



## Assessment of Students in Technical Colleges for Life-Long Learning: The Role of Competency – Based Assessment

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### **Abstract**

*At present, most of the products from technical colleges in Nigeria are not with the sufficient skills in their trade areas to enable them gain employment in industries or employ themselves hence there is high rate of unemployment, poverty and crime among youths. Many studies have attributed the lack of sufficient skills among technical college products to the absence of effective assessment process capable of assessing students comprehensively (knowledge, skill, and attitude). This paper presents an overview of assessment process in technical colleges which is mostly on the assessment of knowledge while other domains of learning such as attitude and skills are lacking. The paper presents competency – based assessment as innovation in assessment process employed in TVET in most industrialized nations. The roles of CBA in TVET are highlighted to include; improve like between knowledge and performance; reduces anxiety among students; increase intrinsic motivation among others. The paper presents problems affecting implementation of CBA in technical colleges to include; Absence of assessment policy that favours CBA; Lack of trained manpower; High cost of assessment process. This paper also recommends that government and other stakeholders should review assessment policy to reflect CBA NABTED should organize workshops and seminars on competency-based education and assessment; Government should ensure effective funding of technical colleges.*

**Keywords:** innovation in assessment; Life-long learning, competency-based assessment.

### **Introduction**

Globally, governments are embarking on policies and legislations that brought high priority to reformation in assessment approach in their educational sector. The aspect of education highly affected by this reform is the Technical Vocational Education and Training (TVET) in which Technical College education is a unit. The reason for this reform in the assessment approach is because it is no longer business as usual when it comes to the field of employment of new staff. Thus applicants seeking for employment who probably are products of technical college without the necessary skills are no more having the chances of getting the job.

Robert (2018) noted that there is growing demand all over the world for people who are competent in their fields of specialization before they are considered for employment. Therefore there is no doubt that industries all over the world compete fiercely in the war for talent. This is in recognition of the fact that human resource is most crucial for achieving sustainable industries. Sustainable industries require technical college products who are work ready and are capable of creating employment for themselves and others. Thus, technical college products should have the necessary skills to fit into the industries as craftsmen. This is as indicated in the National Policy on Education (FRN, 2013). The policy reveals that the goals of TVET shall be to: Provide trained manpower in the applied

sciences, Technology and business particularly at craft, advanced craft and technical level; Provides the technical knowledge and vocational skills necessary for agricultural, commercial and economic development; give training and impart the necessary skills to individuals who shall be self-reliant economically. These goals informed why the technical college curriculum in various trades is prepared in modules to enhance effective classroom instruction, workshop practical and assessment of students. The writing of curriculum in modules, provides means for the National Business and Technical examination Board (NABTEB) to award National Technical Certificate (NTC) to only Technical College products who are competent in their trades.

Unfortunately, it is no longer news that the quality of technical college products in Nigeria is widely criticized. For instance, Ogbuanya and Salihu (2009) noted lack of sufficient skills with attendant effect of unemployment among technical college products. Also, Tombarri and Celestine (2016), observed that qualifications gained at technical and vocational institutions in Nigeria do not match the real needs of the oil multinational companies; and that the graduates do not possess the skills they need to find decent employment. Similarly, Robert (2018) in his study noted that most technical college products in motor vehicle mechanics' work could not carryout maintenance of motor vehicles despite the good grades they obtained in their National Technical Certificate (NTC) at the end of their programme.

It is obvious that with effective assessment policy entrenched in technical college education, only qualified individuals would be promoted to the next level of their schooling and competent graduates awarded with NTC at the end of their programme in technical colleges. Ryan and Tippins (2004) stated that effective assessment is assessment process that assesses individual comprehensively. That is assessing knowledge skill and attitude domains of learning. The authors added that effective assessment is the only means capable of identifying who will perform best in a job. Similarly, by selecting a workforce through the use of effective assessment process, Pulakos (2005) noted that effective assessment would yield significant productivity increase, save cost, decrease in attrition and other critical organizational outcomes that translate into literally millions of dollars. Such effective assessment process is competency-based assessment (CBA). Competency-based assessment according to Robert (2018) is assessment process in which a number of assessment techniques are used to assess whether an individual has acquired the minimum knowledge, skills and attitude required to perform a given task satisfactorily. Thus, the adoption of CBA will enhance the role of TVET in improving equitable access to employment opportunities, productivity, and income generation.

### **Overview of Assessment Process in Technical Colleges**

In technical colleges in Nigeria, there are public and the school-based examination. The public examination is conducted by the National Business and Technical Examination Board (NABTEB). The NABTEB is responsible for the award of NTC to graduates from technical subjects and the National Business Certificate (NBC) for students in business subjects who successfully completed their programme and passed the prescribed examination. Students write these examinations at the end of their final year in school. The school-based examination are constructed and administered by the subject teachers to students on termly basis for the purpose of monitoring the academic progress of the students. Unfortunately assessment process in Nigerian schools had been criticized for not being able

to test what it supposed to test. For instance Ogwo and Oranu (2006) noted expert's argument on the efficiency and desirability of test as assessment instrument used in schools, because of their inadequacies in the assessment process. Thus both the public and school-based examination in Nigeria are described as traditional system of assessing students in school subjects (Robert, 2018). According to the author, traditional assessment is when assessment concentrates on assessing students mental ability while other domains of learning such as attitude and skill are neglected. However, Hoogveld (2003) described such assessment process as knowledge-based. That is assessment process that concentrate on assessing knowledge alone. Robert (2018) stated further that traditional assessment also has to do with the testing of low level cognition. Testing of low level cognition according to Anderson and Krathwohl (2001) is when examination questions are on checking only whether students can remember certain information in the syllabus.

On the assessment of attitude, Robert (2018) noted that NABTEB objectives papers in motor vehicle mechanics work over the years for instance, do not measure students' attitude in one hand, and that most of the test items that measure students' knowledge were on low level cognition.

Similarly, assessments of practical skills are in various forms. Okeke (2004) identified two forms to include product assessment and process assessment. In addition Ogwo and Oranu (2006) identified alternative to practical test as one of the methods also used by some examination bodies and teachers to assess practical skills. Product assessment according to Bukar (2006) is a mere looking at the students finished products and award marks without paying attention to the processes involved in performing the task. Thus in product assessment safety habits, correct use of tools and equipment cannot be assessed. Similarly Ombugus and Ogbuanya (2014) maintained that with product assessment, students can get assistance from other people to produce the product or in the alternative, students can buy the finished product from the market and present for final assessment. Bukar (2006) Ombugus (2013) and Robert (2018) observed that NABTEB and teachers make use of product assessment in their assessment of practical skills, a situation which renders technical college education counter-productive. This is because in product assessment the actual ability of the students cannot be ascertained leading to certifying the wrong people competent. However, Ombugus (2013) and Robert (2018) noted that NABTEB make use of marking scheme checklist, but that the marking scheme checklists provided by NABTEB only highlight the major skills to be rated without detail and systematic presentation of various skills involve in executing a given task. Thus, process skill assessment is most preferred for assessing students' practical skills.

Okwelle and Okeye (2016) described process assessment as assessment method which takes account of the processes of the practical activities leading to having the final product. Ombunus (2013) opined that process skills assessment involves step-by-step method of carrying out practical activities in the workshop. Robert (2018) stated that process skill assessment is the assessment technique that involves the use of rating scale to monitor how a student executes a given task sequentially followed by awarding scores based on the students' abilities. Researchers such as Ogwo and Oranu (2006), Bukar (2006) Okwelle and Okoye (2012) and Robert (2018) have confirmed that competent craftsmen could be selected through the use of process skill assessment. Thus, the use of workshop-based process skill assessment in assessing practical work in technical colleges is inevitable if the main purpose of assessment is to reveal whether a student is competent or not competent in a given task.

## The Concept of Competency-based Assessment

Competency-based assessment is on the agenda in the on-going attempt to reform the teaching, learning and assessment of students in technical and vocational institutions for the purpose of producing competent personnel for the world of work. Competency-based assessment is an innovation in assessment of students especially in educational fields that involve practical activities. For instance, CBA has been used in medical field in the training and assessment of medical students. It is conceptualized by Commonwealth of Australia (2009) as a purposeful process of systematically gathering, interpreting, recording and communicating to stakeholders, information on candidates' performance against industry competency standard/ or learning outcome. The source maintained that in CBA a person is assessed to ascertain whether he or she meets specified standard that defines the knowledge, skill and behavior to safely and effectively do a job. Government of Western Australia (2003) opined that CBA is a process of collecting evidence and making judgment against set criteria which they said criteria is based on the performance an individual is expected to demonstrate in the work environment. Gonczi (1997) opined that CBA is a system in which a number of assessment techniques can be used to assess students' performance. These assessment techniques are to assess students' knowledge, skill and attitude. Thus, CBA is the process in which a number of assessment techniques are used in assessing whether an individual has acquired the minimum knowledge, skills and attitude required to perform a given task satisfactorily.

There are many factors to be considered before an assessment process is adjudged as competency-based. Jamica (2006) stressed that in CBA, systematic development and delivery of assessment is guided by some essential elements which include: identification of task to be assessed by experts in the occupation; assessment of competency is based on knowledge, skill and attitude; utilization of occupation standard or unit competency standard as the basis for assessing achievement and students should be aware of them; monitoring of students progress through the programme by demonstrating the attainment of specified competencies. In CBA, students are assessed against set criteria. The criteria are based on the performance an individual is expected to demonstrate in the industries or workplace. For instance, at the end of this topic, the students should be able to carry out wheel alignment in motor vehicles. By this, a criteria has been set. Competency-based assessment is also known by other names such as standard-based assessment; and Achievement-based assessment (Rawlins, Brandon, Chapman, Leach, Neutze, Scout and Zepke 2005)

## Assessment of Knowledge, Skill, and Attitude

**Knowledge:** Knowledge is a critical area in the assessment process. It is defined by Nellmapius (1996) as what a person must know to perform a task competently. Knowledge is a cognitive ability which constitutes a variety of mental abilities such as verbal and mathematical ability; reasoning ability and reading comprehension (Pulakos, 2005). Alnoor and Hongyu (2011) defined knowledge as the practical understanding that someone needs in order to perform his or her duties.

Anderson and Krathwohl (2001) classified knowledge into four categories of factual, conceptual, procedural and metacognitive. The authors maintained that factual knowledge is the basic elements that students must know to be acquainted with a discipline. Conceptual knowledge is the interrelationships among the basic elements within a larger structure that enable students to function. The authors added that procedural knowledge is how to do something, methods of inquiry, and criteria for using skills, algorithms, techniques and methods while metacognitive knowledge is the knowledge of cognition in general as well as

awareness and knowledge of one's own cognition. Thus, when examinations' questions covers factual, conceptual, procedural and metacognitive knowledge, and are spread across the knowledge dimensions of remember, understand, apply, analyse, evaluate and create, it gives the opportunity to identify those who have critical thinking skills.

**Skill:** Skill is another critical area in assessment process. Okorie (2000) referred to skill as well-established habits of doing something and involves the acquisition of performance capability. Skill is defined by Ogbuanya and Fakorede (2009) as the ability to do something expertly well in accordance to the set standard or manufacturers instruction. Thus Robert (2018), stressed that skill is the abilities in performing a task correctly such as loosening a nut, dismantling and coupling of motor vehicle parts, diagnosing faults among others. Thus, when students are assessed in this domain, process skills assessment instrument such as rating scale is used to monitor and rate how a student performs a given task sequentially.

**Attitude:** Attitude is considered as very crucial in assessment process. For instance, acquisition of skill can be influenced by attitude. Anderson (2005) described attitude as moderately intense emotion that prepares or predisposes an individual to respond consistently in a favourable or unfavourable manner when confronted with a particular object. Ogwo and Oranu (2006) maintained that attitude is the ways of feeling and general behaviour which reflect on individual's values, emotions, motives and interests. The authors identified job attitude to include discipline at work such as punctuality, orderliness, cleanliness, safety, self-control, honesty, and interest at work, the will to learn and execute tasks to logical conclusions, fairness, and friendliness. It is unfortunate that in assessing students in our technical colleges, examination questions are not raised to find out their readiness to function in a work environment.

### **The Role of CBA in Technical Education**

Following are some of the role of CBA in technical college education

- i. The clarity and transparency in CBA helps teachers to provide students with information of what they know, can do, and a clear picture of what they need to do to improve so that they can take charge of their learning (Black and William 1998)
- ii. Promotes competent based approach to training and learning
- iii. Increases the skill levels of the workforce
- iv. Higher level of students achievement is guaranteed (Supovitz, 2001)
- v. Improvement of generic skills (Gfreerer, 2000)
- vi. Improve link between knowledge and performance
- vii. Ameliorates competition among students
- viii. Reduces anxiety among students
- ix. Increases intrinsic motivation
- x. Promotes achievement, cooperation, self-efficacy and deep learning
- xi. Enhances international comparability
- xii. CBA allows ability levels of students to be easily known (Robert, 2018)
- xiii. Provides assessment environment that are realistic and relevant to the workplace.

### **Problems Affecting Implementation of CBA in Technical Colleges**

1. **Absence of assessment policy that favours CBA:** In Nigeria, assessment is not made mandatory to address knowledge, skill and attitude as a comprehensive approach to determining students' competency. Thus individual institution and teacher decides on the cheapest method in determining students' performance

2. **Lack of trained manpower:** Many teachers are not familiar with assessment methodologies for competency-based assessment. For instance, test construction in CBA is rigorous as test items have to cut across all levels of difficulties in each of the domains of learning.
3. **High cost of assessment process:** Competency-based assessment has high financial implication as much money would be required in setting up standard workshops and laboratories for assessment of practical skills. This is because assessment environment must be similar to industry setting.
4. **Teachers' poor perception of CBA:** Teachers see CBA as a cumbersome process of assessing students. An assessment process that takes much of the teachers' time and also as a stressful process of assessing students. With these kind of views most teachers deemphasize CBA and feel comfortable in the traditional method of assessing students
5. **Insufficient time given to assessment in education system:** Generally, time allotment for assessment in technical colleges has always been within two week duration. This period of two weeks for both theory papers and practical activities is adjudged as grossly inadequate. This is because workshop-based practical test has to do with monitoring individual student as they perform each task in a step-by-step procedure. By so doing a whole lot of time would be required for assessing a number of students in a class of 30 students for instance.

## Recommendations

1. The Federal, State governments and other education stake-holders in technical education should review assessment policy to reflect CBA as CBA is a new paradigm in education sector of the developed countries which has yielded tremendous benefits to individual country's economy
2. National Board for Technical Education and State technical schools' Boards should organize workshops and seminars on CBE and Assessment for Technical college teachers.
3. Federal and State governments should ensure effective funding of workshops in technical colleges and the supply of training and assessment materials as priority in technical college education
4. Teachers in Technical colleges should be motivated through the payment of assessment allowance so as to correct their perception on CBA as a tedious exercise that should be scraped.
5. National Business and Technical Examination Board should adopt process skill assessment during assessment of students' practical.

## Conclusion

Technical college education is meant to give training, and impart the necessary skills to individuals who shall be self-reliant economically. Therefore, to ascertain whether the trained individuals have acquired the necessary skills, they must be assessed using appropriate approaches and instruments. Assessment is an important component in the educational system. It is the only way of identifying who would perform well in a workplace. Thus if assessment process is faulty, the graduates would be left with inadequate knowledge, skills and attitude that would help them find decent jobs, hence high rate of unemployment, poverty, and crime in most African countries, including Nigeria. Recently, most industrialized nations are embarking on innovation in their assessment approach, such



assessment approach is competency-based assessment. It is the innovation that guarantees improvement of generic skills, high level of students' achievement and provides assessment environment that are realistic and relevant to the workplace which all TVET stakeholders should encourage in our technical colleges and other TVET institutions.

### References

- Alnoor, A. M. & Hongyu, M. (2011). Instrument of Primary school teacher competency. *Journal of Social Sciences* 7 (4), 586-589.
- Anderson, L. W. & Krathwohl, D. R. (eds) (2001). *A Taxonomy for Learning, Teaching and Assessing. A Revision of Bloom's Taxonomy of Educational Objectives*. New York: Addison Wesley Longman
- Black, P. & William D. (1998). Inside the Black Box: Standard Through Classroom Assessment. *Phi Delta Kappan* 139 - 148
- Bukar, B. (2006). Development and validation of Laboratory-based test for Assessing Practical Skills of Higher National Diploma Students in Electronics Maintenance and Repairs (Unpublished Ph.D Thesis) University of Nigeria, Nsukka
- Commonwealth of Australia (2009). *Guide for Developing Assessment Tools*. National Quality Council
- Federal Republic of Nigeria (2004). *National Policy on Education*. Lagos: NERX Press.
- Hoogveld, A. W. M (2003). *The Teacher as Designer of Competency-based Education*. The Open University of Nederland. Heerlen
- Nellmapius, E. P. (1996). *Human Resource Development Handbook Incorporating Competency-based Training and A System's Approach*. Durban: Personnel and Training Services.
- Ogbuanya, T. C & Salihu, S. U (2009). Employing cooperative Education for Quality Assurance of Vocational Technical Education to Facilitate Achievement of Millennium Development Goals (MDGs). *Nigerian Vocational Journal* 13: 1, 120 – 127
- Okeke, B. C. (2004). Standardization of an Instrument for Assessing practical Work in Technical Colleges. *Journal of Vocational and Adult Education* 3, 1, 42 – 52
- Okorie, J. U. (2000). *Developing Nigeria Workforce*. Calabar: Menky Environ Publishers.
- Okwelle, P. C & Okeke, B (2012). Development and Validation of Instrument for Assessing Practical Skills in Fault Diagnosis and Repair of Radio and Television System in Nigerian Technical Colleges. *American Journal of Scientific and Industrial Research* 2 181 – 190
- Ombugus, D. A. (2013). Development and Validation of Workshop-based Process Skill Test in Mechanical Engineering Craft for Assessing Students in Technical colleges in Nasarawa State, Nigeria. Unpublished Ph.D Thesis, University of Nigeria, Nsukka



- Ombugus, D. A. & Ogbuanya, T. C (2014). Development and Validation of Workshop-based process Skill Test in Metal Fitting for improving Students' Skills in Technical Colleges for Work. *Journal of Education and Practice* (2) 46 – 53
- Robert, A. M. (2018). Development and Validation of Competency-based Assessment Instrument in Motor Vehicle Mechanics work for Assessing Students in technical Colleges in Akwa Ibom State, Nigeria Unpublished Ph.D Thesis, University of Nigeria, Nsukka
- Pulakos, E. D (2005). Selection Assessment Methods. A Guide to Implementing Formal Assessment to Build a High-quality/ Workforce. Foundation Society for Human Resource Management (1) 87 – 98
- Rawlins, P., Brendon J., Chapman J., Leach, L., Neutze G., Scott, A. and Zepke, N. (2005). Standard-based assessment in the senior secondary schools: A review of the literature. *New Zealand Journal of Teachers* 2, (2) 107-115.
- Ryan, A. M & Tippins, N. T (2004). Attracting and Selecting what Psychological Research tells us. *Human Resources Management* 43, 305 - 318
- Tombari, B. Y & Celestine, W. (2016). Role of TVET in enhancing sustainable local content development in Rivers State. *Nigerian Association of Teachers of Technology 29<sup>th</sup> Annual National Conference Minna. Book of Proceedings.*