

**ASSESSMENT OF THE ADEQUACY OF MATERIAL RESOURCES FOR
EFFECTIVE TEACHING OF BUILDING TECHNOLOGY: A PANACEA FOR
PROMOTING ENTREPRENEURIAL SKILLS IN RIVERS STATE TECHNICAL
COLLEGES**

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ABSTRACT: *The global economic pressure to compete on cost, service and quality has resulted in the agenda of the Government to re-focus the economic development processes to increase and nurture intellectual capital and entrepreneurship for economic transformation in Nigeria. This study was designed to assess the adequacy of building material resources for effective teaching of building technology: a panacea for promoting entrepreneurial skills in building technology in Rivers State technical colleges. The population for the study was 90, made up of 26 technical teachers, four technical instructors and 60 building technology students in the four technical colleges in Rivers State. A questionnaire based on five point Likert- scale was used as the data collection instrument. Mean was used to analyze research results. The findings of the study are (1) workshops are not well equipped with sufficient tools and equipment. (2) lack of in-training of teaching personnel (3) inadequate power supply to the workshops. The study recommended the following: there should be adequate supply and proper maintenance of tools, equipment, and workshops. Government should ensure steady power supply to the workshops for practical and there should be in-service training for teaching personnel through seminars and workshops.*

KEYWORDS: Building Technology, Entrepreneurial Skills, Technical Colleges, Material Resources.

INTRODUCTION

The world has become private sector driven, and economic prosperity in the 21 century requires the possession of entrepreneurial skills to function effectively. The youths need exposure in practical entrepreneurial work in order to be proficient in their chosen career and be useful to themselves and the society at large. Entrepreneurship which is a planned effort undertaken by an individual or individuals, institutions or agencies to develop the required skills/competencies to be self reliance. Competencies of individual's entrepreneurial skill in Technical colleges are designed to lead the beneficiaries' to self-employment, economic self-sufficiency, and employment generation through short or long-term training. This has lead African countries including Nigeria to realize that training in Technical colleges is necessary to alleviate poverty through skill acquisition. Technical vocational education and training (TVET) can be described as any form of education whose primary purpose is to prepare beneficiaries for gainful employment or self-employment (entrepreneurship) in an occupation or group of occupations. The entrepreneurial skills are required in technical colleges.

Entrepreneurial Skills

Entrepreneurship is the willingness and ability of an individual to seek out investment opportunities, establish and run an enterprise successfully. Steinhoff and Burgess {1993} defined entrepreneurship as the ability to organize a business undertaking and assume the risks for the sake of profit. Entrepreneurship is the ability and willingness of a person to initiate, control and direct the processes of production of goods and services and bear the attendant risks. Anaele [2010] stated that entrepreneurship involves taken reasonable risks in investing money, human and material resources, and the application of one's creativity and ingenuity to begin a business venture. According to Igbo[2009], many who have ventured into entrepreneurship without entrepreneurial skills have failed. For technical college building construction graduates to get into self-employment, they must be equipped with entrepreneurial skills because according to Anaele and Oviawe [2010], those who have entrepreneurial skills have more knowledge to go into self-employment and succeed.

Skill is the ability to do something well after learning and practicing what have been learnt. Atsumbe [2006] described skills as knowledge and proficiency required in the accomplishment of any specific task. Therefore entrepreneurial skills are the skills required by technical college graduates of building construction to get into self-employment and succeed.

Technical Colleges

Technical Colleges in Nigeria are established to produce craftsmen at the craft level and master craftsmen at the advance craft level. The courses offered at the technical colleges lead to the award of National Technical Certificate (NTC) and Advance National Technical Certificate (ANTC). The curriculum programmes of technical colleges according to Federal Government of Nigeria (2013) are grouped into related trades. These include; the computer trades, electrical/electronic trades, mechanical trades and building trades. FGN(2004) states the goals of Technical College Building Technology as follows: the technical college students will achieve the following objectives: understand the processes, materials, tools and equipment used in building construction, construct or supervise the construction of a simple residential building, prepare for further studies in the construction or allied professions, earn a living through participation in building construction work and inculcate safe working habits in building construction. Building technology, therefore, involves the engagement of both teachers and students in theory and practical (Jadas, Kademi, and Gyallesu, 2004)). Developed technology has contributed greatly to the high economic standards of most of the developed countries of the world. Therefore, the development of building technology in technical Colleges cannot be achieved without adequate facilities and resources. Iliya, Sharon and Josiah (2008) expressed that Nigeria like most developing nations of the world requires a well-articulated building technology programme to enable her achieve economic and technological development but with the prevailing problems of building technology (especially lack of equipment, machine and tools) its dependence as base for the nation's progress cannot be a reality except quick steps are taken to forestall it.

The major goal of building technology which is to prepare students for successful employment in the labour market and to equip the students with the required skills that can enable them earn a living. This goal can be achieved through a curriculum that is relevant and comprehensive and well-equipped workshops with relevant training facilities.

School workshops and training facilities offer opportunities for practical training of students in skill acquisition in their technical trade areas for future development of the key sectors of the economy in order to meet the basic needs of electricity, roads and building, and also encourage entrepreneurial development among others. Student's practical projects are an important part of the curriculum, but a supportive school environment is a fundamental requirement for the successful implementation of curriculum (Bybee and Loucks-Horsely, 2000). This aspect of the curriculum can only be achieved where workshop facilities, tools, equipment and machines are adequate and relevant. Availability of appropriate workshop facilities enhances students learning by allowing them to be involved in demonstrations, and practice which will help them to continue to build their skills.

Most of the Technical institutions in Nigeria have been forced to perform below standard due to purported non-availability, poor management or utter neglect of the required facilities in the workshops for effective entrepreneurial skills acquisition in building technology (Umar and Ma'aji 2010). Promoting entrepreneurial skills in building technology entails having the right building material resources made available and in adequate quantity for optimum performance of students in workshop practice hence the students can only see business opportunities when they are found in the right environment that can enable their skills to develop. Therefore, there is need to provide adequate material resources for effective teaching of building technology in technical colleges.

Material Resources

Material resources in building technology are classified into tools, materials and equipment. Hand tools are used for working materials to size and shape, for smoothing or texture surfaces, digging, painting, forming holes or for setting out and for guiding work. According to Osinem (2008) resources can be considered as any item which will aid, stimulate and motivate the learner as well as simplify the processes of classroom teaching. Resources are classified into two: human and material resources. Human resources are those personnel who aid or assist in imparting knowledge and skills to the learners, while material resources are things that help the teacher to take the world into the classroom, thus making remote, abstract idea concrete and immediate to the experience of the students. This implies that resource is any physical or vital entity of limited availability that needs to be consumed to obtain a benefit from it. Typically, resources are materials, services, self or other assets that are transformed to produce benefit and in the process may be consumed or made unavailable. Benefits of resources utilization may include increased wealth, knowledge, meeting needs or wants, proper functioning of a system to enhance well being. Therefore, anything that can be used to satisfy human need is a resource.

Tools are on the other-hand resources used in transmitting knowledge in the workshop or in the field. Ogundu (2009) asserted that tools are the instruments or devices that can be handled easily while carrying out special operations as well as instrumental and learning activities. They are used in demonstrating practice for learning of skills and for skill testing in special areas. For effective programme delivery and for the objectives of the building technology to be achieved, there is need for constant assessment of the programme. Assessment of technical and vocational education programme refers to the process of determining the weaknesses and strengths of the programme using some criteria.

Statement of the Problem

Building technology is a vocational education programme that requires the training of students in Technical Colleges, Colleges of Education and Universities. Resources are supposed to be adequate to go round the students being taught building technology in technical colleges for the acquisition of practical skills. Material resources and facilities supposed to be supplied to technical colleges for training of students to produce skilled and competent manpower needed by industries and as entrepreneurs

However, there has been apparent inability of this country to generate internal human and material resources for self-reliance because of the training resulting from inadequate resources in the workshop which the educational authority has failed to supply, thereby contributing to the poor performance of students on graduation as perceived by the construction industries. Instructors in technical colleges are not competent enough to handle the material resources for teaching building technology. The lack of capacity building programmes of building technology teachers to suit the industry causes a great deal of problem on the performance of students on graduation

Purpose of the study

The general purpose of the study is to assess the adequacy of building material resources for effective teaching of building technology: a panacea for promoting entrepreneurial skills in building technology in Rivers State technical colleges. Specifically, the study sought to assess.

The availability of various types of tools used in the building workshop for teaching building technology as a panacea for promoting entrepreneurial skills in technical colleges.

1. The adequacy of utilization of the tools used for teaching building technology as a panacea for promoting entrepreneurial skills in technical colleges.

Research Questions

1. What is the availability of various types of tools used in the building workshop for teaching building technology
2. What is the adequacy of utilization of the tools used for teaching building technology

METHODOLOGY

This study was conducted using survey research design in all the technical colleges in Rivers State. The population comprised four technical instructors, 26 technical teachers and 60 building construction students making a total of 90 respondents. A structured questionnaire based on five point Likert- scale was used as the data collection instrument. . The questionnaire was validated by three experts from the Department of Industrial Technical Education, University of Nigeria, Nsukka. For the purpose of obtaining the internal consistency of the instrument, Cronbach Alpha reliability method was be used and a reliability conflict of 0.94 was obtained

The developed questionnaire was structured and grouped into two sections. Section 1: contains items which seek information on the availability of tools that can be used for teaching building technology. Section 2 dealt with items which seek information on the adequacy of utilization of the tools used for teaching building technology practicals. The instrument is based on a 5-point Likert scale of Strongly Agree (SA), Agreed (A), Undecided (U), Disagree (D) and Strongly Disagree (SD) for section 1 while section 2 is also on a 5-points scale of Very Highly Available (VHA), Highly Available (HA), Moderately Available (MA), Available (A) and Not Available (NA). Mean was used to analyze the data collected.

RESULTS

Table 1: Mean Responses of the Respondents on the Various Types of Tools for Teaching Building Technology in Rivers State
N=90

S/No	Items	Mean (\bar{x})	Remark
1	Eraser	4.71	Strongly Agree
2	Measuring Tape	4.21	Strongly Agree
3	Shovel	3.7	Agree
4	Cutlass	3.71	Agree
5	Compass	3.82	Agree
6	Tracing Paper	4.71	Strongly Agree
7	Tracing Pen	4.8	Strongly Agree
8	French Curve	4.5	Strongly Agree
9	Theodolite	4.9	Strongly Agree
10	Profile Board	3.8	Agree
11	Clutch Pencil	4.5	Strongly Agree
12	Drawing Sheet	4.9	Strongly Agree
13	T-Square	4.9	Strongly Agree
14	Drawing Board	4.62	Strongly Agree
15	Set Square	4.19	Strongly Agree
16	Bevel	3.7	Agree
17	Boat Level	3.61	Agree
18	Pointing Trowel	3.83	Agree
19	Mixer	4.9	Strongly Agree
20	Jointer	4.12	Strongly Agree
21	Claw Hammer	3.8	Agree
22	Saw	4.12	Strongly Agree
23	Frenchman	4.86	Strongly Agree
24	Meter Rule	4.3	Strongly Agree
25	Lines and pipe	4.71	Strongly Agree
26	Spirit Level	4.52	Strongly Agree
27	Square	4.24	Strongly Agree
28	Plumb Rule	4.2	Strongly Agree
29	Laying Trowel	4.44	Strongly Agree
30	Straight Edge	4.19	Strongly Agree

Data in table 1 showed that the building technology technical instructors and teachers in Rivers State technical colleges accepted that all the tools presented in table 1 can be used for teaching building technology based on their mean.

Table 2 Mean Responses of the Respondents on the Utilization of Tools used for Teaching Building Technology
N=90

S/No	Items	Mean (\bar{x})	Remark
31	Eraser	4.91	Very Highly Utilized
32	Measuring Tape	4.1	Highly Utilized
33	Shovel	3.5	Utilized
34	Cutlass	3.52	Moderately Utilized
35	Compass	3.61	Moderately Utilized
36	Tracing Paper	2.4	Not Utilized
37	Tracing Pen	2.42	Not Utilized
38	French Curve	3.07	Not Utilized
39	Theodolite	2.19	Not Utilized
40	Profile Board	2.9	Not Utilized
41	Clutch Pencil	4.91	Very Highly Utilized
42	Drawing Sheet	4.16	Highly Utilized
43	T-Square	4.44	Highly Utilized
44	Drawing Board	4.64	Very Highly Utilized
45	Set Square	4.92	Very Highly Utilized
46	Bevel	2.94	Not Utilized
47	Boat Level	3.24	Not Utilized
48	Pointing Trowel	2.1	Not Utilized
49	Mixer	3.52	Moderately Utilized
50	Jointer	2.1	Not Utilized
51	Club Hammer	4.24	Highly Utilized
52	Saw	4.19	Highly Utilized
53	Frenchman	4.44	Highly Utilized
54	Meter Rule	4.02	Highly Utilized
55	Lines and pipe	3.89	Moderately Utilized
56	Spirit Level	4.12	Highly Utilized
57	Square	4.19	Highly Utilized
58	Plumb Rule	4.02	Highly Utilized
59	Laying Trowel	4.24	Highly Utilized
60	Straight Edge	4.19	Highly Utilized

The results presented in table 2 show that the building technology instructors, teachers and students agreed that items such as Eraser, measuring tape, shovel, cutlass, compass, clutch pencil, drawing sheet, T-square, Drawing Board, Set square, mixer, club hammer, saw, Frenchman, meter rule, lines and pipe, spirit level, square, plumb trowel and straight edge are highly utilized for teaching building technology because these items have mean scores 3.5 and above while items like jointer, tracing paper, tracing pen, French curve, Theodolite, profile board, bevel, boat bevel, and pointing trowel are not utilized because they have mean score below 3.50.

Discussion of Findings

The findings showed that tools such as Eraser, Measuring Tape, Shovel, Cutlass, compass, tracing paper, Tracing pen, French curve, Theodolite, Profile Board, clutch pencil, drawing sheet, T-square, drawing board, set square, bevel, boat level, pointing trowel, mixer, jointer, hammer, saw, meter rule, lines and pipe, spirit level, square, plumb rule, laying trowel and straight can be used in teaching building technology in technical colleges. These findings agreed with that of Anaele (2003) which stressed that the need for sufficient supply of tools for effective teaching of building technology to achieve its objectives is vital to entrepreneurial skills acquisition.

There are insufficient tools for the students to practice and improve their skills and acquire more skills as was indicated by the building technology teachers and students. Okorie (2000) contended that the workshops, laboratories and the overall building technology environment must be adequately equipped so as to reflect the actual working environment beyond the classroom. He stated further that the school environment should expose students to the use of basic building equipment in a way that will lead students to acquire relevant knowledge and skills. He added that the skills being developed by students in training are necessarily limited by the availability of equipment and tools. A workshop where there are insufficient tools, the students will be grouped by the teachers during practical work so that each group will be given a set of few tools to practice with. It will be difficult for all the students in a particular group to acquire needed skills in their field. In such a workshop with insufficient tools, mostly in the case of grouping students during practical, it is observed that one person probably the group leader will be doing the practical for others as a result of insufficient tools. Ike, Nwamuo, and Ojukwu, (2011) pointed out that there is the need for adequate facilities in technical college school workshops. He suggested that the only way of determining the level of facilities in the workshop is to check the tools, machines, resources and materials available in the workshop. Ike Nwamuo and Ojukwu [2011] emphasized that entrepreneurial skills and sustainable technological development cannot be achieved if school workshops are in the midst of inadequate facilities and resources. Jackden and Okwori (1997) asserted that many technical Colleges do not have the necessary power tools and hand tools essential for students' use. Teachers and students can only develop entrepreneurial skills and new technologies when they have enough hand tools and machines to practice what they have learnt in theory. This will also encourage new discovery and development of entrepreneurship spirit.

On the constraints hindering the utilization of the tools for teaching building technology, the data presented in table 2 showed that tools are not maintained due to lack of fund and maintenance plan. Okala (2005) pointed out that if maintenance is not properly done, the rate of breakdown of tools will be high. When available tools are not properly maintained, they would result to non-utilization of such tools for teaching, poor storage facilities and funding, Lack of seminars and workshops for teachers/instructors to update their knowledge, Inadequate working facilities and conducive environment, non-replacement of worn-out tools and equipment in the workshop, Unsteady supply of power, Lack of orientation, Neglect of practical work, Outdated and awkward tools, unsafe practice, insufficient supply of tools, supply of irrelevant teaching resources were pointed out as a problem militating against the teaching of building technology by the instructors.

IMPLICATIONS/CONCLUSION

Sufficient tools have to be provided for the teaching of building technology with adequate working space and gangways and storage facilities for workshop. Effective and efficient workshop organization will enable students have access to the tools for practice for effective learning and acquisition of skills. Lack of tools has far-reaching implication for effective technical education programme to technical students in building technology. Neglecting the provision of sufficient tools will amount to the nations decline. More so, the nation may continue to have shortage of technical teachers capable of handling building technology in technical schools, if urgent attention is not given to the causes and measures identified.

Government is to hasten their efforts in making available sufficient tools for practicals. Encourage purchased of workshop tools by experts in the field for the right quality and purpose of tool to be bought. Finally, encourage competent skilled personnel and in-training for correct impartation of required skill to the technical students in a building technology as to promote entrepreneurial skills in building technology.

RECOMMENDATIONS

Based on the findings of the study, the following recommendations are made;

1. Building technology teachers and instructors should be encouraged to carry out required technical activities in the school and tools for various trades should be supplied, installed and made available in all building technology workshops in Rivers State.
2. Government should ensure steady power supply to the workshop
3. Relevant teaching materials should be supplied
4. Supervisors should create measures and assess the utilization of tools supplied by planned supervisions or inspection.
5. Government should provide initial capital in form of soft loan with little or no interest to the prospective graduates who intend floating their entrepreneurship.
6. In-training of technical teachers and instructors to update their skills and knowledge through workshops and seminars on new innovations.

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