

RE-ENGINEERING TECHNICAL EDUCATION INSTRUCTION FACILITIES FOR ENHANCED VIABILITY IN NIGERIAN UNIVERSITIES

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Abstract

Technical Education in Nigerian universities involves an effective interaction among the lecturers, the students and the environment. The environment which includes workshop facilities enables the lecturers to achieve the stated objectives of the programme. The objectives of the programme could only be achieved if workshop facilities are provided to the schools and effectively put to use by the lecturers of the programme. However, doubts have been raised, over the adequacy and effective utilization of these facilities for maximum efficiency by lecturers of the programme. This study therefore was designed to determine the extent of availability of workshop facilities and their rate of utilization aimed at improving the teaching of technology education programme in Nigerian universities in order to fully appreciate and understand the objectives of the programme. All 105 lecturers from the ten public universities in the south-south and south-east zones of Nigeria offering technology education programme was used for the study. The workshop facilities in each of the school were compared with the National Universities Commission (NUC) minimum requirements of workshop facilities for the accreditation of technology education programme. The result revealed that no workshop facility items in the entire ten universities were provided in adequate quantity compared with NUC standard. It was also discovered that the available items are not being effectively put to use by lectures of the programme. Based on these findings, recommendations were made for universities to provide and effectively utilize workshop facilities, in order to make the aims of the programme truly realizable.

Technology education is the training of technically oriented personnel who are to be the initiators, facilitators and implementers of technological development of a nation by adequately training its citizenry on the need to be technologically literate, leading to self-reliance and sustainability. Technology education more than any other profession, has more direct impact on national welfare. Technology education contributions are widespread and visible ranging from Mechanical/metalwork technology, Electrical and Electronic technology, Building and Woodwork technology etc. Consequently, technology education can serve as change agents not only for technical systems but also for many other societal changes. The practical nature of

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Technology education makes it unique in content and approach, thereby requiring special care and attention. The inputs of technology education are so visible to the extent that even an illiterate could see when ‘failures’ occur. Technologists are supposed to solve societal problems in sustainable ways. For them to do so, they need to be sufficiently informed in technical education concepts and the application of its theoretical principles to practical problems. The desire of the stakeholders to achieve this has been met by lots of challenges. The inability to tackle the challenges over the years in Nigeria has put her at a low level in technology and has perpetually made Nigeria a developing nation. The difference between developed, developing and undeveloped countries rests on the ability of the developed countries to convert scientific ideas to useable technology while the developing and underdeveloped countries are yet to effectively do so.

Workshop facilities are the essential features that assist or enable the teacher to teach effectively, the existence of workshop facilities in required number does not in itself achieve the instructional objectives, rather facilities should be effectively associated with appropriate instructional technique in order to achieve stated instructional objective.

In order to effectively attain the objectives of technology education, the guidance of learners through planned activities that will enable them gain rich knowledge as well as produce a change in their behaviour is very necessary (Akuezuilo, 2000). According to Okorie (2001), technology education programme in the universities are geared towards the production of high skilled manpower in the industrial sector and prepare teachers of various grades to qualify as instructors, teachers and lecturers and are expected to teach technology education at all level of educational programme thus making its citizenry to be academically vibrant and technologically viable

Importance of Workshop Facilities to Technology Programme.

To achieve the objectives of technology education, the use of tools and equipment in appropriate environment is required. Such appropriate environment may be found especially in the laboratory or workshop. The recommendation for effective teaching of technology requires provision of workshop, because it can not be taught successfully without equipment and tools which are appropriately kept in the workshop. Regarding the teaching of technology, the Federal Ministry of Education, Science and Technology (1985:32) stated that “the theory is minimal and largely consists of simple explanation or description of how certain simple results are to be obtained with tools and equipment”. This indicates that emphasis should be placed more on practical activities in technology education rather than theories. As such, there is need to provide workshops and other resources if the practical orientation intended is to be realized.

Resources which can be referred to as “umbrella term” that comprises people, building, money, materials, machines, information, knowledge, etc. are needed for the full realisation of the objective of education. Emphasising the importance of workshop facilities in education, Olugbenga (1997) noted that the level of workshop facilities

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available to any educational system and the way they are put to use will determine, to a great extent, the performance of that system. He continued that considering the way some factors have influenced allocation and utilisation of workshop facilities were found to have high positive correlations with academic performance. He finally noted that for a high and uniform academic standard, workshop facilities must not only be available in adequate proportion but also be equitably distributed among technology education schools. For any nation to be self-reliant its educational programmes must have been properly planned and necessary facilities provided to enable the attainment of programme goals.

Since technology education is also designed to enable students understand ways in which industry and technology affect the production of consumer goods, the workshops needed are such that would enable the subject to be taught as an integration of necessary skills from various areas of the technical subjects. It would be best if such experiences can be provided with exposure, which would enable students to comprehend the basic processes involved in production and manufacturing of goods and services.

Utilization of Facilities for Instruction in Technology Education.

The utilization of workshop facilities requires deliberate effort on the part of the teacher. A versatile teacher of technology should have adequate knowledge of basic essential facilities and equipment needed to provide adequate practical skills in the subject. He or she should also be skilful in the utilization of machines and tools in order for him/her to be able to demonstrate the uses for instruction purpose. He needs to be assertive and also be able to provide logical reasons when recommending machines, tools, and materials for purchase. This is because, most authorities usually frown at the budget submitted by technology education departments due to the high cost of machines/tools and materials.

A good technology education programme of a school depends on the initiative and the background training of teachers of the subject. Adequate space for equipment and materials for practice are needed for effective instruction. Teachers and support staff should give attention to general and specific safety rules. During instruction, the technology teacher should have the ability to maximize the available resources (whether abundant or in short supply) to enhance the practical knowledge. Such knowledge ought to help students understand the basic industrial and technological processes in the world of work. Evans (2001:18) asserted that “we are all aware that a metalwork room sumptuously equipped does not necessarily mean good teaching or good work, conversely much excellent work may abound in a sparsely equipped metal workshop”. This is at the discretion of the teacher. He should be able to teach the subject in an integrated format and plan the lesson in a way that will be most stimulating to the learners.

The problems associated with ineffective teaching and learning of technology subjects could result from the extent of use of workshop instructional facilities. The role

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which workshop and equipment play in facilitating the sustainability of technological principles cannot be over stated. Students need a lot of practical lessons to be able to understand the principles involved in the course. Tools and equipment attract and motivate students thus, making them to be in very ready mood to learn the required skills. Most technological principles appear abstract in theory but become understood in practice. The students of technical education will benefit more when theoretical lessons are complemented with practical lessons. This will not only improve their application of the knowledge, but also its sustainance in university system. Technology education can only be effectively taught in a workshop setting, which is a replica of the one available in the society or industry. The implication of this is that each of the constituent optional area of technology education say woodwork or metalwork for instance, should be taught in the same way, with the same tool, with the same machine and with the same operations as in the occupation itself. This is the only panacea to technological growth that will ensure its sustainability in schools. According to Nwachukwu (2002), for any technology training to be successful and sustainable “the training should be based on “actual jobs and not pseudo jobs, that technology teaching and learning can only be achieved in schools where there are adequate and functional facilities”. He went further to say that the absence or ill-equipped workshops is a major constraint to the sustainability of technical education programme in Nigeria. Infact, an effective use of equipment in teaching and learning would enhance the acquisition of science and technology skills needed for sustainable exploitation and harnessing of the nation’s abundant materials resources.

Statement of the Problem.

Since over 30 years of existence, the objectives of technology education have remained unrealizable in Nigeria. According to Adeyemi (2005), the inability of our technology education graduates to be truely technologically viable and self-reliant in the profession for which they have been trained as observed by the massive dependence on white collar jobs by youths in the society today. This ugly situation has raised doubt about the success of this programme in this country that is in a hurry to emancipate from “white collar” to “blue collar” jobs and be amongst the first most developed nation in the year 2020. Alli (2002), asserted that although all hope is not completely lost, but the major reasons responsible for the sharp fall in the teaching of the subject which has made the objectives unrealizable at all levels must be carefully identified and solutions proffered in order to achieve enhanced effectiveness and revigourated vibrancy of the programme.

Research Questions

The following research questions guided the study;

1. What is the level of available workshop facilities for teaching technology education in Nigerian universities?
2. How frequently are the available workshop facilities utilized for teaching technology education in Nigerian universities?

Area of the Study

This study was carried out within the South-East and South-South geopolitical zones of Nigeria. These zones are made up of 11 states namely: *Abia, Imo, Anambra, Ebonyi, Enugu, Akwa-Ibom, Bayelsa, Cross-Rivers, Delta, Edo, and Rivers* States. These zones are chosen for this study because most of the earliest universities offering technical education programme in Nigeria where it is expected that dividends of the programme would have been fully manifested on its citizenry are located within this zone.

Population of the Study

The population of the study consists of all the lecturers of technology education in the public (Federal and State) Universities, offering technology education programmes in this zone. There are ten (10) Federal and State Universities offering technology Education programme with a total of 105 lecturers from this zone. The population distribution of the lecturers in the three course areas of technology education in each university is shown in Table 1 below:

Table 1: University Type and Population Distribution of Lecturers By Universities.

NAMES OF UNIVERSITY	UNIVERSITY Type	UNIVERSITY Codes	No OF LECTURES IN COURSE AREAS			Total
			Bldg/ w/work.	Elect/ Elect.	Auto/ Mech.	
1. Nnamdi Azikiwe University, Awka	Federal	NAU	3	3	4	10
2. University of Benin, Benin City	Federal	UNIBEN	3	4	4	11
3. University of Nigeria, Nsukka	Federal	UNN	4	4	5	13
4. University of Uyo, Akwa Ibom	State	UNIUYO	4	3	3	10
5. Ambrose Alli University, Ekpoma	State	AAU	4	4	3	11
6. Delta State University, Abraka	State	DELSU	4	3	4	11
7. Enugu State Uni. of Sci & Tech.,	State	ESUT	3	2	3	08
8. River State University of Sci. & Tech.	State	RUST	3	3	3	09
9. Ebonyi state University, Abakaliki	State	EBSU	4	4	3	11
10. Niger Delta University, Wilberforce Is	State	NDU	3	4	4	11
Total No. of Lecturers			35	34	36	105

Source: Researcher's input

Data Presentation.

Research Question 1: What is the level of workshop facilities provided for teaching technology education in Nigerian universities?

Tables 2 below, contain summaries of the data collected on the level of workshop facilities provided for instruction in the three major areas pf technology education programme in Nigerian Universities.

Table 2: Percentage Ranking of the Summary of Workshop Facilities Provided in the Three Course Area of Technology Education in Nigerian Universities.

University	Applied Elect./Electronics			Building/woodwork			Metal/Auto-Mechanic			Summary of availability in the 3 courses		
	Total Adq.	%age Adq.	Rank	Total Adq.	%age Adq.	Rank	Total Adq.	%age Adq.	Rank	No. Adq	% Adq.	Rank
AAU	23	57	4 th	29	48	10 th	39	65	8 th	91	57	9 th
DELSU	19	46	10 th	37	62	1 st	42	70	6 th	98	61	5 th
ESUT	26	63	1 st	32	53	7 th	49	82	1 st	107	66	1 st
NAU	22	54	7 th	33	55	5 th	45	75	3 rd	100	62	3 rd
RSUST	23	56	5 th	36	60	2 nd	37	62	9 th	96	60	8 th
UNIBEN	25	61	2 nd	31	52	8 th	47	78	2 nd	103	64	2 nd
UNN	24	59	3 rd	33	55	5 th	41	68	7 th	98	61	5 th
UNIUYO	22	56	6 th	30	50	9 th	29	48	10 th	81	50	10 th
EBSU	21	53	8 th	35	58	3 rd	43	72	5 th	99	61.5	4 th
NDU	20	50	9 th	34	56	4 th	44	78	4 th	98	61	5 th
		56.12			54.4			68.5			60.1	

Data in table 2 revealed that ESUT has 107 workshop items in adequate quantity, being 66%, out of the 160 workshop facility items that are needed in the three course areas of technology education programme listed by the National Universities Commission (NUC). This is followed in rank by UNIBEN with 103 items at 64%, NAU 100 items, at 62%, DELSU, UNN and NDU has 98 items in adequate quantity with 61% respectively; RSUST, 96 items at 60%; AAU 91 items at 57% and lastly in the rank is Uyo which has adequate quantity of 81 workshop facility items with 50% adequacy level.

Research Question 2: How frequently are the provided workshop facilities utilized for teaching technology education in Nigerian universities?
 Tables 3 below, contain summaries of the rate of utilization of workshop facilities by lecturers of technology education programme in Nigerian Universities.

Table 3: Summary of the Rate Utilization of Workshop Facilities in the Three Course Area of Technology Education.

S/No	Course Area	Often Utilized		Rarely Utilized		Total
1	Applied electricity/electronics	23	59%	17	41%	40
2	Building const./woodwork	27	45%	33	55%	60
3	Mechanical/metalwork	26	43%	34	57%	60
	TOTAL	76	49%	84	51%	160

The summary of the rate of utilization of workshop facilities by lecturers in the three course areas of technology education is shown in table 3. Data revealed that only 76 items out of the 160 listed are often used for teaching in technology education, representing 49% of all the facilities presented, while 84 workshop items are rarely or never utilized for teaching technology education by lecturers of the programme, representing 51% of the total listed. The result from the table clearly shows that the rate of utilization of workshop facilities in technical education programme across the Universities in Nigeria is grossly inadequate and needs urgent rehabilitation and improvement.

Findings.

The following findings were made from the data analyzed. The workshop facilities available in the three course area of technology education, (Applied electricity/electronics, Building construction/woodwork and Mechanical/metalwork) are grossly inadequate for teaching the programme, hence meeting the objectives of technology education in the universities would be negatively affected and grossly unattainable. This is because no tools or equipment in the three areas could be provided for at a minimum number recommended by the National University Commission (NUC) in all the universities under study.

The result of the study in the course area of applied electricity/electronics, building construction/woodwork and mechanical/metalwork on the rate of utilization of available items by the lecturers also revealed that not all the workshop items provided are utilized by the lecturers for instruction in technology education across the 10 universities under study. Only 24 items out of 40 workshop facility items listed were often utilized for instruction in applied electricity/electronics, representing 59%. Also, only 27 workshop items of building construction/woodwork were often utilized for the teaching of technology education. This represents 45% of the 60 workshop facility items listed. Thirdly, only 26 workshop facility items in Mechanical/metalwork course area are utilized for the teaching of technology education, out of the 60 items listed. This represents just 43% of the workshop facilities listed.

This summary of the findings therefore is that more than 50% of the items available for instruction in the three course area, of the programme were rarely or not utilized for the teaching of technology education in these course areas thereby raising doubts on how the stated objectives could be attained.

Conclusions

Based on the findings of this study, the following conclusions were drawn: Workshop facilities are inadequately provided for instructional purposes in the universities under study. This is because an inadequacy level of between 44% to 50% exist, which is high enough to prevent the aims of the programme from being achieved

On the rate of utilization of the workshop facilities for teaching technology education, only 76 workshop facility items are often utilized for instruction. This number represents 48% of the 160 workshop items, while the remaining 84 items

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representing 52% are either rarely utilized, not available for use, or are abandoned and neglected by the lecturers for utilization in the teaching and learning exercise. This unutilized rate is high enough to stall the objectives of the programme currently experienced today.

Recommendations

The recommendations of this study are as follows;

- 1) The departments of technology education should be properly funded and quality facilities provided to meet and even surpass the NUC recommendations and accreditation minimum requirements in all universities that have their facilities in a short fall.
- 2) The National Universities Commission (NUC) should insist on the provision of the minimum standard requirement of facilities before any Nigerian university could be accredited to offer any course in technology education programme.
- 3) Though it was observed that most workshop facility items were inadequate, record however revealed that some of those available in the institutions were not adequately utilized for effective teaching. It is therefore recommended that lecturers should increase their rate of utilization of the workshop facilities by teach and strike a balance between theory and practice so that both can complement the actualization of the stated objectives of technology education programmes.

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