities used for enhancing the competence of pre-service teachers in Electrical/Electronic Department in Colleges of Education in Rivers State?
3. To what extent are appropriate training facilities frequently used to enhance the competence of pre-service teachers in Electrical/Electronic Department in Colleges of Education in Rivers State?
4. How can training environment be organized to enhance the competence of pre-service teachers in Electrical/Electronic Department in Colleges of Education in Rivers State?

Literature Review

Teaching is used to impart knowledge for a particular work, occupation, profession or for knowledge sake which can be engaged in by people in life work or as a means of livelihood. Teaching is the process of assisting an individual to acquire knowledge, skill and attitude through instruction. Ogwo and Oranu (2010) viewed teaching as the science and art of assisting a person to learn. The awareness of information and communication integration into education system is increasing. New information technology is the driving force behind the explosion of knowledge that we witness today. Every nation depends on its educational institutions to provide it with high level manpower which is necessary for its development and survival (Reyes, 2012). It is as a result of this that many countries place high premium on their education

system.

Electrical/Electronic is one of the technical education departmental options offered in Nigerian colleges of education. This programme is designed to meet the need of teaching personnel in secondary schools. Electrical/Electronic department in Colleges of Education is geared towards the production of technicians and craftsmen who have skill, altitude, and knowledge to meet the demand and the development in the Electrical/Electronic industries. In Electrical/Electronic Department, students learn the basic skills needed to operate, maintain, install and repair electronics and electrical equipment. This course has been incorporated into the programme in order to equip pre-service teachers with skills, knowledge and attitude (competence) for teaching basic technology and applied electricity in secondary schools after graduation. These pre-service teachers after graduation are expected to effectively teach all aspects of Basic Technology subject as well as Applied electricity to students in secondary schools in Nigeria.

The role of Information and Communication Technology (ICT) in Vocational and Technical Education is crucial. This is for the fact that knowledge of ICT can provide a lot of impact on the teaching of pre-service teachers; these include; offering a reality of experience which stimulates self-activity on the part of the learner, example the internet; providing a high degree of interest and sustains the interest. This can be done through the use of films, slides, models and personal computers for teaching and learning; they also provide the learner with the opportunity for independent and individualized learning; it offers rich opportunities for developing communication skills for the teacher and the learner. Assignments can be given and received on-line; teaching and learning of Vocational and technical related courses are made easier through the use of computers/internet. They ensure larger coverage of curriculum.

Training activities are strategies for enhancing competence of students. Training activities in Electrical/Electronic department require appropriate organization in order to enhance competence of pre-service teachers, this is because, when training activities are carefully organized and properly coordinated the objectives of the course are easily been achieved. Training activities in this study are; Students' Industrial Work Experience Scheme (SIWES), Field Trips/Excursions and Teaching Practice.

The students industrial work experience scheme (SIWES) is planned and organized training activity based on stated and specific learning and career objectives, and geared towards developing the occupational competencies of the participants. It is a skill training activity required to be undertaken by all candidates of institutions in Nigeria pursuing courses in specialized areas such as engineering, technical, business, applied sciences and applied arts, (Mafe, 2010) cite in (Tsojon & Gidado, 2011). In order to bridge the gap between theory and practice, students are exposed to machines and equipment, professional methods and ways of safeguarding work areas and workers in industries and organizations (Tiemo & Ogheneruemu, 2012).

Field trip is an outdoor activity aimed at complementing materials taught in the conventional classroom setting. Field trip according to Ogwo & Oranu (2010) is a well-organized visit to an area of interest for first-hand information. A field trip is a teaching method and can also be a training activity, this is because, if it is considered as a teaching method or a training activity, it still exposes the students to practical operation in the industries visited, which is aimed at equipping the students with competencies in their chosen careers.

In enhancing the competence of pre-service teachers, teaching practice (TP) is performed. It is a compulsory requirement before graduation. Teaching practice according to National Commission of Colleges of Education (NCCE), is aimed at equipping them with the ethos and practices of the teaching profession. It is performed in first semesters for all Nigeria Certificate of Education (NCE) pre-service teachers. Teaching practice in the colleges of education is a six (6) credits course that must be undertaken. The teacher decides what goes on in the classroom and transfers educational theories and principles into practice. According to Bosah (2011), a teacher is a person who inspires, supports, counsels and guides the students, a model for tomorrow's leaders. The training of teachers professionally in the colleges of education starts from the micro-teaching and teaching practice. However, Owodunni (2010) stated that, there is need for continuing training of teachers if qualitative education is to be maintained in our institutions. Living in a dynamic world with ever increasing knowledge, ideas and techniques at such marvelous rates that apparently sophisticated and fascinating inventions soon become outdated and unattractive junk in a matter of years and so the need for regular training (Anikweze, 2014).

Electrical/Electronic Department is a practical oriented course. Training students in Electrical/Electronic department can enhance the competence of students. Appropriate training facilities can be regarded as catalytic to the technology and acquisition of functional technical skills in the teacher education. Chen & Ierkwagh (2010) submitted that, no nation can develop meaningfully and attain professionalism without a good technical educational programme. This requires technical education students to be functional in the society after graduation. Modern infrastructural and training facilities in creating learnable atmosphere for effective technical education. All the tools, equipment and machines mentioned above are training facilities. These training facilities can enhance the competence of students if they are properly used and handled by the instructors/lecturers.

Adequate management of these training facilities becomes imperative for the achievement of the goals of technical education in Nigeria. Therefore, technical staff ought to and should be conversant with the names and uses of these tools to facilitate their effective management and utilization during teaching and learning. Functional training requires the manipulation of tools and equipment in the minimum standard should be readily available and utilize during training.

Methodology

The study adopted a descriptive survey research design. The descriptive survey research design is suitable for this study since data will be collected through questionnaire from lecturers of Electrical/electronic Department in Colleges of Education in Rivers State. This study was carried out in the Electrical/Electronic Department of the Federal College of Education (Technical) Omoku, Rivers State. The population for the study consisted of twenty-one (21) Electrical/electronic Department lecturers and instructors in the Federal College of Education, the only government college of Education in Rivers State. The whole population of the study was used as the sample of the study. This is called census sampling technique. The instrument for data collection was a structured questionnaire. The data was collected and analyzed using frequency tables and mean.

Presentation of Results

Research Question 1: What are the teaching strategies aided by the computers used to enhance the competence of pre-service teachers in Electrical/Electronic Department in Colleges of Education in Rivers State?

Table 1: Mean Response of the Respondents on the Teaching Strategies Aided by

S/N	Item Statements	VHU	HU	MU	RU	NU	$\sum fx$	Mean	Remark
1.	Train students using Auto-CAD in schools	5	6	6	3	1	76	3.52	Accepted
2.	Use of Projectors for teaching and learning	3	10	4	4	0	75	3.57	Accepted
3.	Circuit simulations are used for circuit analysis during teaching	5	8	4	3	1	76	3.62	Accepted
4.	Electrical/electronic drawings are demonstrated using computer aided design (CAD) (Auto CAD)	2	6	11	2	0	71	3.38	Accepted
5.	Assemblage and dismounting of electrical equipment are demonstrated using slide show	1	5	5	2	8	52	2.47	Rejected
6.	Various software's are utilized to teach power generation, transmission and distribution system	2	5	9	5	0	67	3.19	Accepted
7.	Power distribution in sub-stations are taught using power point	3	4	7	1	6	60	2.85	Rejected
8.	Intercom system connections are demonstrated using Auto CAD	3	4	6	5	3	62	2.95	Rejected

the computers used to enhance the Competence.

N = 21

Source: Researcher's Field Survey (2022)

Data in Table 1 above show that 5 items out of the 8 items given have their Mean values ranged from 3.00 to 3.62 which are above the cut-off point of 3.00, indicating that all the computers aided teaching strategies could enhance the competence of pre-service teachers while the remaining 3 items have their Mean values ranged from 2.47 to 2.95 which are below the cut-off point of 3.00 could not enhance the competence of pre-service teachers in Electrical/Electronic Department in Colleges of Education in Rivers State.

Research Question 2

What are the techniques that will be adopted to effectively utilize training activities for enhancing the competence of pre-service teachers in Electrical/Electronic Department in Colleges of Education in Rivers State?

Table 2

Mean Responses of the Respondents on the Training Activities for Enhancing the Competence of Pre-service Teachers **N = 21**

S/N	Item Statements	VHU	HU	MU	RU	NU	$\sum fx$	Mean	Remark
1.	The pre-service teachers perform the SIWES in relevant industries to enhance their competence	13	4	3	1	0	92	4.38	Accepted
2.	Pre-service teachers uses code of conduct given to them by their institutions before embarking on the SIWES training	8	8	3	2	0	85	4.04	Accepted
3.	Pre-service teachers are exposed to real life experiences concerning sequence of operations of machines during field trips	8	7	5	1	0	85	4.04	Accepted
4.	Posting of pre-service teachers for teaching practice is evenly distributed among schools	11	7	2	1	0	91	4.33	Accepted
5.	Pre-service teachers are always assigned to teach the subject in their area of study during the teaching practice	12	3	5	1	0	89	4.23	Accepted
6.	The right grading & supervision of Pre-service teachers in class as they demonstrate their competencies in the teaching profession is evenly used.	7	7	6	1	0	83	3.95	Accepted

Source: Researcher's Field Survey (2022)

Data in Table 2 above show that all the 6 items have their Mean values ranged from 3.95 to 4.38 which are above the cut-off point of 3.00, indicating that only nineteen techniques could be adopted to enhance the competence of pre-service teachers in Electrical/Electronic Department in Colleges of Education in Rivers State.

Research Question 3

What are the appropriate training facilities that will enhance the competence of pre-service teachers in Electrical/Electronic Department in Colleges of Education in Rivers State?

Table 3

Mean Responses of the Respondents on Training Facilities that will Enhance the Competence of Pre-service Teachers **N = 21**

S/N	Item Statements	VHE	HE	ME	R	N	$\sum fx$	Mean	Remark
1.	A well-equipped technical library that contains electrical/electronic textbooks, audio visual and visual aids for electrical/electronic courses are used.	5	12	2	2	0	83	3.95	Accepted
2.	Modern electronic measuring instrument in the laboratory are used.	10	6	3	2	0	87	4.14	Accepted
3.	Modern hand tools as required by NCCE are used by pre-service teachers.	5	9	5	2	0	80	3.80	Accepted
4.	Sufficient electrically powered hand tools for student's practicals are used.	6	6	6	3	0	78	3.71	Accepted
5.	Functional electrical machines as required by NCCE are used during teaching and learning.	4	6	8	3	0	74	3.52	Accepted
6.	Electronics and electrical components (gates, I.C's, capacitors and resistors) for	1	9	6	5	0	69	3.28	Accepted

	students practical's are utilized during teaching and learning.										
7.	Safety materials and equipment for fire fighting in electrical/electronic department workshops are handy.	3	6	9	3	0	72	3.42	Accepted		
8.	There are adequate numbers of storage facilities in electrical/electronic department workshops and are duly utilized.	7	4	6	4	0	77	3.66	Accepted		
9.	Electricity power supply to the workshops and classrooms of Electrical/Electronic Department is adequate.	5	4	8	4	0	73	3.47	Accepted		

Source: Researcher's Field Survey (2022)

Data in Table 3 above show that all the 9 items have their Mean values ranged from 3.00 to 4.14 which are above the cut-off point of 3.00, indicating that all are appropriate training facilities for enhancing the competence of pre-service teachers in Electrical/Electronic Department in Colleges of Education in Rivers State.

Research Question 4

How can training and working environment be organized to enhance the competence of pre-service teachers in Electrical/Electronic Department in Colleges of Education in Rivers State?

The data for answering research question 4 are presented in Table 4

Table 4

Mean Responses of the Respondents on How can Training & Working Environment be Organized

N = 21

S/N	Item Statements	SA	A	U	D	SD	$\sum fx$	Mean	Remark
1	By locating classrooms and workshops near each other.	8	10	2	1	0	88	4.19	Accepted

2	Lavatories for washing hands after practical's are provided near the workshops.	11	7	1	2	0	90	4.28	Accepted
3	By providing toilets and bathrooms for students within the departmental laboratories.	5	8	3	5	0	76	3.61	Accepted
4	By providing basic amenities such as fan, air condition, lights in the classes and laboratories	5	12	1	3	0	82	3.90	Accepted
5	By providing intercom network within the department for easy information dissemination	4	11	3	2	1	78	3.71	Accepted
6	By provision of Fire extinguishers which are mounted on walls to avoid floor space occupation within the laboratories	9	9	1	1	1	86	4.09	Accepted
7	Ensuring that Machines, equipment and tools have sufficient access area to permit their maintenance as well as operation within the laboratories.	9	8	3	1	0	85	4.04	Accepted
8	Ensuring twin fluorescent fittings are installed in the laboratory to reduce stroboscopic effect.	4	11	4	2	0	80	3.80	Accepted

9	Sufficient natural air ventilation and air conditionals in the laboratories to provide enough comfort during practical exercises.	12	7	2	0	0	94	4.47	Accepted
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Source: Researcher's Field Survey (2022)

Data in Table 4 above show that all the 9 items on how training and working environment be organized had their mean values ranged from 3.61 to 4.47. This shows that the mean value of each item was above the cut-off point of 3.00, indicating that all the items can enhance the competence of pre-service teachers in Electrical/Electronic Department in Colleges of Education in Rivers State.

Discussion of Findings

The findings of this study reveal 8 computers aided teaching strategies for enhancing the competence of pre-service teachers in Electrical/Electronic Department. The findings were in line with the opinion of Reyes (2011) that using internet facilities by the teachers for teaching and learning in schools will facilitate the competence of the graduates. The author further stated that the students under this learning condition will acquire useful skills in their areas of specialization. Also the findings were in agreement with the opinion of Ojugo, Aghware and Okonta (2010) that the integration of Information and Communication Technology (ICT) into the educational system has brought about the power shift in teacher/student structure, equipping students to become the producers of knowledge instead of knowledge consumers. The findings of this study reveal 19 training activities for enhancing the competence of pre-service teachers in Electrical/Electronic Department in Colleges of Education in Rivers State.

These strategies include the electrical/electronic industries are sort for by the school authorities before posting pre-service teachers to the industries, the pre-service teachers perform the SIWES in relevant industries to enhance their competence, pre-service teachers are given code of conduct by their institutions before embarking on the SIWES training, pre-service teachers are supervised regularly throughout the SIWES programme, staff and pre-service teachers are fully mobilized before the SIWES excise, log books, assessment forms, report sheets and other logistics are always provided for pre-service teachers and supervisors before embarking on the

SIWES, some pre-service teachers abandon the SIWES excise for other private businesses, pre-service teachers always stay on the SIWES training for the entire duration, pre-service teachers are always briefed about the terrain or industries they are to visit for excursions and pre-service teachers are exposed to real life experiences concerning sequence of operations of machines during field trip. The findings were in opinion of Hassan (2009) that exposing individual students to different relevant training activities improves competence and job performance.

The findings of the study reveal 6 training facilities for enhancing the competence of pre-service teachers in Electrical/Electronic Department. These findings were in consonance with the opinion of Tan (2009) that provision of training facilities in educational programme makes teaching and learning meaningful and also improve competence of the learners on how to do.

The findings reveal that 9 strategies on how training and working environment should be organized to enhance the competence of Pre-service Teachers in Electrical/Electronic Department in Colleges of Education in Rivers State. These findings were in agreement with the opinion of Akinrotohun, (2009) that proper organization of training and working environment encourages skills acquisition in occupation areas. The author added that to organize is to ensure that all human and material resources required are available and arranged such that they will enhance good working relation, effective communications and proper co-ordination to execute the programme.

Conclusion

Based on the major findings of the study, a conclusion was made. The study was set up to look at the different types of strategies that lecturers use to improve the competence of pre-service teachers. Teaching strategies aided by the computers, training activities, training facilities and training/work environment are identified as strategies for enhancing pre-service teacher's competence in Electrical/electronic Department in Colleges of Education in Rivers State.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. Lecturers of electrical/electronic Department in colleges of education in Rivers State should adopt different strategies to teach, for facilities and environment for enhancing the competences of the pre-service teachers.
2. Workshops and the workshop facilities must be conducive for learning.

3. Graduates of electrical/electronic Department should be retrained for effective teaching in schools and colleges.
4. Government should provide amenities and instructional facilities to all the colleges of education training teachers for secondary schools.
5. Qualified teachers of electrical/ electronic should be employed for teaching in Electrical/electronic Department in colleges of Education in Rivers State.

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