COLLABORATIVE LEARNING IN BRICKLAYING/CONCRETE WORKS AND SKILLS ACQUISITION BY TECHNICAL COLLEGE STUDENTS IN AKWA IBOM STATE

BY

DAVID, U. E. Ph.D
DEPARTMENT OF VOCATIONAL EDUCATION
FACULTY OF EDUCATION
UNIVERSITY OF UYO, UYO.

&

DR JUDE LUKE PIUS
DEPARTMENT OF VOCATIONAL EDUCATION
FACULTY OF EDUCATION
UNIVERSITY OF PORT HARCOURT, HARCOURT.

ABSTRACT

This work was done to assess the effect of collaborative learning on skills acquisition in bricklaying and concrete works by students in Technical Colleges in Akwa Ibom State. Collaborative learning is based on the model that knowledge can be created within a population where members actively interact by sharing experiences and take on asymmetric roles. Bricklaying and Concreting is a practical and skilled-based task which requires the cooperation, understanding, shared experiences and ideas to accomplish: hence, the need for collaborative learning. Among educational institutions, Technical Colleges are institutions that impart necessary skills that lead to the production of craftsmen, technicians, brick layers and concrete workers who are highly enterprising and self-reliant. Brick laying and concreting as a Course in the Technical Colleges curriculum involve the skills required in accomplishing the tasks of mixing mortar, molding blocks, laying of blocks, concreting, etc. Skill is basic to life. However, bricklaying and concreting is one of the trade courses offered in technical colleges for the purpose of acquiring theoretical knowledge and practical skills in building construction. The development of an appropriate instrument for assessing the performance of student in bricklaying and concreting can improve the quality of production and skills of the students. This paper recommends among others, that bricklaying and concreting teachers in technical colleges should implement and enforce collaborative learning among their students, and that brick laying and concreting teachers should be acquainted with developed instruments to enhance uniform standard in assessing students' practical work.

KEYWORDS: Brick laying and Concreting, Collaborative Learning, skills Acquisition, Manipulative skills, Self-reliance.

INTRODUCTION

Among the institutions that provide technical education in Nigeria are the Technical Colleges. Technical colleges impart necessary skills that lead to the production of craftsmen and technicians who are enterprising and self-reliant (FRN, 2004). Programmes offered in technical colleges are skill oriented and performance-based (Odu, 2001). These programmes allow for effective training and assessment of craftsmen in a wide range of trade subjects that help the students to achieve various instructional objectives in the different domains of learning (Igbo, 1997). Collaborative Learning is a situation in which two or more persons learn or attempt to

learn something together. Unlike individual learning, people who engage in collaborative learning capitalize on one another's resources and skills (asking one another for information, evaluating one another's ideas, monitoring one another's works, etc). More especially, collaborative learning is based on the model that knowledge can be created within a population where members actively interact by sharing experiences and taking on asymmetric roles (Telima, 2013).

Today, in both higher education and vocational settings, people are asked to work together in teams. Aiming to prepare individuals for this essential requirement in their work life, many studies within the last few years have focused on how to implement cooperative learning while at school. Collaborative learning is similar to cooperative learning which is understood in educational settings as students working together in small groups to accomplish a common goal to maximize both their individual knowledge and the knowledge of the entire group. Brick laying and concreting like other courses are carried out in classrooms and workshops, learning and training environments, and each complement the other. The workshop environment in college setting is the introduction of industry in the real learning situation, designed to equip students for work in their chosen occupations as demanded by the labour market (N.B.T.E, 2001). Bricklaying and concreting at Technical college level is designed to provide the trainee with the essential knowledge and skill that will enable him perform competently in all aspects of block-work in the construction industry. On completion of the programme, the trainee should be able to manipulate various tools and equipment in the block laying and concreting trade. Manipulative skills are required in brick laying and concreting. Skills are those aspects of technical and vocational education which involve hands-on the-job experience by students.

Skill acquisition remains the major goal of vocational technical education and this helps to satisfy the personal work needs of both the individual and the society (Aliozor, 2004). To acquire skills in vocational technical education courses such as building technology at technical college level, opportunities must be provided for students to practice the skills they are taught in an environment that is relevant to the job skills learnt. Such opportunities that should be provided that may improve skill acquisition of building technology students include field trip/excursion, allocation of more time for practical work, production unit, provision of materials to practice with. As such, brick laying and concreting is a practical skilled-based task which needs cooperation, understanding, and shared experiences/ideas to accomplish. Thus, collaborative learning can provide such phenomenon. Collaborative learning is commonly illustrated when a group of students work together to search for understanding, meaning, or solutions, or to create an artifact or product of their leaning. Further, collaborative learning redefines traditional student-teacher relationship in the classroom or workshop which results in controversy over whether this paradigm is more beneficial than harmful. Collaborative learning activities can include collaborative writing, group projects, joint problem solving, debates, study teams, and other activities. This approach is closely related to cooperative learning.

Bricklaying and concreting is offered at both intermediate and advanced levels in technical colleges. The curriculum of intermediate brick laying and concreting in addition to what may be termed general education subjects such as Mathematics, English Language, Physics, Chemistry, Social Studies, etc, has the core trade subjects to include introduction to Building construction, Concreting, Bricklaying, Land Surveying, Quantity surveying, Technical Drawing, Building Drawing and Construction Management.

COLLABORATIVE LEARNING AND TECHNICAL EDUCATION

Often, collaborative learning is used as an umbrella term for a variety of approaches in education that involve joint intellectual effort by students or students and teachers, by engaging individuals in interdependent learning activities. Many have found this to be beneficial in helping the technical education students to learn effectively and efficiently than if they were to learn

independently. Some positive results from collaborative learning activities include that students are able to learn from more materials by engaging with one another and making sure everyone understands, students retain more information from thoughtful discussion, and students have a more positive attitude about learning and working with each other in the classroom or at the technical education workshop.

However, among the institutions that provide technical education in Nigeria are the Technical Colleges. Technical colleges impart necessary skills that lead to the production of craftsmen, technicians, brick laying and concrete workers, who are enterprising and self-reliant (FRN, 2004). Programmes offered in technical colleges are skill oriented and performance-based such as brick laying and concrete work (Odu, 2012). These programmes allow for effective training and assessment of craftsmen in a wide range of trade subjects that help the students to achieve various instructional objectives in different domains of learning (Odu, 2012). This is better achieved with the implementation of collaborative learning.

The national curriculum for technical colleges centers around the psychomotor domain with relevant emphasis on cognitive and affective domain (FRN, 2004; NBTE, 2003). By implication, much attention is focused on psychomotor or practical component of studies in technical colleges but this is done without looking at the relevant emphasis on critical areas of cognitive and affective components. The psychomotor component requires that appropriate materials necessary for effective training of the craftsmen in their chosen trade must be available. The availability and effective utilization of materials with collaborative learning help to achieve the skills of technical education as outlined in the National Policy on Education (FRN, 2004), and this includes: to provide trained manpower in applied science, technology and business particularly at the craft, advance craft and technical task analysis.

Technical college is an institution where students are taught skills including brick laying and concreting. Upon completion of their courses they are employed, or they choose further studies. A technical college, according to Odu (2012) is that institution which provides thorough training with the adequate knowledge and skill for gainful employment under the guidance of a teacher in a related occupation such as building technology, using workshops as work places for practices. Technical colleges play vital roles in Nigeria. They train and produce technicians for industry, impart vital technical skills in the youths, help towards the goal of self employment and job creation and in the struggle toward technological advancement and acquisition. Through the technical colleges, youths acquire such skills as skilled technicians, bricklaying and concreting, carpentry, painting, and auto mechanics, electrical/electronic technicians and skilled vocational nurses. N.B.T.E., (2003) defines technical education as that aspect of education which leads to the acquisition of practical and applied skills as well as basic scientific knowledge. Technical education provides opportunities for the mastery of skills and knowledge in selected occupations as well as in the development of personality for useful living.

SKILL ACQUISITION IN BUILDING TECHNOLOGY

Vocational education is the education for work. It is all about skill. There is the need to assist people to learn and acquire appropriate knowledge, habits of thought and conduct, skills, as well as other qualities of character that will enable them to develop intellectually, socially, physically, emotionally, morally, spiritually, politically and economically (Aliozor, 2004). Skill acquisition is one of such ways of learning. Mgbeahurike (2000) describes skill acquisition as a process by which individuals are exposed to learning and continuous practices in a particular task till the learner becomes proficient in such operation and can perform them when required. Skills are therefore acquired first and developed subsequently, through utilization and practice.

According to Okorie (2000), skills are acquired when procedural instructions are matched with performance activities. He added that repetition is the watchword. Aliozor (2004) says that for students to acquire skills in vocational education, courses such as bricklaying and concreting,

metal work, woodwork, etc. opportunities should be provided for them to practice the skills they are taught in an environment that is relevant to the job skills learnt. For instance, science laboratories should be provided to study sciences, and the students should be taught the practical aspects of the subjects. In the same manner, typing pools, office practice and language laboratories, computer rooms or laboratories should be provided for business and computer education. There should be workshops also for technical education students where skills can be acquired. To acquire skills according to Okorie and Ezeji (1988), three factors are involved. They include imitation, repetition and participation.

- To imitate implies to mimic or copy the behaviour or acts of the teacher by students. As they watch the teacher perform certain acts, they consciously or unconsciously follow and practice the examples of the teacher.
- Repetition involves the performance of an act many times to master the act. After acquiring a skill, the learner must repeat the action many times before he attains any useful degree of readiness.

- Participation in vocational education involves the learners practicing under the actual production conditions or situations. Both the imitation of a master and frequent practice, fall short of complete preparation for skilled vocational practice, hence the need for practice by the learner in the actual production conditions.

Mgbeahurike (2000) also observes that the process of skill acquisition involves the following; observation, imitation, manipulation, performing and perfecting. Olaitan (1996) explains that in the course of developing skills in an occupation, knowledge and ability required for success in that occupation should be taught. This is because skills consist of habits, which require adaptation. The acquisition of skills is important in vocational education since it is occupationally oriented.

COLLABORATIVE LEARNING AND SKILLS ACQUISITION

The popularity of collaborative learning in the acquisition of practical job skills has increased over the last decades. With the emergence of many new collaborative tools, as well as the cost benefit of being able to reinforce learning in trainees during collaborative learning, many work environments are now looking towards methods that involve collaborating with older employees and giving trainees more of a hands-on approach for skills acquisition, (KellyJ.,2012).

Skill, as a basic ability, is the means by which a person adjusts to life. A person's aptitude and work functions are required as necessary antidotes, suggesting that suitable skills performance and acquisition is easier by going through a given work sample. In the work place, skill is what the worker gives in exchange for remuneration. If the skill (or the cluster of skills popularly referred to as aptitudes) is satisfactory, the worker and employers get corresponding satisfaction. This process is sustained, culminates in promotion and prolonged tenure, and leads to increased productivity (Sabiru, 2014).

Skill is thought of as a quality of performance which does not depend solely upon a person's fundamental, innate capabilities but must be developed through training, collaborative practice and experiences. It also includes the concepts of efficiency and economy of performance. Modern concept of skill stresses the flexibility with which a skilled operator reaches a given end on different occasions, varying specific actions according to practice circumstances. However, it must be reiterated that even through basic human capacities are not sufficient to produce skills, they form the necessary basis of their development, such as collaborative learning technique. Skills represent particular ways of using capacities in relation

to environmental demands, with human beings and external situations altogether forming a functional system (Adeyemo, 2009).

In building technology, students are expected to work with materials, tools, equipments and machines to mould blocks, carry out preliminary site operations, do concreting, block wall construction and finishings in the building industry. In building technology, according to Odu (2012), students learn building construction, brick laying, technical drawing, building drawing, construction management, and quantity surveying. The curriculum for building technology by the National Board for Technical Education (NBTE) is made up of 60 percent theory and 40 percent practical. The aim of this initiative is to increase the technological growth of the country and to allow students to acquire more technical skills. In spite of Federal Government's emphasis on improving technology, building technology students still find it difficult to acquire building skills. That is why there is need for collaborative learning, which is the type of learning technique that encourages group work and shared knowledge among learners, creates strategies, and plans documents that require multiple inputs. It also allows for forms of vertical integration to find effective ways to synchronize skills, such as bricklaying and concreting skills, that can make the students to function in the society after graduation.

COLLABORATIVE LEARNING IN BRICKLAYING AND CONCRETE WORKS

Bricklaying and concrete operations in the technical college curriculum involves skills required in accomplishing given tasks like mixing of mortars manually, molding of blocks, laying of blocks, plastering and rendering of walls, walls and floor tilling, pointing top walls and laying of curved walls (arches). It also involves workability tests on concrete, Slump Tests, Placing of concrete, Application of mixtures to concrete, Compaction, Curing of Concrete and Fixing of Concrete Joint Materials. The student will perform these operations using tools and necessary equipment while teachers or instructors assess their performance based on their skills and competences.

Bricklaying and concrete operations are based on actual jobs and not pseudo jobs. The training should be carried out to the extent where it gives the trainee a productive ability with which he can secure and hold employment and be able to profit by it. To achieve such level, proper instruction/training materials and skills must be utilized in the course of instruction. The use of training materials as Monich (2013) put it, involves using materials and skills that are most appropriate and commonly available in communicating more correctly and practically the concepts of technology.

Encouraging collaborative learning can improve bricklaying and concrete activities in the technical college workshop because it is a learning method that encourages team work, interaction among students and shared ideas, unlike traditional methods where students non-interactively receive information from the teacher. Cooperative, problem-based learning demonstrates improvement of students engagement and retention of classroom material. Meta-analysis comparing small group work to individual work and college classrooms also found that students working in small groups achieved significantly more than students working individually, and optimal groups for learning tended to be three to four members in teams with lower ability students working better in mixed groups, and medium-ability students doing best in homogenous groups. For higher ability students, group ability levels made no difference.

BRICKLAYING AND CONCRETING IN TECHNICAL COLLEGES

Bricklaying and concreting is one of the trade courses offered in technical colleges for the purpose of acquiring theoretical knowledge and practical skills in building construction. Technical colleges have Course offers for specialization which include but not limited to auto-mechanic, metal work, building construction, woodwork, electrical/electronic engineering (FRN, 2004). The National Policy on Education further outlines general education theory and related

courses, workshop practical, and industrial training/production education, theory and related components, which the curriculum of each technical training should consist of. FRN (2004) and NBTE curricular and course specifications on all technical and vocation programmes developed from the 1980's emphasize the importance of practical components in the training of technicians/technologists (FRN, 2004 and NBTE, 2003).

Bedsides the need to produce self-reliant technologists is also for technological, industrial and economic development of the country. It is mandatory to produce properly trained technicians/technologists with good theoretical knowledge and sound practical skills from our technical institutions including technical colleges. National Board for Technical Education (NBTE) curricular for Building and Wood trade consists of three basic components aimed at achieving the goals and objectives of technical education as specified in the National Policy on Education (NPE). These includes the General education, the Trade courses, and Students' Industrial Work Experience, leveling, constructing brick walls up to 2B thick and wall bond, English bond etc., constructing corbels and plinth in wall up to 22mm thick, decorative panels, arches construction, rendering and plastering, concrete mix, slump test, cube test, among others.

Practical skill is defined as manipulative skills that involve the movement of the body or use of tools to assist performance in the case of operating machine. Acquisition of skill is a means of increasing the production power of the nation. Learning by doing which leads to the acquisition of manipulative skills was the major emphasis for the introduction of technical education in schools curricula, especially the technical colleges. The influence and role of workshop toward students attitude is of relative importance on students' practical skills. Sabiru (2014) emphasizes that for adequate training of students on skills acquisition in their subject areas, the required facilities in the workshop must be provided for effective training. In the same vein, Monich (2013) notes that to make the practical skills in schools realistic, the learning environment for the practical and applied aspects of technical and vocational education programme should be similar or as nearly as the work environment.

To possess a skill is to demonstrate the habit of acting, thinking and behaving on a specific activity in such a way that the process becomes natural to the individual through repetition or practice. The development of skills varies with the nature, complexity and type of activity. Adyemo (2009) maintains that individuals who opt for skill training should among other things possess qualities such as interest, ability, aptitude, patience, personality characteristics and other human and physical qualities that would enable them to succeed in it. In technical colleges, bricklaying and concreting, like other technical courses, is carried out in classrooms and workshops in the learning-training environment, and each compliment the other.

Workshop environment in the technical college setting is the introduction of industry in learning situation designed to equip students for work in their chosen occupations as demanded by the labour market. Workshop practices and production work as identified in the FRN (2004) are carried out in technical workshops in technical colleges. Workshop practice can be seen as specific tasks demonstrated by building technology teachers or instructors based on set objectives and assigned for practice for students. Practical skills can be seen as the personal ability to carry out manipulative tasks. In addition to this, students who receive further assistance during collaboration and who try to appreciate the assistance they received, acquire much higher skills or scores at pre-test than do students who passively receive assistance. Collaboration also promotes in the discussion of tasks given and expectations of students' learning outcomes that lead to improve the teaching and learning process. Kelly (2012) describes collaborative learning activities such as allowing students to provide explanations of their understanding can help students elaborate and reorganize their knowledge. The social interaction between group mates stimulates elaboration of explanations and conceptual knowledge, which improves students' comprehension of concepts. Collaborative approaches may also be related to motivation.

Students usually tend to enjoy the whole learning process where they are placed in group settings. Working with others in groups encourages students to academically improve through the added responsibility of group performance.

BENEFITS OF BRICKLAYING AND CONCRETING SKILLS

National Technical Certificate (NTC) and Advanced Technical Certificate (ANTC) programmes are aimed at producing technical and vocational craftsmen who can aspire to higher levels of education programmes such as brick laying and concreting. Bricklaying and concreting like other Courses are carried out in classrooms and workshops in the learning-training environments, and each complement the other. Bricklaying and concreting at technical college level is designed to provide the trainee with essential knowledge and skills that will enable him perform competently in all aspects of block work in the construction industry on completion of the programme. The trainee should be able to manipulate various tools and equipment in the bricklaying and concreting trade. Manipulative skills are required in bricklaying and concreting. Skills are those aspects of technical and vocational education which involves hands-on the job experience by the students.

Bricklaying and concreting involve knowledge and training in wood work and joinery, painting and decoration, building drawing and construction, among others (FRN, 2004). The importance of shelter and need for a conducive environment for domestic and industrial works has necessitated the demand for quality buildings. The development of appropriate instrument for assessing the performance of students in brick laying and concreting will help to improve the quality of products. Identification of tasks is the process of identifying the major learning activities or operation for carrying out a job. Tsado (2012) Identification of tasks could be used for improving skills training in complex tasks, while task analysis is the process of breaking down complex tasks for easy learning. This process assesses students' manipulative skills, which should be carried out with a stated degree of accuracy in performing tasks.

Due to the potentials of Cognitive Task Analysis (CTA) and Traditional Task Analysis (TTA) incorporated into instructional guides, this process may be used to enhance students' performance in bricklaying and practical concrete works in technical colleges.

Procedures are the accepted and correct ways in relating to workshop procedures in building construction. Procedures can be seen as correct and accepted ways of deriving set objectives of the programmes by planned and systematic follow-up of activities designed for the purpose. Procedures in workshop activities are process-based, (Ogbuzuru, 2011). A special method for assessment of manipulative skills is necessary because in performing any operation or task such as brick laying and concreting, certain techniques and attributes to be noticeable in students, which cannot be guessed at or judged intuitively, must be critically considered when assessing their performance. An assessment should be based on laid down criteria regarding the quality of characteristics of the finished products, or final task (Tsado, 2012).

CONCLUSIONS

Based on this work, it is obvious that technical education students and graduates require relevant skills to perform competently in bricklaying and concrete works. The findings also clearly indicate that collaborative learning techniques can improve bricklaying and concrete works and skills acquisition. Collaborative learning enhances social skills and knowledge acquisition relative to traditional teaching approaches. However, collaborative learning does not work automatically but needs adequate implementation and further development. An assessment instrument developed, if adopted for use in all the Technical Colleges in Akwa Ibom State will help students to improve on their practical performance and will encourage a lot of intakes into bricklaying/concrete programme in our Technical colleges.

RECOMMENDATIONS

Based on the findings of the work, the following recommendations are made:

1. Examination bodies such as National Business and Technical Board (NABTEB), National Examinations Council (NECO), West African Examinations Council (WAEC) should consider and adopt the developed instrument for assessing students' practical performance in bricklaying and concreting at NTC and ANTC levels.
2. Bricklaying and concreting teachers should be acquainted with developed instruments to enhance uniform standard in assessing students' practical work.
3. Government of Akwa Ibom State should equip the Department of Building Technology in Technical Colleges with adequate equipment and tools so that their collaborating in learning can effectively take place with ease.

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