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Research paper

Instructional Competencies Required by Technical College Teachers for Effective Performance in Technical Drawing

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Abstract

The National Business and Technical Education Board (NABTEB) chief examiners reported that instructors employed to teach the students lack the required competencies in teaching methods in Technical Drawing (TD), which leads to poor performance. Therefore, a study was conducted to identify the instructional competencies required by technical college teachers in teaching TD. To achieve this objective, 3 (three) research questions were formulated to guide the study. The population of the study comprised 103 technical college teachers in Ondo state, Nigeria. A structured questionnaire of 38 items was used for data collection. The instrument was face validated by 3 (three) experts. Mean and standard deviation was used to answer the research questions and the reliability of the instrument was also established using Cronbach's Alpha, with the reliability coefficient being 0.84. Based on the findings, it was determined that technical college teachers required the identified 15 instructional competencies to teach effectively. It was also found that there are factors that militate against the teachers' competencies. The study's findings contributed to identifying these factors and to how the competencies could be enhanced.

Keywords: *Instructional Competency; Technical college; Performance; Technical drawing.*

1. Introduction

Technical Drawing (TD) is a unique course and a constituent of courses offered in the Technical and Vocational Education Training (TVET) programme. It is indubitably a medium of communication in the engineering field and, therefore, is regarded as the language used by engineers, technologists and technicians. TD involves delineating or depicting ideas through the use of both the brain and the hands. It is otherwise referred to as engineering drawing and is a compulsory course for all students taking technical education courses.

The National Policy on Education made TD an elective subject offered at secondary school level, but the National Board for Technical Education (NBTE) specified that it should be taught as a trade-related course and should be taken by all students in engineering and construction trades at technical colleges(1). The importance of TD in the field of engineering, and in all institutions that offer technical education programmes, necessitates the enhancement of its teaching. Technical colleges are regarded as a principal vocational institution in Nigeria and they provide full training, which is intended to prepare students for entry into various occupations (2).

In its National Policy on Education, the Federal Republic of Nigeria defined teaching as a systematic process of transmitting knowledge, skills and attitudes to students, in accordance with professional principles (1). This implies that it is very important for a teacher to have knowledge of his or her subject in every teaching and learning situation. The instructor in any work-based educational enterprise should be the master of the content that they undertake to teach (2). These assertions are in consonance with the popular saying that nobody can give what they do not have. However, for a teacher to play this essential role effectively, they must possess certain professional competencies. Competence is the capability of a person to do a job correctly and a competency is a set of distinct methods that provide an organized guide allowing the identification, evaluation and development of the behaviours in individual workers (3). Technical education teachers are expected to attain some specific competencies to enable them to perform their function optimally, in both workshops and in the classroom.

One must not simply and completely throw away the fact that TD, as a course, remains quite difficult for many students to understand. Therefore, any teacher of it in technical colleges must possess certain qualities, such as patience and commitment and must be caring or friendly to students in order to evoke their interest in the subject.

2. Statement of the Problem

According to the NABTEB chief examiners` report, the likely cause of the high failure rates in students in recent years is partly due to the lack of required competencies in teaching methods in the instructors employed to teach the students (4). The lack of acquisition of the relevant competencies by teachers in coaching TD could be responsible for poor performance in the classroom instructional delivery, which could be a factor behind the students' poor performance in TD.

Therefore, this study's problem statement is that TD teachers are not competent enough to train students in technical colleges. It is also a growing concern that there are low numbers of teachers conducting TD lessons and that the ones who are available are inadequately competent. The paucity of qualified teachers is one

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of the current issues that might diminish TVET as an effective tool for national development (5). Against this backdrop, it has become imperative to determine the competencies required in enhancing the teaching of TD.

3. Purpose of the Study

This study's purpose was to identify the competencies required in the teaching of TD in order to enhance the teachers' proficiency. Specifically, the study sought to identify:

i. The instructional competencies required by technical college teachers of technical drawing.
ii. How the instructional competencies in technical drawing can be enhanced.
iii. The factors militating against the acquisition of technical college teachers' instructional competencies in technical drawing.

4. Research Questions

The research questions are formulated as stated below:

i. What are the instructional competencies required by technical colleges teachers in TD instruction?
ii. How can the teachers' instructional competencies in teaching TD be enhanced?
iii. What are the factors militating against the acquisition of instructional competencies in TD teachers?

5. Methodology

The study adopted a descriptive survey design. The survey design was used because it involves seeking the opinion of a group of people that represents the entire population. The population for the study was 103 technical college teachers in Ondo state, Nigeria.
The instrument used for the data collection was a questionnaire, which consisted of 38 items, structured in a 4-point rating scale, based on the 3 (three) research questions formulated for the study. The opinion of the experts that validated the instrument was used to restructure it. The reliability of the instrument was also established using Cronbach's Alpha and the reliability coefficient was 0.84, which indicated that the instrument was highly reliable and suitable for the study. The administration of the instrument was carried out personally by the researchers over a period of 45 days. The mean and standard deviation were used to answer the 2 (two) research questions that guided the study. Any item with a mean of 2.50 and above was regarded as required and were, respectively, agreed, while items with mean below 2.50 were regarded as not required and were disagreed.

6. Findings

From the descriptive analysis method, using the mean, there are 15 instructional competencies required by TD teachers in technical colleges identified from the 38 competencies in the questionnaire. The results showed that instructional competencies have a mean ranging from 2.70 to 3.34. The important competencies require in teaching TD are the ability to draw an auxiliary view (3.38), proficiency in drawing the interpretation of a solid (3.30), the ability to draw cam profiles (3.31), competency in drawing orthographic projections (3.12), competency in identification and using drawing instruments (3.10), the ability to recognize different types of line and their application (3.08), proficiency in the practical application of terms and symbols (3.07), proficiency in pictorial drawings (3.07), proficiency in the development of patterns or solids (3.03), proficiency in working drawings (3.00), the ability to draw sectional views (2.99), proficiency in the construction of border lines and title blocks (2.85), competency in dimensioning drawings (2.79) and the ability to convert measuring systems (2.70).

The 10 items on how instructional competencies in TD can be enhanced indicated the importance of organizing workshops and seminars on self-confidence for the TD teachers (3.20), using modern techniques and equipment in teaching TD (3.15), effective management of time (3.06), stress management (3.02), working cooperatively (2.90), setting high standards of job performance (2.81), using different methods of instruction (2.80), coping with the students' pressure (2.78), how to work for long periods of time (2.77) and training and retraining as morale booster for TD teachers (2.67).
In the factors militating against the acquisition of instructional competencies of TD teachers, the 13 items findings are insufficient time for teaching (3.15), inadequate provision of funds (3.14), paucity of TD teachers in technical colleges (3.07), insufficient workshops and seminars (3.04), excessive workloads outside teaching (3.00), lackadaisical attitudes to work due to its complexity (2.93), use of obsolete teaching methods (2.90), poor provision of TD instruments (2.88), inadequate equipment and infrastructure (2.81), unqualified TD teachers (2.73), lack of motivation for the TD teachers (2.62) and unconducive TD studios (2.60).

7. Discussion

The respondents indicated that possession of competency is very important for effective instructional delivery of TD. The study also revealed that TD teachers need improvements in their instructional competencies in order to increase their teaching proficiency. This is an indication that, apart from the mastery of the subject matter, the development of a high level of competency is extremely important in the instructional delivery of TD in technical colleges. The study also revealed that TD teachers required professional training, and retraining, to enhance their instructional competencies. This is in line with the National Policy on Education of Nigeria, (6) which specified that all teachers in educational institutions should be professionally trained and that the teacher education programme should be structured to equip teachers for the effective performance of their duties.
The TD teachers also need to increase their pedagogical skills, self-confidence, stress and time management, and to be equipped with new teaching and learning skills, such as problem-based learning, scenario-based learning, work-based learning, cooperative learning, etc. This can be achieved by using a proper training and retraining programme, conducted by the agencies concerned (7). A sufficient number of qualified teachers should be engaged to eliminate the complexity being encountered by the TD teachers in the process of discharging their duty.
The use of technology in teaching and learning can improve the classroom and can enhance the students' higher-order thinking skills and attitudes (8). The use of computer aided instruction (CAI) in TD will make the class more interesting, as the teachers can show the process of constructing the drawing without any difficulty. Nowadays, the use of technology can make the teaching and learning process easier. TD teachers can obtain more information using technology, such as YouTube and online learning, (3) which will go a long way in boosting the students' interest.
In relation to the factors militating against the acquisition of the instructional competencies required by TD teachers in technical colleges, it was revealed that one of the factors was that TD rooms or studios in the technical college environment are not conducive to teaching and learning, due to the non-provision of the necessary infrastructure, instruments or well-equipped drawing rooms. This agrees with the work by (9)who posited that technical colleges in Enugu state lacked conducive practical learning environments, infrastructure, workshop equipment and tools. In order to conduct any meaningful teaching and learning in technical colleges, the instruction of the students must be accompanied with the use of appropriate tools, equipment and materials.
Therefore, it is recommended that:

i. Special training and retraining programmes should be organised for the TD teachers.

ii. The school administrators and the government should organise seminars and workshops at regular intervals for all TD teachers. This would assist in refreshing them.
iii. Additional qualified TD teachers should be employed to lessen the overloading of the teachers.
iv. All necessary instructional facilities, tools, equipment and materials should be provided in all the technical colleges' drawing rooms to assist the teachers in their instructional delivery, as well as making the environment more conducive for students to learn.

8. Conclusion

Based on the findings and the discussion above, it has been shown that technical college teachers required the 15 instructional competencies, the 10 approaches to enhancing the instructional competencies and the addressing of the 13 factors militating against the acquisition of the instructional competencies of TD teachers in order to make them proficient. The technical college management and the Ministry of Education in Nigeria must emphasize the development of the skills, as revealed among TD teachers, to meet the current trends in imparting knowledge to students.

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