

Equipment and Facilities Gap in Vocational Technical Education of Higher Institution: Implication for Graduates Employability in Nigeria

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Abstract

The global aim of technical education is to produce competent manpower who will be employable or self-reliant. The rising rate of restiveness and criminality occasioned by the spate of unemployment among technical education graduates in Nigeria calls for concern. Despite the huge government investment in technical education, there seem to be a lot of grounds to be covered in equipment and facilities. This study surveys the equipment and facilities used for teaching technical students in Nigeria Universities. A peer-reviewed methodological approach based on a systematic review of journal articles and a checklist of the minimum equipment and facilities standards by the National University Commission was conducted using research assistants from Adekunle Ajasin University, Akungba Akoko, Ekiti State University and the Bamidele Olumilua University of Education, Science and Technology, Ikere-Ekiti was used for this study. The totality of equipment and Facilities available in the 3 Universities for imparting knowledge in Electrical/Electronics, Building technology, Woodwork Technology, Metalwork and Automobile technologies. The percentages of the available equipment and facilities were obtained using Excel Package for generalization. The study reveals that equipment and facilities for some courses in technical education are grossly in short supply. A recommendation was made for further study on the quality and functionality of the equipment and facility for teaching technical students in Nigerian Universities.

Keywords: Equipment, Facility, Gap, Technical education, Employability

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1.0 INTRODUCTION

The aim of technical education in Nigeria is to equip its recipients with saleable skills that will allow them to enter the labour market after graduation based on their chosen areas of course specialization. This will lead to the attainment of objectives in the cognitive, affective and psychomotor domains of educational objectives. Teaching and learning in technical Education programmes demand a close relationship between the teachers and the students (Sacco, 1983). This permits the learner to gain the technical knowledge, information and skills and skills needed for the labour market. (Uwaifo, 2009). The training also requires the attainment of objectives in the three levels of educational domains. This refers to the affective, cognitive and psychomotor domains. Therefore, the students and the teachers must possess a strong interest in an area of specialization that involves the ability in manipulative skills, and an innate attitude in the field of teaching (Wahba, 2010). Technical Vocational Education and Training (TVET) plays an important role in the growth and development of many nations of the world (Otu & Aniedi, Usoro, 2020). The core areas of national life are programmable covered by technical education (Emmanuel, 2015a, 2015b). This consists of building construction, woodwork, Electrical/Electronic, Metal and Automobile technology. Therefore, there is no justification for any graduate of the programme to continue to lament the absence of work. The physical facilities are the tools that enable the teacher to impart knowledge effectively. In Nigeria, tools in industrial technical education are grouped based on the requirements of the various units and departments (Onyeike & Onyeagbako, 2018; NUC, 2004). Among the tools are saws, pliers, files, chisel, screws drivers, etc., these are classified as hand tools. The lathe, pillar drills, grinders, power saw, combination players, rolling, shaping and milling machines are classified under machine tools, while materials include steel rods, wood and cement (Uwaifo, 2009). The facilities that are common to the courses in technical education are the workshop stores, first aid boxes, demonstration charts, wash-hand basins, electrical sockets, drawing and chalkboards, and the main workshop buildings.

2.0 LITERATURE REVIEW

The planning for physical facilities in technical education needed adequate planning for the number of students that should enroll in the programme (Suyanta et al., 2019; Ukit, 2016). Similarly, a very sound maintenance culture is needed to be able to retain the good and

serviceable conditions of the physical facilities. This is effectively attained when the affective domain, good and serviceable physical facilities help in creating a synergy between the teacher and students. It is also important to note that instructional objectives are not achieved barely on the existence of physical facilities in the required number. Rather, physical facilities should be effectively associated with the appropriate instructional approach to achieve the stated instructional objective. This is desired to match the students with the need of the employer.

Various studies on unemployment in Nigeria including (Asaju, 2014; Awogbenle & Iwuamadi, 2010; Chinyere & Faith, 2012; Noko, 2017; SACCO, 1983) came up with several factors responsible for unemployment in Nigeria. This is regardless of the massive oil wealth, and abundant human and material resources present in the country (Lloydtruth, 2017). Some of the major factors that account for the high rate of unemployment in Nigeria are Low economic growth, adoption of untimely policy measures, Wrong impression about Technical Education, Neglect of the Agricultural sector of the economy, Poor enabling environment, Rural-urban migration, Rapid population growth, Outdated School curricula and lack of employability skills. Other factors advanced are a rapid expansion of the educational sector, and the overloaded curriculum of instruction (Noko, 2017; Okoye & Arimonu, 2016; Samuel & Olumuyiwa, 2012). What is central to all these factors are poor planning and the neglect of the educational sector. This has negatively impacted Technical Education and its products in terms of the fulfillment of its mandate of producing employable graduates. It is the view of this researcher that competently trained students will grow to become an asset to society rather than being a burden. (Kautz, Heckman, Diris, Weel, & Borghans, 2014; Moses, 2016; SACCO, 1983) gave several reasons such as corruption, poor funding and the dearth of infrastructural facilities as part of the factors responsible for the high level of unemployment among youth at regional, sub-regional and country levels. Noting that the government has been taking steps to address the factors listed by researchers, efforts must, therefore, be made to look at the adequacy of the equipment and facilities. The major reason advanced for lack of job among the youth is their lack of skills for employment. This is essentially the absence of employability skills. Employability skills are the employment skills needed by the youths not only to make them employable but to ensure their sustainability and advancement on the job (Kautz et al., 2014). Without adequate training and the use of the right tools and equipment, it will be difficult for graduates to fit into the labour market. This is the main reason many employers call them half-baked graduates (Ari, 2018; Babatunde Durosinmi-Etti, 2017; Holmes & Holmes, 2015). Therefore, the school environment must be a semblance of what the students will meet outside after graduation.

Many studies have identified equipment and facilities as one of the major problems confronting technical education programmes (Akanbi, 2017; Ayonmike & Okeke, 2016; John Olutope, 2014; Kinash, Shelley; Linda Crane; Madelaine-Marie Judd; Sally Kift; Kirsty Mitchell; Matthew McLean; Cecily Knight; David Dowling; Grace Lynch, 2015; Ukit, 2016; Ukuma, Ochedikwu, & Deke, 2013). There seem not to be practical steps towards analyzing the facilities gap in the provision of equipment and facilities in Nigerian Universities. Thus, this study focuses on the identification of the equipment/facilities gap in Nigeria tertiary institutions so that areas of deficiency could be bridged for the benefit of promoting graduate employability.

■ 3.0 METHODOLOGY

The descriptive survey was used for this study. It involves the development of a checklist after a thorough analysis of documents involving Government Policy and Journal articles. The checklist was used to assess the availability or otherwise of equipment, machines and tools housed by the respective University against the National University Commission recommended Standards. The process involved 3 Universities which has technical education in South-Western Nigeria. The study was conducted among the technical experts in the Adekunle Ajasin University, Akungba-Akoko, Ekiti State University, Ado-Ekiti and the Bamidele Olumilua University of Education, Science and Technology, Ikere-Ekiti because, they have access to the records of the various units in the departments. 30 experts were involved in the data gathering in the Universities. 10 research experts visited each of the Universities to gather the related data. The submission of the experts was collated and analyzed thematically to obtain the data matrix and the percentage. The Excel packages were used for the final analysis of the data.

Data Analysis

Table 1 Equipment and Facilities Standards for Electrical/Electronics

S/No	DESCRIPTION	NUC Minimum Standards	EKSU	AAUA	BOUESTI
1	Universal pipe bending	3	1	1	1
2	Long nose pliers	10	2	4	5
3	Blow lamps	6	4	2	-
4	Hammers assorted sizes	15	11	8	6
5	Hand drill	3	6	3	
6	Cold chisel sets	10	12	6	1
7	Screw driver	20	61	45	30
8	Electronic soldering iron 15/48w assorted	15	2	6	10
9	Files assorted	20	75	35	3
10	Wire gauze	5	-	-	-
11	Screwdriver	20	-	-	-
12	Measuring tapes	20	-	-	1
13	Metal rectifiers	20	-	-	-

14	Fixtures-fluorescent	10	-	-	
15	Capacitors assorted	20	-	-	28
16	Bells electric	10	-	-	4
17	Hydrometer	10	-	-	2
18	Magnetic kit	10	-	-	8
19	Continuity tester	10	-	-	-
20	Motor-wound motor induction	5	1	1	-
21	Miniature circuit breakers	10	10	6	2
22	Potentiometer	10	-	-	1
23	Motor generator unit – 220v	10	1	-	-
24	Power supply	5	1	-	-
25	AC and DC motor	15	-	-	1
26	Vacuum tube voltmeter	10	-	-	-
27	Voltmeter dc 0-2.5-25-220v	10	3	2	1
28	Experimental cell	1	-	-	-
29	Switches assorted	15	-	-	-
30	Relays	10	-	-	-
31	Volt-ohm meter, 240-500v	10	7	4	2
32	Cathode ray oscilloscope	4	1	1	2
33	Ammeter d. c 0-54 scale	10	49	26	1
34	Bench radio	4	-	-	-
35	Watt-hour meter (PHCN)meter	10	6	2	-
36	Workbenches	15	-	9	2
37	Galvanometer	10	-	5	1
38	Generator (sine and wave)	6	-	5	2
30	Frequency modulator	2	-	1	1
40	Cathode ray tubes	5	-	2	
Total number of items		414	254	89	115
Percent Adequacy			61.3%	44.5%	27.7%

Table 2 Equipment and Facilities Standards for Building Technology

S/No	Description	NUC Minimum Standards	EKSU	AAUA	BOUESTI
1	Portable tools (assort)	50	24	10	-
2	Pipe wrenches(assort)	5	2	1	-
3	Port compressor and acc	2	1	-	-
4	Portable concrete mixer	2	1	-	-
5	Portable pipe thread	2	-	-	-
6	Hack saws	15	69	31	-
7	Block making machine	2	6	1	2
8	Spades	10	6	3	9
9	Chisels	10	-	-	9
10	Trowels (assorted)	20	3	7	15
11	Tape measure (2.6 m)	15	-	1	3
12	Head pans	10	5	8	10
13	Sprit levels	15	12	14	18
14	Lion square	15	-	2	10
15	Shovels	10	6	7	6
16	Brush	10	-	3	5
17	30M Tape	5	-	2	3
18	Club	12	-	1	6
19	Axe	2	-	1	2
20	Watering Can	5	-	6	3
21	Water stainless bucket	5	-	2	4
22	Sieve	10	-	1	4
23	Floating Trowel	6	-	-	3
24	Scraper	10	-	-	5
25	Sledge hammer	4	-	--	2
26	Interlock plastic Mould	500	-	250	500
27	Weel barrow	8	-	-	5

28	Poker vibrator	1	-	-	1
29	Pan Mixer	1	-	-	1
Total number of items		752	38	332	626
Percent Adequacy			5.05	44.1	83.2

Table 3 Equipment and Facilities Standards for Woodwork

S/N o	Description	NUC Minimum Standards	EKSU	AAUA	BOUESTI
1	Jack planes	15	5	9	15
2	Smoothing planes	15	55	32	40
3	Rebate planes	15	-	-	2
4	Grooving/plough planes	3	-	-	1
5	Compass plane	3	-	-	-
6	Rip saw	15	-	-	6
7	Crosscut handsaw	15	-	-	5
8	Tension saw	15	-	-	10
9	Compass saw	15	8	3	2
10	Coping saw	10	8	4	4
11	Keyhole saw	10	-	-	-
12	Fret saw	10	2	1	2
13	Panel saw	10	9	12	10
14	Formal chise	20	-	6	20
15	Revenge chisel	20	4	8	10
16	Notice chisel	10	119	31	5
17	Firmer gauge set	8	-	-	1
18	Auger set	13	-	-	-
19	Twist set	10	10	6	2
20	Gimlet set	10	-	-	1
21	Spoke shaves set	10	-	-	5
22	Screw driver set	10	13	12	25
23	Mallet	16	12	4	25
24	Claw hammer	10	2	3	5
25	Bradawls	10	26	23	5
26	Sash cramp	10	-	-	2
27	G –Clamp	8	-	-	4
28	Circular saw	3	-	-	1
29	Surface	1	-	-	1
30	Wood lathe assoc	1	4	2	1
31	Band saw	1	1	-	1
32	Moister	1	-	-	-
33	Sanders	1	3	3	1
34	Cross cur sawing machine	1	2	1	-
35	Drilling machine	1	1	-	2
36	Oil cans	6	1	-	5
37	Sewing machine	2	1	-	-
38	Try square	10	74	32	20
39	Staples	5	-	-	-
40	Marking gauges	10	-	8	20
41	Mortise gauges	8	9	11	20
42	Marking knives	8	25	24	10
43	Meter square	8	31	6	1
44	Measuring tape	10	12	11	10
45	Compressor	3	1	1	2
Total number of items		396	438	370	302
Percent Adequacy			110.6	93.4	96.3

Table 4 Equipment and Facilities Standards for Metalwork

S/No	Metal Work	NUC Minimum Standards	EKSU	AAUA	BOUESTI
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1	Set of taps and wrench	10	1	-	-
2	Hacksaw frames	20	69	48	102
3	Cold chisels	15	16	24	29
4	Files assorted	20	75	78	375
5	Steel rule (300m)	20	18	34	70
6	Scriber	15	-	10	42
7	Set of dies and stock	10	1	1	5
8	Venier calipers	10	4	2	10
9	Micrometer assorted	20	18	5	1
10	Hammers	10	19	13	40
	Metal scrapers	13	11	16	8
11	Try square	11	18	10	48
12	Sanding machine	1	-	-	-
13	Grinding machine (uni)	1	6	5	4
14	Power hacksaw	1	-	3	1
15	Benches vices	18	7	2	6
16	Centre lathe	5	4	8	7
17	Grinding wheels	10	1	9	-
18	Pillar drilling machine	2	5	3	2
19	Milling cutters assorted	10	1	3	5
20	Universal milling Mac.	1	-	-	1
21	Surface plates	2	11	6	2
22	Forging hammers	10	-	-	-
23	Blows lamps	4	-	-	-
24	Soldering bits	20	-	-	12
25	Anvil	2	5	4	4
26	Blacksmith hearth	1	1	-	-
27	Flat nose pliers	15	6	7	9
28	Furnace for heat treat	2	2	2	2
29	Pipe cutter	2	1	-	-
Total number of items		281	300	543	785
Percent Adequacy			106.7	193	279.3

Table 5 Equipment and Facilities Standards for Automobile Technology

S/No	Automobile	NUC Minimum Standards	EKSU	AAUA	BOUESTI
1	Punches	15	10	2	-
2	Life vehicle	1	1	-	-
3	Dead vehicle	1	1	1	1
4	Diesel vehicle	1	-	-	-
5	Petrol engine	1	2	1	-
6	Chassis	1	1	-	2
7	Spanners open ended	10	16	8	2
8	Ring spanners	10	12	25	50
9	Socket spanners (boxes)	6	18	9	3
10	Ball peen	10	8	15	1
11	Pullers assorted	6	6	20	9
12	Grease guns	6	1	-	4
13	Screw driver assorted	10	30	15	9
14	Pliers assorted	20	10	20	9
15	Chisel assorted	20	10	5	-
16	Files assorted	15	14	21	50
17	Engineers square	10	18	3	-
18	Allen keys	10	-	-	2
19	Twist drills	10	-	-	-
20	Tread cutting taps and dies	5	1	-	-
21	Rubber mallets	5	16	-	-
22	Tire levers	5	2	23	38
23	Air compressor	1	1	1	1
24	Battery charger	1	1	1	3
25	Welding equipment	1	5	2	-
26	Electric soldering	10	-	-	15
27	Soldering lead	10	-	-	-

28	Grinding machine	1	3	3	2
29	Wheel balancing machine	1	1	1	2
30	Wheel alignments machine	1	1	1	1
Total number of items		199	189	197	204
Percent Adequacy			94.9	98.9	102.5

■ 4.0 RESULTS

Table 6 Percent Equipment/Facilities Adequacy by University and Course

	Electrical/ Electronics	Building Technology	Woodwork	Metalwork	Automobile	Percent Mean per University
EKSU	61.3	5.05	110.6	106.7	94.9	75.71
AAUA	44.5	44.1	93.4	193	98.9	94.78
BOUESTI	27.7	83.2	96.3	279.3	102.5	117.8
Percent Mean per course	44.5	44.1	100.1	193	98.7	

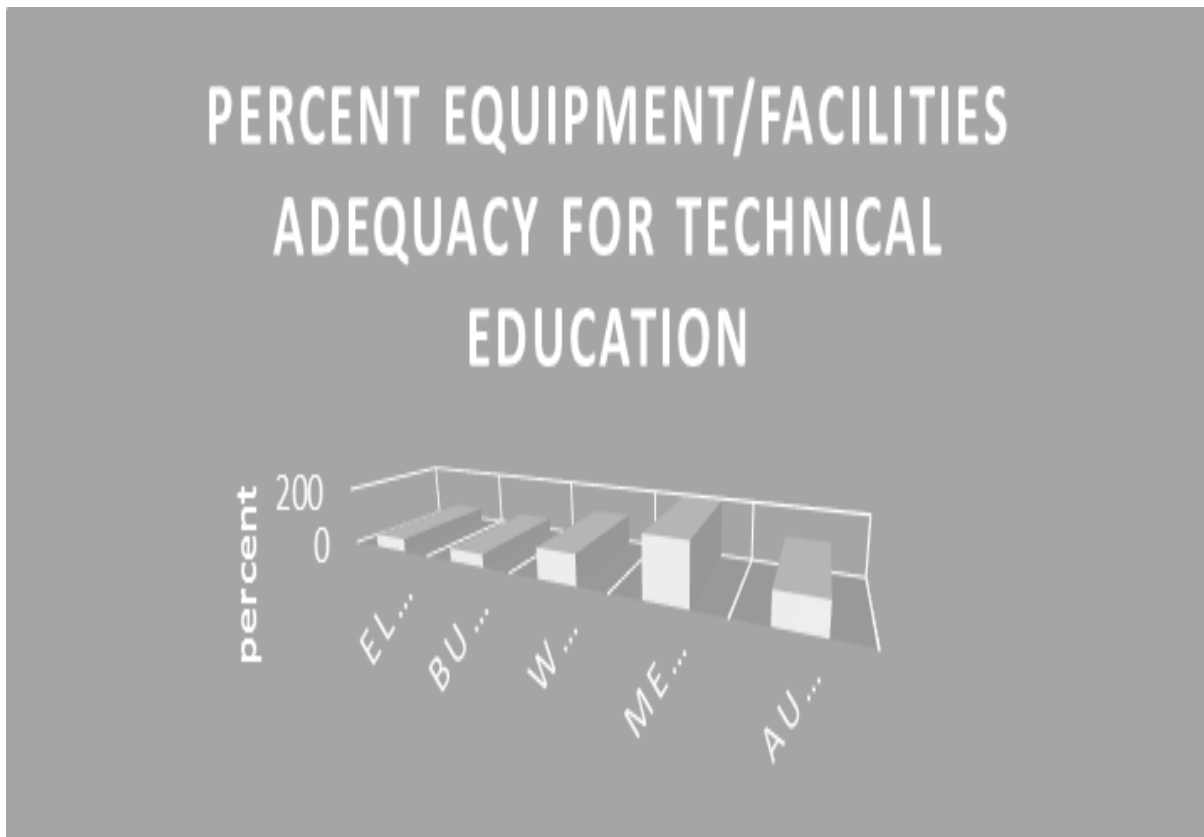


Figure 1 Percent Equipment/Facilities Adequacy for Technical Education Courses

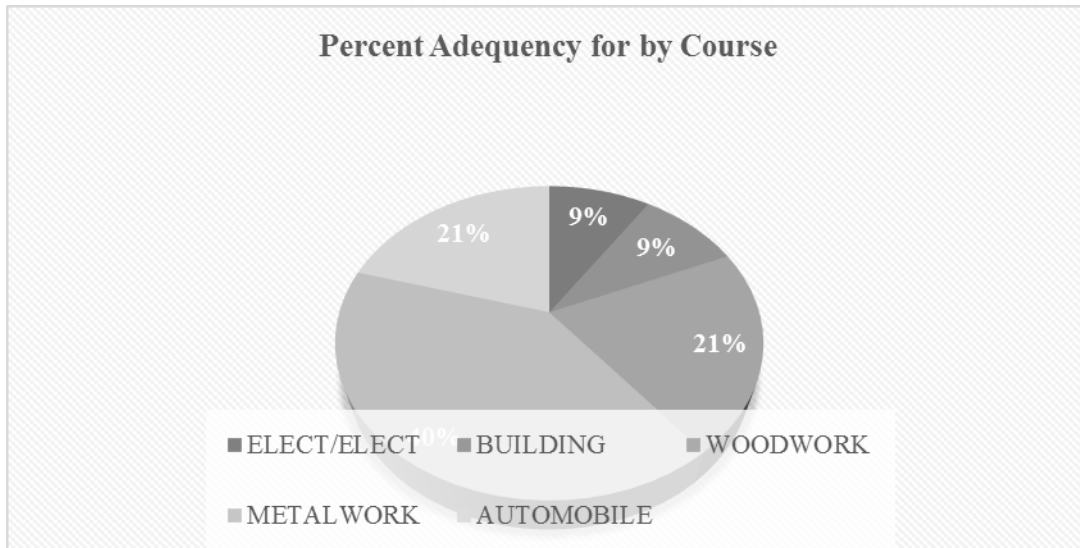


Figure 2 Percent Equipment/Facilities Adequacy by Course

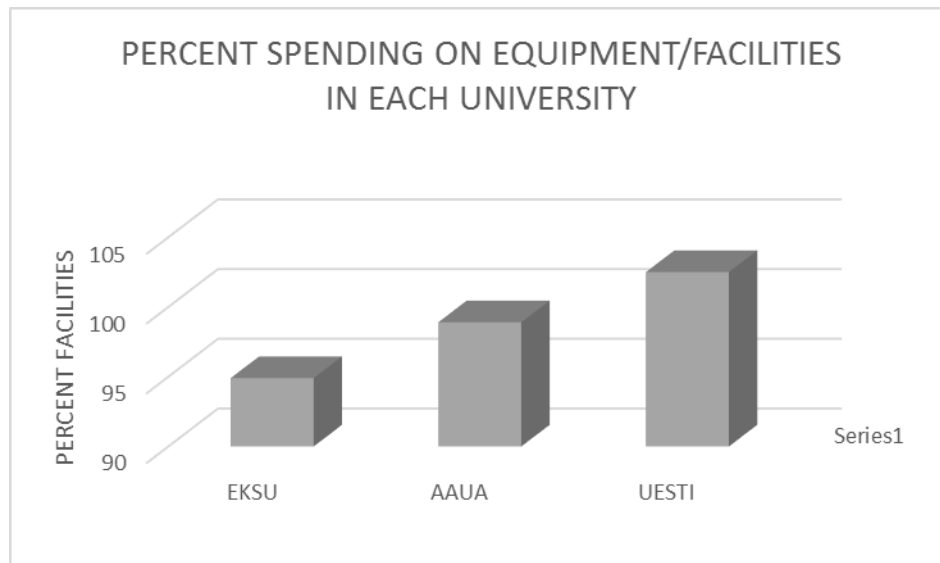


Figure 3 Percent Spending on Technical Education by Universities

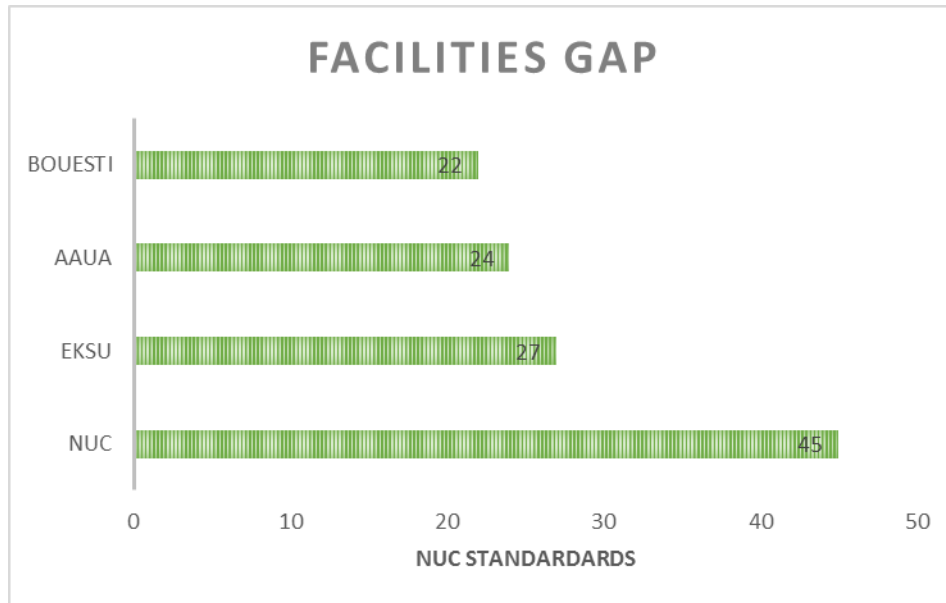


Figure 4: Equipment and Facilities Gap in 3 Higher Institutions

5.0 DISCUSSION AND RECOMMENDATION

The review of the independent data gathered by experts from each of the universities did not only reveal a gap in equipment and facilities but shows variances in what was procured to train students in each of the same symmetrical specialties of Electrical/Electronics, Building Technology, Woodwork, Metalwork, and Automobile Technology. Against the recommendations of the National University Commission (NUC), the arrays of the materials in the workshops and stores of the 3 Universities were at variance with the expected requirement. For example, the NUC expected 1 live vehicle for teaching Automobile Technology in Nigerian University, both Adekunle Ajasin University, Akungba (AAUA) and University of Education, Science and Technology, Ikere-Ekiti (BOUESTI), did not have any in their pool for the training of their students. Analysis of the findings revealed that each of the 3 universities spends a measure of their income on equipment and facilities procurement for technical education. The universities purchased more than the National University's Minimum Standards in many cases thereby leaving others to suffer. In this vein, the cost-benefit to technical education is allowed to suffer (Toby, 1997). While Woodwork, Metalwork and Automobile technologies have equipment and facilities adequacies of 100.1%, 193% and 98.7% respectively, the reverse was the case in terms of Electrical/Electronics and building technologies. This corroborated the study conducted by (Emmanuel, 2015b; Sambo, Garba, Zarma, & Gaji, 2012; Sunday et al., 2017) that many Electrical Technology students in Nigeria are unemployable (Adesina, 2013; Amedorme & Fiagbe, 2013; Asaju, 2014). Ekiti State University (EKSU) is recorded to have 75.71% adequacy on technical education, but building technology suffered underfunding with equipment and facilities adequacy of 5.05%. This implies that the graduates in the course specialization will find it very difficult to meet the requirement of the employers. This justifies the claim by many researchers that the skills aspect of technical education is being relegated to the background (Fraser, Duignan, Stewart, & Rodrigues, 2019; Olojuolawe, Bt, Amin, & Babatunde, 2020; Rahim Bakar, Mohamed, & Hamzah, 2013). Similarly, Table 6, shows that both Adekunle Ajasin University, Akungba Akoko and the Bamidele Olumilua University of Education, Science and Technology, Ikere-Ekiti (BOUESTI) did not meet the National University Minimum Standards for Electrical/Electronics. This accounts for the assertion of researchers that technical education needed remodeling in Nigeria (Abolo, 2016; Afolayan, Okodua, Matthew, & Osabohien, 2019). Figure 3 shows that Bamidele Olumilua University of Education, Science and Technology, Ikere-Ekiti has the highest percentage of equipment and facilities, followed by Adekunle Ajasin University, Akungba Akoko (AAUA). The obvious gap in equipment and facilities hampers the employability of the graduates. The environment in which the students are trained must be a near replica of where they would eventually work. Findings also show that EKSU is deficient in 27 out of the total 45 equipment and facilities required for teaching and graduating Electrical/Electronic Technology students. Similarly, AAUA is also deficient in 24 of the facilities while BOUESTI is also lacking in 23. These obvious gaps made the students unemployable and unfit for the need of the employers. Figure 4: explains this further. The same scenario applies to the 3 other vocational fields. The level of the gap in equipment and facilities procurement for the teaching and training of students is abysmally low compared to the recommendations of NUC for technical education undergraduate programme in Nigeria Universities. Except the trend is urgently reversed, technical education may not be able to meet the set goals of producing competently trained manpower for trade and industry and producing self-reliant individuals in Nigeria. Thereby, continuing to breed an army of unemployable graduates into society.

The study is, therefore, recommended for other disciplines of engineering and medical sciences to assess the adequacy and functionality of the equipment and tools being used for the training of students. This will ultimately provide feedback to the Management and the government for the development of an immediate action plan. The NUC should be more firm during accreditation of the University's programmes to ensure that strict compliance with laid standards.

6.0 CONCLUSION

The role of equipment and facilities in the teaching/learning process towards enhancing productive graduates cannot be overemphasized. The school Management must ensure that the equipment is not only adequate but meet the requirement of matching the students with the realities in the labour market. The environment in which the students are trained must be a replica of what they will meet after graduation. This will ensure the easy absorption of the graduates into the labour force and save the employers the huge cost of retraining. Thus, society will be to a reasonable extent free of the hooliganism and other social- vices that are troubling the Nigerian society and the world at large.

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