

Factors Militating Against The Teaching And Learning of Technical Drawing In Technical Education In Public Nigerian Universities

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Abstract— This paper examined the factors militating against the teaching and learning of Technical Drawing in Technical Education in Public Nigerian Universities. Two research questions were raised to guide the study. The researchers adopted descriptive survey research design for the study .The sample of the study consisted of 470 technical education teachers using proportionate sampling techniques. The questionnaires was used to collect data from the respondents. Four point rating scale of likert format of strongly agree, agree, disagree and strongly disagree. The findings of the study revealed that there were inadequate qualified technical drawing teachers, students were not exposed to practical technical drawing, resource persons in technical education were not available for talks, seminars and workshops, government did not purchase facilities, provide studios instruments, materials, there were inadequate classrooms and the schools had no good technical drawing textbooks in the libraries. it was recommended that Federal ,States, Local government Tertiary Trust Fund should employ qualified technical education teachers, provide studios, purchase technical drawing instruments, materials, facilities, classrooms, libraries with good technical drawing textbooks in technical education in public Nigerian Universities.

Index Terms— Teaching and learning; technical Drawing, Technical Education Public Nigerian Universities.

I. INTRODUCTION

Vocational and technical education is that form of education that are offered in technical colleges, colleges of education (technical) and Universities. It prepares an individual to acquire practical skills, Basic Scientific Knowledge, altitude required by Vocational and technological studies at sub-professional levels. The goals of Vocational and Technology education as stated by the Federal Government of Nigeria FGN) (2004) in her National Policy on Education are:

- (a) To provide trained manpower in applied sciences, particularly at craft, advanced level;
- (b) To provide the technical knowledge and Vocational Skills necessary for Agricultural, commercial and economic development;
- (c) To give training and impart the necessary skills to individual who shall be self-reliant economically;

- (d) To give an introduction to professional studies in engineering and technologists;
- (e) To train people who can apply scientific knowledge to the improvement and solution to environmental problems for the convenience of man; and
- (f) To enable our young men and women have intellectual understanding of the increasing complexity of technology.

Concepts of Vocational and Technical Education in Nigeria

According to Federal Government of Nigeria (2004), Vocational and technical education

is a “means of preparing for occupational fields and for effective participation in the world of works; and indeed a method of alleviating poverty”. It is an aspect of education that leads to the acquisition of practical and applied skills as well as basic scientific knowledge, for individuals to live well in the society and contribute to its meaningful development. It is the type of education, which is directed towards the acquisition of skills for occupational life. The role of Vocational Technical Education according to United Nations Educational, Scientific and Cultural Organization (2007), technical and Vocational education helps to develop individuals’ knowledge, Science and technology in a broad occupational area requiring technical, professional competences and specific occupational skills. Technical and Vocational Education also develops the knowledge and skills that will help the work force become flexible and responsive to the needs of labor market while competing in the global economy of the nation. It went further to say that technical and vocational education ensures integrating the work place based learning and training into the technical and vocational programs become inevitable.

Robert (2005) reported that technical and Vocational education revealed the violence that is common in most Nigeria cities has its roots in unemployment and lack of parity in opportunities which comes about as a result of lack of technical and Vocational education. Those who do not have marketable skills may have no jobs and so may easily be misled into participating in heinous crimes which hinders the effective functioning of the economy in the society arising from Unemployment, a person that is gainfully employed may not be disgruntled to the point of taking to such crime. He added that Vocational and technical education reduces drop -out rate by providing training opportunities for persons who are unable to continue with the general form of education they may be pursuing. It serves as a way of ensuring the manpower needs of the nation in industrial,

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business, agricultural and other occupational clusters are met. Technical and vocational education also ensures that the available human resources within the society are streamlined into occupations on the basis of needs, interest and abilities. Akume (2006) pointed that technical and Vocational education gives employees the awareness that the only way workers can retain his/her employment is by providing more than he/she earns. He added that government promote technical and vocational education strategy directed at alleviating the conditions of the rural populace there by achieved the goals of a more balanced rural development. The former “chalk and talk” school system was clearly not effective in preparing workers for the jobs required by modern industries, government looked towards technical and vocational education as a means of providing the workforce needed in both rural and urban industries. This is done with the hope of improving the standard of living of the Nigerian citizens.

The Concept of Technical Drawing

The concepts of technical drawing are as follows;

Solid geometry, advanced geometrical construction, conic sections, intersection of surfaces, locus problems, principles of tangency, pictorial and perspective projections, isometric scales and isometric projections, oblique projections, freehand sketching of solid, introduction to orthographic drawing, interpretation of drawings, conversion of pictorial views and simple sectional views, preparation of working drawings, assembly drawings, cam construction, steel structural Graphics, complex jigs and fixtures, orthographic projections of the first and third angle projections, Sectional Views, auxiliary Views and projections, advance conic auxiliary projections, lines in space and links mechanism (Uddin, 2016).

Supply of Personnel to Teach Technical Drawing

Adeyemi and Uko-Aviomoh (2005) posited that the quality of any education program and its products are dependent on the quality of teaching provided with the program. It is very important that the teaching staff for technical colleges, Vocational and technical education programs must be “specialist” in their various fields but the number should be adequate and of good mix, even though it varies from trade to trade and work load.

Utulu (2003) posited that the shortage of technical education teachers is of the challenges plaguing the educational development, in the sense that failure to get teachers in sciences, mathematics and vocational and technical education fields retards the quality and number of output of students in these fields.

Adeyemi and Ogonor (2009) asserted that the human resources situation as regards the effective teaching of science, technical subject such as technical drawing in Nigerian technical colleges, technical and vocational education identified the dearth in the quantity and quality of teachers teaching the course as a serious problem. They further stressed that in terms of quantity, the numbers of teachers required to teach this course is in short supply in technical and vocational education. Aina (2006) observed that the short fall in the production of adequate qualified

technical teachers led various State governments to appoint anybody with science background to teach technical subjects. This could have negative effects on the teaching and learning process and this will have adverse effect for the primary foundation for any meaningful technological, scientific aspiration and development of a nation.

Uwameiyie (2010) cited that inadequate number of technical teachers has seriously affected the teaching of technical subjects in technical and vocational education. Despite the addition of existing colleges of education (Technical) Universities of science and technology which produce technical teachers, there has not been so much improvement in the inadequate number of Technical teachers to teach the Technical subject such as technical drawing in the universities. He went further to say that the shortage of vocational and technical education teachers is highly due to attractive conditions of service offered by industries and retrenchment exercise carried out by some State governments which remove many technical teachers from teaching in public schools.

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Supply of Equipment, Instrument and Materials to Teach Technical Drawing in Technical Colleges

The National Council on Education and Monitoring Committee (2002) and National Board for Technical Education (NBTE) (2005) recommended two blocks for workshops; one containing three rooms for woodwork/building construction, metalwork and technical drawing the other block containing two rooms for electrical/electronic and mechanical/metal work technology. On the issue of inadequate number of laboratories in schools Imarhiagbe (2005) recommended that building of functional laboratories was the best way to achieve the aim of technical colleges as stated in the National Policy on Education. Based on a large number of Junior Technical colleges high cost of providing laboratories and classrooms, desks, chairs and tables, chalkboards and so on. He stressed the need for functional laboratories, mobile laboratories, classrooms, desks, chairs and tables in schools.

Idiaka (2007) observed that one of the major reasons why some technical and vocational teachers leave the teaching field is the non-provision of adequate infrastructural facilities such as laboratories, workshops and classrooms

Asilokun (2008) asserted that the performance rate of any product of technical college is to a large extent a function of the available instructional facilities to which the student were exposed to while in the college. meaningful training could only be achieved if the equipment /tools and materials are available in industries are also used in training the students. He went further to say that basic machines, equipment/tools and materials are needed and absolutely necessary to make the teaching of technical subjects stimulating and goal directed.

Osuala(2007) indicated that technical and vocational education require a generous outlay of instructional facilities are grossly inadequate in various technical institutions across the country. Consequently, most teaching and learning are done theoretically and in some places they are not taught at all

The Organization for Economic Co-operation and Development (2003) sought for the role of physical facilities in schools. It concluded that the development of suitable economic school building and other facilities help to ensure fast and effective educational expansion. The organization went further to recommend standards which include sufficient space, lighting system, ventilation, furniture and equipment to enable students perform optimally in their tasks of learning. United Nations Educational, Scientific and Cultural Organization (UNESCO) (2007) also acknowledged the importance of well-equipped laboratories and workshops in a practically oriented programme such as technical and vocational education. The natures of technical and vocational education programmes are quite peculiar because emphasis is always placed on the development of manipulative skills. Unlike the conventional classrooms, technical workshop is a special space for designing, fabrication, repairs, maintenance and improvisation of materials. It further stated that in order to achieve the objective of technical and vocational education programmes, which mainly focus on production of skill personnel, the provision of adequately equipped workshops to encourage creative initiatives and practical development becomes imperative in schools. Mogbo (2003) stated that a good workshop helps learners to:

- (i) Acquire the necessary manipulating skills which its operation demands;
- (ii) Observe correctly, measure carefully and record accurately the outcome of an investigation under review;
- (iii) Device and design appropriate schemes for solving a problem;
- (iv) Inculcate the spirit of self-reliance to combat the day-to-day problem of living specially in these days of economic strangulation;
- (v) Improves viable alternative methods and materials when traditional materials are not available;
- (vi) Adopt at times a cost effective approach to the solution of problems;
- (vii) Proffer alternative and lasting employment to young school leavers and graduates in system where government jobs have become inaccessible;
- (viii) Arouse and maintain interest in the course in which the beneficiary intends to become experts;
- (ix) Verify facts and principles already taught; and
- (x) Elucidate theoretical work in order to aid comprehension. He noted that any standard workshop should:
 - (a) Accommodate reasonable number of students and workers;
 - (b) House the permanently installed equipment;
 - (c) Act as a warehouse for workshop tools; and
 - (d) Act as a warehouse for the raw materials. Mogbo (2003)

concluded that another important need for the effective implementation of technical and vocational education programmes are materials. Fixed parts and materials are required for use in the workshops and laboratories.

The National Board for Technical Education (NBTE) (2005) gave concern the unsatisfactory state of academic facilities in the technical colleges offering technical and vocational education programmes. The commission report identified three major problems namely, lack of equipment and tools,

inadequate infrastructure and inadequate number of qualified manpower in schools. The Federal Government, according to Ekpenyong (2005), equipment worth 218 million from Bulgaria and Czechoslovakia were distributed to schools in 1982. The National Council on Education Monitoring Committee (2002) reported that only 40% of the schools supplied the equipment and installed them. The non-installation of some of the equipment was due to lack of electricity and personnel to operate and maintain them. He added that in most schools no workshops to accommodate this equipment yet the students performed well in schools.

Training equipment such as machines, hand tools and well equipped studios are difficult to come by. Many technical colleges and universities offering technical and vocational education programmes still operate at their old sites, as they are unable to build appropriate infrastructures and equip the new site with training facilities. This high cost of administration of technical and vocational education programmes arising from building of classrooms, building and equipping of special workshops and laboratories, equipment and tools for practical work has been identified by many authors. He argued that technical and vocational education programmes were so expensive that government alone cannot meet the high demand of pressing national and economy priorities (Nwadiani, 2006)

Statement of the Problem

Education has always claimed a substantial amount in the allocation of fund in the annual budget but the reverse is the case today. This may have negative effect on the provision of tools, equipment, instruments, materials, workshops drawing studios and other facilities for training teachers in the Nigerian public Universities that offered Vocational and Technical Education courses.

Purpose of the Study

The purpose of the study is to find out the factors militating against the teaching and learning of technical drawing in Vocational and Technical Education in public Nigerian Universities specifically the study seeks to determine how many personnel are available for teaching technical drawing and how many facilities, equipment, materials, instruments, workshops available for the teaching of technical drawing in schools.

Research Questions

For the purpose of this study, two research questions are raised:

- (1) How many personnel are available for teaching and learning of technical drawing in schools?
- (2) How many facilities, materials, instruments, available for teaching and learning of technical drawing in schools.

II. METHOD OF STUDY

Design of the Study

The researchers adopted the descriptive survey research design for the study

Population

The population of the study comprised four thousand seven hundred (4,700) Technical and Vocational Education

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Teachers in Nigerian Universities. This information was received from the National Universities Commission, Abuja

Sampling Techniques

The 10% of the total population of 4,700 which is 470 Technical and Vocational Education Teachers constituted the sample for the study. This was carried out by using proportional stratified, random sampling techniques

Instrument for the Study

The four scale rating likert format of strongly agree, agree, disagree and strongly disagree was used to collect data from the prospective teachers of Vocational and Technical Education. The rating scale was structured into two tables and sought answers to the two research questions formulated for the study.

Validity of the Instrument

In order to validate the instrument, a panel of five lecturers in the Department of Vocational and Technical

Table 1: Classification of Respondents by the Personnel available towards the Teaching and Learning of technical drawing in schools

S/NO	Personnel items	Total	Mean response	Decision
1	There are qualified Teachers of Technical Education in schools	240	0.51	Disagree
2	Teachers of technical education expose the students towards the practical technical drawing in schools	223	0.48	Disagree
3	Resource persons are always available for talks, seminars and workshops in schools	230	0.49	Disagree

The data in table 1 above, pointed that 1, 2 and 3 with a mean of 0.51, 0.48 and 0.49 respectively shows that there were inadequate qualified teachers of technical education in schools, teachers of technical education did not examine their students towards the practical technical drawing in schools, Resource persons were not available for talks, seminars and workshops in schools.

Table 2: classification of Respondents by facilities, materials, instruments ,Available for Teaching and Learning of Technical Drawing in Schools

S/NO	Facilities/items	Total	Mean Response	Decision
4	There are good storage of facilities, materials, instruments, in schools	180	0.38	Disagree
5	My school has adequate classrooms	260	0.55	Disagree

Education, Faculty of Education, Ambrose Alli University, Ekpoma had ensured the validity of this instrument.

Reliability of the Instrument

The reliability of the instrument was established by conducting test retest of the instrument on twenty (20) teachers who were not part of this study at two different occasions with an interval of about two (2) weeks. The scores received from the test was subjected to P

Pearson's Product Moment Correlation Coefficient Reliability test of 0.75 which was high enough to achieve the objective of the study.

Administration of the Instrument

The 470 instrument was administered to the respondents with the help of trained research assistants. All the 470 instruments distributed were collected back.

Method of Data Analysis

The data were analyzed with mean

III. RESULTS AND DISCUSSION

6	My school has adequate drawing studios	170	0.36	Disagree
7	The technical drawing tables are enough in my school	200	0.43	Disagree
8	Government supplied facilities, materials and instruments of technical drawing in schools	250	0.53	Disagree
9	The school library has good Technical drawing books to cater for Technical Education Teachers in Schools	190	0.40	Disagree

The data in table 2 above, shows the item 4, 5, 6, 7, 8, and 9 with means response of 0.38, 0.55, 0.36, 0.43, 0.53 and 0.40 respectively indicated that government did not supply facilities, drawing materials and instruments to schools, there were no good storage of facilities, materials and instruments to schools, no adequate classrooms, no adequate drawing studios, the technical drawing tables were not enough and there were no good technical drawing text books for technical education teachers in schools.

IV. DISCUSSION OF RESULTS

Table 1 indicates that there were inadequate qualified technical teachers, students lack practical teaching of technical drawing and resource persons were not available for talks, seminars and workshops in schools. This view was supported by Utulu (2003), Adeyemi and Ogonor (2009), Aina (2006) and Uwameiye (2010) who opined that there were shortage of technical and vocational education teachers at all level of education in Nigeria. Adeyemi and Uko-Aviomoh (2005) who corroborated this from a different perspective by stating that teaching staff for technical colleges, vocational and technical education programs must be “specialist” in their various fields and the number should be adequate, good mix even though it varies from trade to trade and work load.

Table 2 reveals that there were no facilities, such as technical drawing instruments, materials, studios, classrooms, storage of facilities, and libraries had no good technical drawing books in schools. This view was in agreement with Asilokun (2008), Osuala (2007), UNESCO (2007), Aghenta (2006), Organizational Educational cooperation Development (2003) and National council on education and monitoring committee (2002) who reported that the technical drawing facilities, materials and instruments were grossly inadequate in various technical education institutions across the country.

Major Findings of the Study

The following findings include among others:

- i. There were inadequate qualified technical education teachers in schools;
- ii. Technical education teachers/lecturers did not expose the students towards practical technical drawing in schools
- iii. The resource persons were not available for talks, seminars and workshops in schools
- iv. Government did not allocate funds to purchase facilities, studios, instruments and materials of technical drawing in schools.
- v. There were no good storage of facilities, materials and instruments in schools
- vi. There were inadequate classrooms in schools
- vii. Their schools had no good technical drawing textbooks libraries for technical education teachers

V. CONCLUSION

Based on the findings of this study, the factors militating against the teaching and learning of technical drawing in technical education in public Nigerian Universities was not successful. There will be hope if all the proffered solution stated are implemented by the government.

VI. RECOMMENDATIONS

Based on the findings of this study, the following recommendations were made: tertiary education trustfund, Federal, States, Local governments and should employ

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qualified technical education teachers, purchase technical drawing facilities, instruments, materials, adequate fund to purchase technical drawing studios, classrooms and provide libraries with good technical drawing text books in public Nigerian Universities

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