
**Collaborative Learning and Skills Acquisition in Blocklaying/Concreting Works by
Students in Technical Colleges in Nigeria and Ghana**

BY

Tunde K. KINGSLEY
Faculty of Education

University of Lagos,

Lagos, Nigeria

AND

King L. NELSON, *Ph.D*

Faculty of Education

University of Cape Coast
Ghana

ABSTRACT

This work was done to assess the effect of collaborative learning on skills acquisition in blocklaying and concreting works by students in Nigeria and Ghana. 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. Blocklaying and concreting is a practical and skilled-based task which requires the cooperation, understanding and shared experiences/ideas to accomplish. Hence, the need for collaborative learning. Among the educational institutions, technical colleges are the institutions that impart necessary skills that lead to the production of craftsmen, technicians, block laying and concreting workers, enterprising and self-reliant. Block laying and concreting as a course in the technical colleges curriculum involve the skills required in accomplishing task in mixing of mortar, molding of blocks, laying of blocks, concreting, etc. Skill is basic to life. However, blocklaying 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 blocklaying and concreting can improve the quality of productions and skills of the students. This paper recommends among others, that blocklaying and concreting teachers in technical colleges should implement and enforce collaborative learning among his or her students, and block laying and concreting teachers should be acquainted with the developed instrument to enhance uniform standard in assessing students' practical work.

KEYWORDS: Block laying and Concreting, Collaborative Learning, skills Acquisition, Manipulative skill, Self-reliant.

Introduction

It is obvious that Collaborative Learning is a situation in which two or more people learn or an 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, monitor 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 take on asymmetric roles (Telima, 2013). Today, in both higher educational and vocational settings, people are asked to work together in teams. Aiming to prepare individuals for this essential requirement in later working life, many studies within the last few years focused on how to implement cooperative learning already in 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. Put differently, collaborative learning refers to methodologies and environments in which learners engage in a common task where each individual depends on and is accountable to each other.

These include both face-to-face conversation and computer discussions (online forums, chat rooms, etc). It is the type of learning that facilitates skills acquisition on a practical based task such as block laying and concreting in building technology course.

Interestingly, block laying and concreting is a practical skilled-based task which needs the cooperation, understanding, and shared experiences/ideas to accomplish. Thus, collaborative learning can provide such phenomenon. Collaborative learning is commonly illustrated when 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. According to Telima, Jane. and Temitope. (2013), collaborative learning needs to include the following five elements to be useful: positive interdependence, individual accountability, face-to-face interaction, appropriate use of collaborative skills and group processing, also include periodically assessment of group functioning and continuously improvement.

Blocklaying and concreting is offered at both intermediate and advanced levels in technical colleges. The curriculum of intermediate block 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, Blocklaying, Bricklaying, Land Surveying, Quantity surveying, Technical Drawing, Building Drawing and Construction Management.

Relationship Between Collaborative Learning and Technical Education

Many at times, 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 individual in interdependent learning activities. Many have found this to be beneficial in helping the technical education students to learn effectively and efficiently than if the students were to learn independently. Some positive results from collaborative learning activities are students are able to learn more material 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 Ghana are the technical colleges. Technical colleges impart necessary skills that lead to the production of craftsmen, technicians, block laying and concrete workers, enterprising and self-reliant (FRN, 2004). Programmes offered in technical colleges are skill oriented and performance-based such as block 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 leaning (Odu, 2012). This is more 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 the appropriate materials that are necessary for effective training of the craftsmen in his or her chosen trade must be available. The availability and effective utilization of materials with collaborative learning would 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 block laying and concreting, upon completion of their courses and are employed or they choose further studies. 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. The technical colleges play vital roles in our society. They train and produce technicians for industry, impart vital technical skills in the youths, helps 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, blocklaying and concreting, carpentry, painting, and auto mechanics, electrical/electronic technicians and skilled vocational nurses. N.B.T.E., (2003) defined 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 skills and knowledge in selected occupations as well as for the development of personality for useful living.

Effect of Collaborative Learning and Skills Acquisition

It is true that 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 environment 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 basic ability is the means by which a person adjusts to life. A person's aptitude and works functions are required and necessary as antidotes suggesting the suitable skills performance and acquisition of some by going through a given work sample. In this work place, skill is what the worker gives in exchange for remuneration. If the skill (for 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, pertaining and prolonged tenure and leads to 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 efficient and economy in performance. Modern concept of skill stresses the flexibility with which a skilled operator reaches a given end on a different occasion, 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 basis as collaborative learning technique. Skills represent particular ways of using capacities in relation to environmental

demands, with human being and external situation together 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, concreting, block wall construction and finishing in the building industry. In building technology according to Odu (2012), students learn building construction, brick/block 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 the Federal Government's emphasis on improving technology, building technology students still find it difficult to acquire building skills, that is why the need for collaborative learning which is the type of learning technique that would encourage group work and shared knowledge among learners and creating strategies, planning documents that require multiple inputs. It also allows for forms of vertical integration to find effective ways to synchronize skills such as, block laying and concreting skills can make the students to function in the society after graduation.

Usefulness of Collaborative Learning in Blocklaying and Concreting Works

Blocklaying and concreting operations in the technical college curriculum involves the skills required in accomplishing a given tasks in mixing of mortars by manual, moulding 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 test on concrete, Slump Test, Placing of concrete, Application of Admixture 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.

Blocklaying and concreting 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 blocklaying and concreting 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 receives information from the teacher, cooperative, problem-based learning demonstrated improvement of student 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.

Blocklaying and Concreting in Technical Colleges

Blocklaying 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 offerings for specialization which include and not limited to auto-mechanic, metal work, building construction, woodwork, electrical/electronic engineering (FRN, 2004). The National Policy on Education further outlined 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 the FRN(2004) and NBTE curricular and course specifications on all technical and vocation programmes developed as from the 1980's emphasized the importance of practical components in the training of technicians/technologists (FRN, 2004 and NBTE, 2003).

Besides the need to produce self-reliant technologist is also for technological, industrial and economic development of the country. It is mandatory to produce properly trained technicians/technologist 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 Student's Industrial Work Experience, leveling, construct brick wall up to 2B thick and wall bond, English bond etc., construct corbels and plinth in wall up to 22mm thick, decorative panel, 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 school curriculum especially the technical colleges. The influence and role of workshop toward students attitude is of relative importance on students' practical skills. Sabiru (2014) emphasized that for adequate training of students in skills acquisition in their subject areas, the required facilities in the workshop must be provide for effective training. In the same vein, Monich (2013) noted that to make the practical skills in schools realistic, the learning environment for the practical and applied aspect 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 of complexity and type of activity. Adyemo (2009) maintained that individuals who opt for skill training should among other things possess qualities such as interest, ability, aptitude, patience, personality characteristics and other human/physical qualities that would enable them to succeed in it, in technical colleges, blocklaying and concreting like other technical courses is carried out in classrooms and workshops, learning training environment and each compliment the other.

Workshop environment in technical college setting is the introduction of industry in learning situation designed to equip students for work in their chosen occupation as demanded by the labour market. Workshop practices and production work as identified in the FRN (2004) are

carried out in technical workshop in technical colleges. Workshop practice can be seen as specific task demonstrated by building technology teachers or instructors based on set objectives and assigned for practice for students. Practice skills can be seen as the personal ability to carry out manipulative task. In addition to this, students who received further assistance during collaboration and who try to understand the assistance they receive earn much higher skills or scores at pre-test than did students who passively receive assistance. Collaboration also promotes in the discussion of task given and expectations of students' learning outcomes that leads to improve teaching and learning process. Kelly (2012) described 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 student's 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 promotes students to academically engage through the added responsibility of group performance.

Numerous Benefits of Blocklaying and Concrete Skills

National Technical Certificate (NTC) and Advanced Technical Certificate (ANTC) programmes are aimed at producing technical and vocational craftsmen who can aspire to higher level of education programmes among which is block laying and concreting. Blocklaying and concreting like other courses are carried out in classroom and workshop learning and training environments and each complement the other. Blocklaying and concreting at technical college level is designed to provide the trainee with the 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 blocklaying and concreting trade. Manipulative skills are required in blocklaying and concreting. Skills are those aspects of technical and vocational education which involves hands-on the job experience by the students.

Blocklaying 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 building. The development of an appropriate instrument for assessing the performance of students in block 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. Process of assessing student manipulative skills as which should comprise of assessing student skills, to be carried with a stated degree of accuracy in performing tasks.

Due to the potential of Cognitive Task Analysis (CTA) and Traditional Task Analysis (TTA) incorporated into an instructional guide it may be used to enhance student's performance in blocklaying and concreting practical work in technical colleges.

Procedures are the accepted and correct way of doing something in relation to workshop procedures in building construction. Procedures can be seen as a correct and accepted way of

deriving set objectives of the programmes from 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 block 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 student's performance. An assessment should be based on a laid down criteria regarding the quality of characteristics of the finished products, or final task (Tsado, 2012).

Conclusion

Based on this work, it is obvious that technical education students/graduates required relevant skills to perform competently on blocklaying and concreting works. The findings also clearly indicated that collaborative learning techniques can improve blocklaying and concreting works 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 will help the student to improve on their practical performance and will encourage a lot of intake of students into blocklaying/concrete programme in our technical colleges.

Recommendation

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

- 1) Blocklaying and concreting teachers in the technical colleges should implement and enforce collaborative learning among his or her students.
- 2) Blocklaying and concreting teachers in technical colleges should de-emphasise the use of product assessment only, but rather combine both product and process assessment methods.
- 3) Examination bodies such as National Business and Technical Board (NABTEB), National examination, Council (NECO), West African Examination Council (WAEC) should consider and adopt the developed instrument for assessing student's practical performance in blocklaying and concreting at NTC and ANTC levels.
- 4) Blocklaying and concreting teachers should be acquainted with the developed instrument to enhance uniform standard in assessing students' practical work.
- 5) Government of Nigeria and Ghana should equip the Department of Building Technology in Technical Colleges with adequate equipment and tools so that their collaborating learning can effectively take place with ease.

REFERENCES

- Adeyemo, S. A. (2009). Understanding and acquisition of entrepreneurial skills: A pedagogical reinvention for classroom teacher in science education. *Journal of Turkish Science Education*, 6(3) 56 – 64.
- Federal Republic of Nigeria (2004). *National policy on education*, Revised (4th Edition) Yaba Lagos Nigeria Education Research and Development Council.
- Kelly, J. (2012). Collaborative learning: higher education, interdependence, and the authority of knowledge, a critical Study. *Journal of the National Collegiate Honours Council – Online Archive*.
- Monich, J. M. (2013). Leadership in administration of vocational and technical education. *Journal of Vocational Education*, 3(10) 3 – 6.
- National Board for Technical Education (2003). *National technical certificate (N.T.C.) and advanced national technical certificate (ANTC) curriculum course specification (Brick/blocklaying and concreting)* UNESCO – Nigeria.
- Ogbuzuru R. (2011). *Strategies for improving skill acquisition of building technology students in technical colleges in Ebonyi State*. www.unn.edu.ng/publications/files/tsa10%20anal%20copy.pdf
- Odu, O. K (2012). Technical and management skill, needs of blocklaying and concreting graduates for effective entrepreneurship in Nigeria. *Journal of Vocational Education and Training*, 1(1) 5 – 7.
- Sabiru, D. Y. (2014). Effective of collaborative learning on chemistry students' academic achievement and anxiety level in balancing chemical equations in secondary schools in Katsina Metropolis, Nigeria. *Journal of Education and Vocational Research*, 5(2) 43 – 48.
- Tsado I. N. (2012). Identification of tasks and procedures necessary for assessing practical work in block/bricklaying and concreting in technical colleges in Niger State. *Asian Journal of Management Science and Education*, 1(1) 1 – 10.
- Telima A., Jane A. and Temitope, A. (2013). The effect of collaborative learning on problem solving simple harmonic motion. *Journal of Education and Practice*, 4(25) 10 – 15