

## **Benchmarks in Workshop Equipment and Students' Practical Skill Development in Mechanical, Electrical and Building Construction Specializations in Cross River State College of Education**

**Arikpo, Sampson Venatius**

Department of Technical Education  
Cross River State College of Education, Akamkpa

**Bepoh, Gabriel Ukah**

Department of Curriculum & Instructional Technology  
Cross River University of Technology

**Ubi, Ofem Usani**

Department of Technical Education  
Cross River State College of Education, Akamkpa  
[ubiofemusa@gmail.com](mailto:ubiofemusa@gmail.com)

### **Abstract**

*The study examined the availability and utilization of workshop equipment and students' practical skills development in mechanical, electrical and building construction specializations in Cross River State college of Education. Two research questions and two null hypotheses were formulated to guide the study. Ex-post facto research design was adopted for the study. The research population was 6 technical lectures and 25 NCE III technical students drawn from technical education department. The entire population was used, hence no sample was made. Two instruments tagged "Availability of School Workshop Equipment Questionnaire (ASWEQ)" and "Utilization of School Workshop Equipment and Students Practical Skills Development Questionnaire (USWESPSDQ)" were developed by the researchers and used to elicit data in the study. The ASWEQ and USWESPSDQ were face validated by three experts in Test and Measurement and technical education in Cross River State College of Education. Data obtained were subjected to Cronbach's Alpha statistics which yielded 0.78 and 0.81 for ASWEQ and USWESPSDQ respectively. One-way analysis of variance was used for data analysis. The findings of the research revealed that there was no significant difference in the mean ratings of lectures on the availability of school workshop equipment for training NCE (Technical) students and there was significant positive difference in the mean ratings of students on the utilization of school workshop equipment students' practical skill development. Based on the findings of the study, it was recommended that college management should beacon on government to provide equipment/machines in all aspects of specialization in technical education programme and these equipment/machines when provided should be utilize by both lecturers and students during practical classes to enhance technical skills.*

**Keywords:** Practical skills development, School workshop equipment

### **Introduction**

The Nigeria Certificate in Education (NCE) technical is a three calendar years course comprising of six semesters. Students admitted into the NCE (Technical) programme offers all the courses listed in the first and second year and will choose area of interest in the third year from the following courses automobile, building construction, electrical/electronics, metalwork and woodwork technology. At the end of the training programme a technical students is expected to specialize in two related courses as listed above (one as major and the other as minor). Specialization means area of mastering. Mastering could be achieve when technical graduates are equipped with the intellectual and professional background adequate for teaching technical subjects and be adaptable to any changing situation in technology development not only in the country but also in the world at large. For this reason, according to the National Commission for Colleges of Education (NCCE) (2012) the objectives of NCE (Technical) program shall be to provide practitioners of technology capable of teaching basic technology in junior secondary schools, technical NCE teachers who will be able to inculcate scientific and technological attitudes and values into the society and qualified technical teachers so as to qualify them for a post-NCE degree program in technical education.

Workshop equipment provides the necessary physical material or facilities which can be manipulated during practical lessons for proper understanding of the lesson taught. This equipment has to be available in substantial quantity to facilitate instruction and make learning more immediate by means of experience. Bello (2012) observed that when equipment are not available in schools, there occur an adverse effect on students development. No effective technical education programme can exist without the availability of necessary equipment because, equipment enable the teachers and learners to develop problem-solving skills and scientific attitudes. When equipments are provided to meet relative needs of a school system, students will not only have access to the reference materials mentioned by the teacher, but individual students will also learn at their own pace (Ajayi, 1996). Apart from its effect on students' performance, low availability of equipment will limit students' opportunity of working with equipment and thus cannot develop the attendant technical process skills and equally cannot develop the appropriate and inquiry approaches to the study of technology courses. Availability and utilization of school equipment goes hand-in-hand in training students. It is therefore important not to lose sight of the need to effectively utilize this equipment for the development of appropriate practical skills. According to Etokebe (2008) the effective usage of workshop equipment would account for their effect on students' learning and achievement. This is because workshop experience provides knowledge of the equipment or illustrations of basic principles and their applications and serves as verifiable facts. Utilizing workshop equipment is also capable of improving students thinking skills, technical skills as well as motivating them to learn more and perform excellently well.

Giving the present economic state of the country, education should be made functional. The curriculum for colleges of education should lay more emphasis on practical skills acquisition. This is because the mandate of college of education is not just for training professional teachers but also in making trained teachers to be self reliant on graduation (Azunku, Nwebonyi & Uloh, 2010). Effective training also empowers trainees to be productive and contribute positively to the development of every nation (Ogwo & Oranu, 2006). NCE (Technical) teachers training programme should be handle in such a way that it can guarantee the production of graduates who will be skillful in their fields and capable of

been self reliant, self sufficient and job creators. Proper development cannot take place without the students having qualitative skills and competencies in the field of work. The resource based theory propounded by Coase in 1937 enable managers to appreciate why competence is perceived as a most valuable asset in an organization and individual. The theory holds that if resources are not available nor effectively utilized (when available), teaching and learning could be adversely affected or jeopardized. Thus, quality teachers, materials and facilities should be made available as resources to ensure effective implementation of technical education programme at tertiary level in Nigeria.

### **Statement of the Problem**

The quality of education and training given to youths depends greatly on the ability of institutions to adjust their educational content to the changing skill requirements of the nation. In other words, educational institutions are expected to provide knowledge and training that satisfies the human resource demands of the nation and the nation's economy. It is a known fact that the need for useful living gave birth to vocational and technical education. The implication of this is that institutions must in addition to general knowledge, orient their students in the study of technologies toward acquisition of practical skills, technical knowhow, attitudes and understanding relating to occupations in the various sectors of economic and social life so that the product can live and contribute to the development of the society. Technical subjects should provide skills and competences that will make its recipients employable in industries, self employed and employers of labour.

When students are not exposed to enough practical due to lack or inadequate tools and equipment or given practical instruction with non-functional equipment they look naive and uncomfortable at manipulations of some workshop equipment they were denied of using in their institutions. The increasing number of technical graduates roaming the streets in the search of jobs and the inability of the employed lucky few ones to show competence in their areas of speciality is a clear pointer to the fact that there seems to be a drift from the core philosophy of the programme. This will continue if institutions run technical programmes without adequate provision of instructional facilities or utilize them.

### **Purpose of the Study**

The purpose of this study was to investigate the influence of school workshop equipment on students' practical skills development. Specifically, this study sought to:

1. investigate the availability of school workshop equipment for training NCE (Technical) students.
2. examine the influence of school workshop equipment on students' practical skills development.

### **Research Questions**

The following research questions were posed to guide the study

1. are there available school workshop equipment in training teachers in mechanical, electrical and building construction technology?
2. to what extent does utilization of school workshop equipment influence students' practical skills development?

## Null Hypotheses

The following Null hypotheses were formulated and tested in the study

- Ho<sub>1</sub>** There is no significant difference in the mean ratings of lecturers on the availability of school workshop equipment for training NCE (Technical) students in mechanical, electrical and building construction technology.
- Ho<sub>2</sub>** There is no significant difference in the mean ratings of students on the influence of utilization of school workshop equipment on practical skills development.

## Methodology

Ex-post facto design was employed in this study. The choice of Ex-post facto design was considered because the phenomena of interest have already occurred and cannot be manipulated in any way. The area of the study was cross River state college of Education, Akamkpa. The population of the study was made up of 6 technical lectures and 25 NCE III technical students in the department of technical education. Since the population was small and manageable, the entire population was used as sampled hence no sampling procedure was adopted. Two instruments namely Availability of School Workshop Equipment Questionnaire (ASWEQ), Utilization of School Workshop Equipment and Students Practical Skills Development Questionnaire (USWESPSDQ) were developed by the researcher for the collection of data in the study. The ASWEQ was developed using the NCCE minimum standards for technical education. The ASWEQ consisted of two sections A and B. Section A of the ASWEQ sought information on lectures demography while section B consisted of 112-items structured on a 4-point Likert scale question items of Always Available (AA), Sometimes Available (SA), Rarely Available (RA) and Not Available (NA) with weight 4, 3, 2 and 1. The Utilization of School Workshop Equipment and Students Practical Skills Development Questionnaire (USWESPSDQ) was made up of three sections A, B and C. Section A elicited information on students demography such as sex, year of study, area of specialty among others. Section B consisted of 112-items and section C had 15-items constructed using a 4-point Likert scale question items of strongly Agreed (SA), Agreed (A), Disagreed (D) and Strongly Disagreed (SD).

The instruments were validated by three experts. Their comments and suggestions were used to produce the final instruments. The instruments were administered on 15 students in the study area but not part of the sample. Data obtained were subjected to Cronbach's Alpha statistics which yielded 0.78 and 0.81. These values indicated that instrument was reliable and suitable for use. The instruments were administered personally by the researcher. Data obtained were analyzed using One-way analysis of variance (ANOVA) to test the hypotheses at .05 level of significance. For decision to be taken, the null hypotheses were rejected when the calculated F-values were greater than the corresponding F-critical values, and accepted when otherwise.

## Result and Discussion

**Null Hypothesis 1:** There is no significant difference in the mean ratings of lecturers on the availability of school workshop equipment for training technical students in mechanical, electrical and building construction courses.

**Table 1: Summary of One-way Analysis (ANOVA) of the Mean Ratings of Lecturers on the Availability of School Workshop Equipment for Training NCE (Technical) Students.**

Group	N	X	SD
Mechanical lectures	2	11.42	3.51
Electrical lecturers	2	12.14	3.43
Building Construction lecturers	2	13.05	3.61
<b>Total</b>	<b>6</b>	<b>12.23</b>	<b>3.52</b>

  

Sources of variance	Sum of squares	df	Mean square	F-value
Between Group	96.33	2	43.145	3.487
Within group	6231.496	4	12.368	
<b>Total</b>	<b>6327.862</b>	<b>6</b>		

Not significant at .05, df = 2, 4 F-critical = 6.94

Table 1 shows that there were 6 respondents that constituted the analysis of the study 2, 2, 2 for mechanical, electrical and building construction technology. Their mean values were 11.42, 12.14 and 13.05 with standard deviations of 3.51, 3.43 and 3.61. To analyze the data the respondents were categorized on the basis of their area of specialty (Mechanical, Electrical and Building Construction technology) the result of the analysis in Table 1 shows F-ratio 3.48 when the ANOVA was performed using lectures areas of specialty and availability of school workshop equipment. At 2 and 4 degree of freedom (df), the F-critical was 6.94 which was higher than the F-calculated value (3.487). The null hypothesis was accepted which implies that there was no significant difference in the mean ratings of lectures on the availability of school workshop equipment for training NCE (Technical) students.

**Null Hypothesis 2**

There is no significant difference in the mean ratings of students on the utilization of school workshop equipment for training NCE (Technical) students in mechanical, electrical and building construction technology.

**Table 2: Summary of One-way Analysis (ANOVA) of the Mean Ratings of Students on the Utilization of School Workshop Equipment on Students' Practical Skills Development**

Group	N	X	SD
Mechanical specialization	5	14.08	3.28
Electrical specialization	13	15.30	4.12
Building Construction specialization	7	12.86	3.32
<b>Total</b>	<b>25</b>	<b>14.08</b>	<b>3.57</b>

  

Sources of variance	Sum of squares	df	Mean square	F-value
Between Group	100.89	2	58.44	3.724*
Within group	34079.051	23	56.58	
<b>Total</b>	<b>34179.941</b>	<b>25</b>		

\* $P < .05$ ,  $df = 2, 23$   $F$ -critical = 3.42

Table 2 shows that there were 25 respondents that constituted the analysis of the study 5, 13, 7 for mechanical, electrical and building construction technology. Their mean values were 14.08, 15.30 and 12.86 with standard deviations of 3.28, 4.12 and 3.32. To analyze the data the respondents (students) were categorized on the basis of their area of specialty (Mechanical, Electrical and Building Construction technology) the result of the analysis in Table 1 shows F-ratio 3.724 when the ANOVA was performed using students areas of specialty and utilization of school workshop equipment. At 2 and 23 degree of freedom (df), the F-critical was 3.42 which was less than the F-calculated value (3.724\*). The null hypothesis was rejected which implies that there was significant difference in the mean ratings of students on the utilization of school workshop equipment students practical skill development. Since the null hypothesis was rejected, there was need to probe the pattern of the significant difference between the scores involved. A Post-hoc Multiple Comparison Analysis was carried out using Fisher's LSD Multiple Comparison Test, as shown in Table 3.

**Table 3: Post-hoc comparison with Fisher's least significant difference (LSD) on the Mean Ratings of Students on Utilization of School Workshop Equipment.**

Students	Mechanical (n= 5)	Electrical (n= 13)	Building (n= 7)
Mechanical specialization	14.08 <sup>a</sup>	-1.22 <sup>b</sup>	1.31
Electrical specialization	0.31 <sup>c</sup>	15.30	2.44
Building specialization	0.30	0.69	12.86

MSW = 58.555

Not significant at .05,  $df = 23$ ,  $t$ -critical = 2.07

**Key:**

- a = Group means are placed along the diagonal
- b = Difference between group means are placed above the diagonal
- c = Calculated Fisher's LSD t-val between group means placed below the diagonal

The means comparison with Fisher's Least Significant Difference (LSD) in Table 3 indicated that the mean difference for mechanical and electrical specializations has a statistical mean difference as ( $t = 0.31$  and  $X = -1.22$ ). For mechanical and building specializations is statistically not significant as ( $t = 0.31$  and  $X = 1.31$ ) while, for electrical and building specializations there is a statistical mean difference also not significant as ( $t = 0.69$  and  $X = 2.44$ ). This indicated that the use of equipment/machines in teaching practical courses enhances students' skills acquisition in technical education programmes in colleges of education.

**Discussion of Findings**

The findings of the study were discussed hypothesis by hypothesis. The result obtained on the ratings of lecturers on the availability of school workshop equipment revealed that there was no significant difference in the mean ratings of lecturers on the availability of school workshop equipment for training NCE (Technical) students in mechanical, electrical and building construction technology. Workshop equipment provides the necessary physical materials which can be manipulated during practical lesson. The availability of these equipment makes learning more immediate by closing the gap between the classroom and the outside world. The finding agrees with those of earlier studies of Muhamed and Tashim (2003), Igwe (2005), Obalikwe (2011) and Kols (20013) whose studies revealed the presence of equipment in schools.

The result obtained on the utilization of school workshop equipment showed that there was significant difference in the mean ratings of students on the utilization of school workshop equipment on practical skill development. This might be due to the fact that most college stock with equipment in their school workshop locked them up as monument without students knowing about them or having access to them. The effect of workshop equipment cannot be ascertained until they are appropriately used. The manner in which they are used would account for their effect on students' learning and competence. Inyagu (2014) stated that the proper utilization of technical equipment in schools is capable of eliciting thinking skill, technical skill and students' motivation which will in turn result to excellent performance. However, in agreement with the findings, United Nation Education Scientific and Cultural Organization, UNESCO (2008) observed that practical teaching and learning relate positively with academic achievement, holding that an object handling impresses itself more firmly on the mind than the object merely seen from a distance or in an illustration. The result corroborates the findings of Ogbu (2015), Kelani (2007), Usen (2016) whose studies established significant difference between utilization of teaching equipment and students' skill acquisition.

**Conclusion**

Based on the data analyzed, findings and discussion made, it is concluded that there was no significant difference in the mean ratings of lectures on the availability of school

workshop equipment for training NCE (Technical) students and there was significant positive difference in the mean ratings of students on the utilization of school workshop equipment students practical skill development in Cross river State College of Education, Akamkpa.

### Recommendations

Based on the conclusion drawn, the following recommendations were made

1. The college management should beacon on government to provide equipment/machines in all aspect of specialization in technical education programme for the smooth running of the programme
2. Lecturers, workshop technologies and students should always utilize school workshop on equipment/machines during practical courses to enhance its influence on students' practical skills development.

### References

- Ajayi, A. O. (1996). *Quality improvement of teaching, supervision and administration in primary schools*. Ibandan: intec Printers Limited.
- Azunku, F. N, Nwebonyi, R. N and Uloh, V. E ( 2010). Soil conservation skills required by students of agriculture in colleges of education in South East Nigeria. Unpublished M.Ed thesis, university of Nigeria.
- Bello, T. O. (2012). Effect of availability and utilization of science laboratory equipment and students' achievement in senior secondary school physics. *World Journal of Education* 2 (5), 925 - 942
- Etokebe, I. J (2008). Availability and utilization of science laboratory equipment and students' performance in biology in senior secondary schools in Akwa Ibom State. Unpublished M.Ed thesis, university of Calabar.
- Igwe, T. D. (2005). Strategies for effective utilization of instructional materials in schools. A paper presented at the conference of principals of secondary schools in Ebonyi State.
- Inyiagu, E. E. (2014). Challenges facing technical and vocational education in Nigeria. *Journal of educational policy and entrepreneurial research* 1(1), 40 – 45.
- Kelani, R. A. (2007). Assessment of the adequacy and utilization of woodwork equipment for acquisition in technical colleges in Lagos and Ogun State. Unpublished M.Ed thesis, university of Nigeria.
- Kols, D. C. (20013). Repositioning facilities in technical colleges in Ghana for skill acquisition. *Journal of technical studies* 2(6).
- Muhamed, S. Q. & Tashim, O. (2003). *Bench mark for technical colleges instructional materials*. Kaduna: NBTE press
- National Commission for Colleges of Education (NCCE) (2012). Nigeria certificate in education minimum standards for vocational and technical education.

- Obalikwe, H. A. (2011). Availability of teaching materials and students' academic achievement in public schools in Agbani Local Government Area in Enugu state. *Unpublished B.Sc project University of Nigeria.*
- Ogbu, J. E. (2015). Availability and utilization of instructional facilities for the teaching for the teaching of basic electricity in Ebonyi State technical colleges. *Developing country studies* 5(21).
- Ogwo, B. and Oranu, R. N (2006). *Methodology in formal and non-formal technical and vocational education*. Enugu: University of Nigeria press.
- UNESCO (2008). *Challenges of implementing free day secondary education in Kenya*. Experience from district. Nairobi: UNESCO.
- Usen, O. M. (2016). Teachers' utilization of school facilities and academic achievement of student nurses in human biology in schools of nursing in Akwa Ibom State, Nigeria. *Journal of research and development in education* 6(1), 29 – 39.