

The Imperatives of Technical Drawing Skills in Teaching TVET Subjects: The Case of Nigeria

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Abstract

This paper focuses on the perceived imperatives of technical drawing knowledge and skills in teaching TVET Subjects. The concept of technical drawing is considered as an important means of communication in engineering, technology, industry and vocational fields. Therefore, the paper discusses the challenges militating against effective teaching and learning of technical drawing in Nigerian institutions. Some of the recommendations proffered are Technical Teachers teaching technical drawing should be given an inductive course in modern methods and techniques of teaching technical drawing to effectively impart the appropriate knowledge and skills of technical drawing to their students. Technical drawing should be made compulsory in all secondary schools in Nigeria. It should be accorded the same status as Mathematics and English, as these subjects form the entry requirements for all science, engineering and technological courses in tertiary institutions in Nigeria and elsewhere in the world. The paper concludes that government should pay closer attention to TVET programmes by putting in place the required infrastructures, facilities and equipment to provide a conducive environment in TVET schools for effective teaching and learning of TVET subjects particularly technical drawing as a key to technological breakthrough.

Keywords: technical drawing, Skills, teaching, TVET Subjects, Nigeria.

1. Introduction

Numerous studies have stressed the importance and the roles of training, acquisition and utilization of relevant skills by the people on economic growth and national development (e.g. Udoh & Akpan, 2014). This is because the fields of science, Technology, and Engineering have made and are still making enormous contributions in the area of economic growth and supply of modern amenities and services to mankind. A reason why governments, institutions and policy makers lay more emphasis on the need for practically oriented education curriculum which necessitate the need also to provide effective teaching of technical subjects in Nigerian educational institutions (Ezeani & Urama, 2014).

Technical Education and Vocational (TVET) plays a vital role in the technological advancement of any country. It has continued to gain prominence globally as a change agent for social, economic, technological and national development (Raimi, and Akhuemonkhan, 2014) This is evident as many countries have refocused their educational systems towards TVET Nigeria inclusive. According to Adams, (2008), World Bank Report, (2008) and Afeti, (2008), Technical Vocational Education and Training (TVET) is a powerful tool for accelerating technological advancement, citizens' capabilities, economic growth and national development. For a country to achieve these plausible advantages of TVET, a sound and functional education system need to be put in place. Functional education according to Udoh & Akpan, (2014) can be conceived as a well-organized system of education that ensure effectiveness of transmission, acquisition, creation and adaptation of information, knowledge, skills and values, for the purpose of resourcefulness and sustainable development of a nation. These characteristics cannot be achieved without adequate knowledgeable, dedicated and committed teachers and functional curriculum. This paper, therefore, seeks to explore the significance of technical drawing knowledge and skills in teaching Technical and Vocational Education and Training (TVET) courses in Nigeria.

Concept of Technical and Vocational Education

In a comprehensive term, technical and vocational education refers to 'those aspects of the educational process involving, in addition to general education, the study of technologies and related sciences and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various aspects of economic and social life'(NPE 2004). The term Vocational and Technical Education has changed in scope and structure since its inception. As a component of the general educational system, TVET has since increased in both prominence and complexity.

In Nigeria, TVET implementation covers the following areas; automobile, building, electrical electronics, metalwork, and woodwork technology (Technical) and agriculture, business, fine and applied arts and home economics (vocational). In technical education programs, technical drawing is integrated as a major agent in

accelerating, simplifying and promoting the teaching and learning TVET programs. For training to be effective in TVET subject areas, the trainer must have to be knowledgeable and skillful in technical drawing as it helps facilitate the teaching and understanding of learning in all technical and vocational education and engineering areas of work. Unfortunately, in Nigeria the implementation of Technical Vocational Education and Training (TVET) programs has been and is still challenged by lack of conducive environment, inadequate power supply, poor subject mastery by teachers and curriculum deficiency (Raimi & Akhuemonkhan, 2014; FME, 2012 ; Abassah, 2011).

Concept of Technical Drawing

Technical drawing according to Laguador, (2014) is a means of clearly and succinctly communicating all of the information necessary to transform an idea or a concept into reality. It is the act and the discipline of composing plans that visually communicate how something can be manufactured or constructed. Technical drawing is an important form of technological and engineering communication in science, technology, industry and vocations (Mikhailov, 2006). Without technical drawings, the engineering field would have been a discipline of enormous guesswork (Madsen, 2012). Technical drawing allows engineers to create designs, calculate forces and stresses on structures which contribute to the quality of products. The ability to know and work with technical drawings will not only make someone a good engineer or teacher, but it is a necessary skill on the way to becoming an expert in the profession. Therefore, the role of technical drawing in every aspect of engineering and technology is vital.

Technical drawing is a course of study within the technical and engineering education fields. Technical education aims to develop the individual through the provision of experiences directly related to technology and engineering. It improves an understanding of various aspects of industry, technology and vocations while developing in students' specific manipulative and cognitive skills and improve students' capacity and ability (New South Wales, 2007). Generally, technical drawing is the language used in engineering and technical fields; it is important that all stakeholders such as technical teachers, drafters, designers, engineers, machinists, electricians, and builders understand this language (Hablitzel, 2007). When properly understood, the discipline of technical drawing helps the technical teacher and other stakeholders in simplifying their jobs using 3D and 2D drawing and sketches.

The general objective of technical drawing as outlined by Caribbean Examinations Council, (2006) are:

- (i) develop an understanding and appreciation of Technical Drawing in the Industrial Society;
- (ii) discover and develop talents in the fields of Technical Drawing and related technologies;
- (iii) develop technical problem-solving skills in Technical Drawing as related to materials and processes;
- (iv) develop the correct and accepted Technical Drawing skills as demanded by Industry;
- (v) define the career opportunities available in Technical Drawing and its related fields;
- (vi) have a working knowledge and understanding of Computer Aided Drafting applications;
- (vii) develop skills to use drawing in the process of design.(Council, 2006)

Challenges to Effective Teaching of Technical Drawing in Nigeria

The challenges militating against the effective teaching and learning of technical drawing in Nigeria are numerous, but only the major ones are presented and briefly discussed hereunder. They include:

i. Lack of qualified technical drawing teachers: this is a serious problem in TVET in general and in technical drawing in particular. The quest for technical personnel in the present stage of technological growth is very important as the country strives towards being a self-reliant nation, meaning that, no meaningful development can take place without a conscious effort to have specialized manpower in various areas. Most graduates of TVET are specialist of one of the trade areas and not technical drawing. As such, they prefer to teach their areas of specialization and not technical drawing, and those who volunteer to teach it ended up in teaching areas they feel they can teach effectively and leave the rest. The effect of this is that poor attitude and loss of interest will be developed by most students towards the subjects.

ii. Use of traditional methods of teaching: science and technology are always growing in terms of new discoveries and designs, same with technical drawing which has move from manual to computer aided design. This implies that teaching and learning of technical drawing have also to change from the traditional method of teaching to introduction of modern teaching methods such as use of simulations, animations; application of soft wares such as auto card, etc. will facilitate effective teaching and learning of technical drawing.

iii. Lack of adequate drawing equipment/materials: TVET programme is very expensive as compared to conventional general education subjects. Particularly in terms of the provision of consumable training materials such as drawing boards, studio, drawing equipment and textbooks which are very expensive. In many schools, students have to pair with others on a drawing table during technical drawing lessons. This makes teaching and learning very difficult to both the teacher and the students.

iv. Lack of modern teaching aid: most institutions require modern instructional materials such as computer aided design (CAD) software, cassette, videotapes of drawings and internet facilities for students' researchers are not adequately available.

Conclusion

The purpose of TVET is to provide trained manpower in the applied sciences and business, particularly at craft and technical skills-oriented areas. The roles of the technical knowledge and vocational skills necessary for agricultural, commercial and economic development are enormous. It equally provides the necessary training and imparts skills to individuals, thereby making him be self-reliant. Thus, it is important for educational planners to employ strategies for effective instruction in technical and vocational education and training (TVET) subjects' particularly technical drawing. The quest for technological advancement cannot be overemphasized. It is therefore, important that our educational system be re-evaluated, and necessary amendments are made to re-focus TVET sub-system in order to meet the need for advanced technology for human comfort and economic growth and development.

Uwaifo, (2010) observes that no Nation can afford to ignore the impact of technology in the modern world or tread slowly on the path of technological development if it is not her wish to make herself as a dumping ground for foreign products. Nigeria needs to move faster than ever before so that her vision 2020 of being one of the world's 20th largest growing economies will become a reality. A waste of effort in TVET is a waste in human resources, which no rational society can afford. The educational system should pay closer attention by putting in place the required infrastructures, facilities and equipment to provide a conducive environment in TVET schools for teaching and learning of TVET subjects particularly technical drawing as a key to technological breakthroughs.

Recommendations

1. Technical drawing subject should be introduced and made compulsory in first year in the secondary schools and technical college, so as to expose the student to the basics of the subject and technological career.
2. Technical Teachers teaching technical drawing should be given an inductive course in modern methods and techniques of teaching technical drawing using CAD computer animation and application of software to effectively impart the knowledge and skills technical drawing to their students.
3. Technical drawing should be made compulsory in all secondary schools in Nigeria. It should be accorded the same status as Mathematics and English, or other Science subjects like Biology, Physics and Chemistry as these subjects forms the entry requirements into all science, engineering and technology courses in tertiary institutions in Nigeria and elsewhere in the world.
4. A conducive environment (well-equipped studio) with modern drawing facilities and instructional materials should be available for teaching and learning technical drawing in schools as they stimulate learning and arouse students' interest and develop a good attitude toward the subject and career in engineering and technology.

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