ADEQUACY OF EQUIPMENT FOR SKILL ACQUISITION IN BLOCK LAYING AND CONCRETING TRADE FOR NATIONAL TECHNICAL CERTIFICATE (NTC) IN KANO STATE.

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ABSTRACT

The Teaching of Block laying and Concreting Trade as an Integral part of Building Construction at Technical Colleges lie on adequate number of Equipment. Researches indicate the problem of inadequate number of equipment at almost all levels and types of education in Nigeria. The purpose of this study was to find out the adequacy of Block laying and Concreting Trade Equipment (BCTE) at Technical Colleges (TC) that could inform the administrators and government on the state of the art toward executing the TC Curriculum. The research question answered in the study focused in identifying the adequacy of (BCTE) in (TC) 1, 2, 3, &4, 5, respectively. Relevant literatures related to the study were reviewed and descriptive survey research design was employed for the study. Thirty-eight (38) items questionnaire were adopted from National Board for Technical Education (NBTE) Manual as instrument for data collection. Also, a total of six (6) workshop assistants were employed as population of the study to respond to the items. Mean rating and percentage was used to answer the research question. The hypothesis was tested using chi-square statistical tool at 0.05 levels of significance. The test results indicate no significant difference between the mean ratings of Workshop assistants on the adequacy of equipment in TC 1, 2, 3, 4 and 5, for National Technical Certificate. It was recommended that adequate number of equipment had to be provided to agree and maintained the stipulated number of equipment required by the NBTE in order to safeguard Students from possessing less or no skill acquisition, thereby resulting to low TC Students employability.

INTRODUCTION

Technical Education (TE) is that aspect of education which leads to the acquisition of practical skills, as well as basic and scientific knowledge. According to the Federal Government of Nigeria (FGN, 2004), TE is the form of education which is partly obtainable at the Technical Colleges. This is equivalent to the senior secondary school education but designed to prepare individuals to acquire practical skills, basic and scientific knowledge and attitudes required as craftsmen in various trades. Trades offered at Technical Colleges are broadly grouped into four categories, in line with National Business and Technical Examinations Board Syllabus (NABTEB, 2007) .These are: Construction Trades, Engineering Trades, Miscellaneous Trades and Business Trades. These trades or form of education are:

a. Provide trained manpower in applied science, technology and commerce particularly at sub-professional level.
b. Provide people who can apply scientific knowledge to the improvement and solution of environmental problems for use and convenience of man.
c. Provide technical knowledge and vocational skills necessary in Agriculture, Commerce and Economic Development and others (FGN, 2004).

The acquisition of skill involves imitation, repetition and occupational participation. That is the process through which people learn on the job and supplement their practical experience via corresponding courses as in the trade areas in Technical Colleges (Brickman, 2007). According to Idi (1998), acquisition of skill cut across the three domains of educational objectives, namely: affective, cognitive and psychomotor domains. He also added that skill acquisition is through participation in carrying out practical work in the workshop as one of the resources.

Resources for teaching and learning at Technical Colleges may be broadly divided into three, Namely; Human, Infrastructures and Equipments. The organizational set- up in Technical Colleges should have adequate number of equipment. Equipment at Technical Colleges consist of furniture items such as Try-square, Tape and Shovel etc; hand and machine tools and instruments which are sometimes called " Instructional facilities" are required for the execution of practical work in the workshops , laboratories and classrooms etc.(NBTE, 1992). The organizational set-up in Technical College should also have adequate number of qualified teaching staff to teach all the trade areas. At least one Technical Teacher per every fifteen or twenty students in the workshop. The number of teachers varies according to trade and workload, that is, for a trade section that can offer four different craft level modules, each module requiring twenty hours of workshop practice weekly will require four instructors/teachers. While infrastructures refer to system which support the operation of organization (Educational Institution). This includes; Mechanical workshop, Wood workshop, Electrical/Electronic workshop, Building workshop, Laboratories, Classrooms and other storage areas for the execution of practical/theoretical work and safe keeping of tools and equipment at TC (NBTE, 1992).

STATEMENT OF THE PROBLEM

Technical Colleges are mainly established for the training of students to acquire practical skills, knowledge and attitudes essential for employment in a given occupation. According to Aina (2000), there is the problem of inadequate Equipment at almost all levels and types of Education in Nigeria; this resulted in inability to skillfully train the Technical College students as designed in the Technical Education curriculum in Nigeria. Furthermore, Amoor (2008) has indicated lack of adequate Equipment in the Technical Colleges. These lead to overstretching equipment, thereby resulting to less or no skill acquisition. It is upon this background the researcher carried out a study on the adequacy of Equipment for Skill Acquisition in Blocklaying and Concreting Trade for National Technical Certificate in Kano State.

PURPOSE OF THE STUDY

The purpose of this study was to find out the adequacy of Equipment for skill acquisition in Blocklaying and Concreting Trade for National Technical Certificate in Kano State. Specifically, the study intended to:

1. Determine the adequacy of Blocklaying and Concreting Trade Equipment in Technical Colleges 1,2,3,4 &5 for National Technical Certificate in Kano State.

RESEARCH QUESTION

The following research question was raised to guide this study:

1. What is the adequacy of Block laying and Concreting Trade Equipment in Technical Colleges 1,2,3,4 & 5 for National Technical Certificate in Kano State?

RESEARCH HYPOTHESIS

The fallowing research hypothesis guided the researcher in carrying out this study and it was tested using chi-square statistical tool at 0.05 Levels of significance.

H_0 1: There is no significance difference between the mean ratings of workshop assistants on the adequacy of Blocklaying and Concreting Trade Equipment in

Technical Colleges 1,2,3, 4 &5 for National Technical Certificate in Kano State.

RESEARCH METHODOLOGY

This describe research procedure employed which was a descriptive survey research design, According to (Sambo, 2005 and Nworgu, 2006) descriptive survey research design aims at collecting data in a systematic manner, the characteristics, features or facts about a given population. Thus, a survey method was chosen because of its suitability to the study. The study intend to reveal the state of the art of Block laying and Concreting Trade Equipment in Technical Colleges for National Technical Certificate in Kano State ,so as to ascertain areas of strength, weaknesses or effectiveness with a view to prosper recommendation for improvement in instruction. The area of the study comprised of all Technical Colleges from five (5) Educational Zones of Kano State. The target population of the study consists of all the six (6) workshop assistants from the Technical Colleges. Due to the smaller size of the population the whole sample size were involved for this study. The research instrument was adopted by the researcher using NBTE Manual. A checklist of thirty-eight (38) items of questionnaire was used which relates minimum number of Equipment required for a standard workshop setting per teacher with present Class/workshop enrolment. The checklist of the questionnaire items was given to three (3) experts in Abubakar Tafawa Balewa University to carry out face and content validation of the instrument. They were asked to assess language used and appropriateness of the instrument to collect the needed data from the respondents. All the suggestions of the experts were carefully considered and used in the adoption of the instrument. The data for this study are collected by the researcher with the help of research assistants through the adoption of course specification manual obtained from NBTE. The checklist instrument is design to collect relevant data pertaining to adequacy of block laying and concreting trade equipment in Technical Colleges 1, 2, 3, 4&5, which was administered to workshop assistants. The data for the study was analyzed using mean rating, percentage and chi-square statistical tool.

PRESENTATION OF RESULTS

Research question 1: What is the adequacy of Block laying and Concreting Trade Equipment in Technical Colleges 1, 2, 3, 4&5 for National Technical Certificate in Kano State?

The results in Table 1 , 2 and 3 shows that (100%) of these Technical Colleges had inadequate equipment per Students Ratio as assessed by the respondents in line with NBTE Minimum Standards, this is because the available items in each school do not tie with the Minimum Standards requirement neither does it tie with corresponding enrolment of the schools. This might invariably leads to overstretching the available equipment.

Also, the results in Table 4 and 5 shows that (100%) of these Technical Colleges had inadequate equipment per Students Ratio as assessed by the respondents in line with NBTE Minimum Standards, this is because the available items in each School do not tie with Minimum Standards requirement neither does it tie with corresponding enrolment of the Schools.

Table 1: List of tools, equipment/machines use for block laying and concreting work In Technical College 1.

S/N	Description of Items	Minimum Qty Rqd	No. of Students	Qty. Avail	Short Fall	Remark (s)
1	Brick trowels	25	35	15	29	Inadequate
2.	Pointing trowels	25	35	10	34	Inadequate
3.	Plastering trowels	25	35	05	39	Inadequate
4.	Spirit levels	20	35	10	25	Inadequate
5.	Plumb bulbs	20	35	05	30	Inadequate
6.	Builders squares	25	35	10	34	Inadequate
7.	Chisels	20	35	10	25	Inadequate
8.	Chip hammers	10	35	05	13	Inadequate
9.	Sledge hammers	10	35	05	13	Inadequate
10	Lines	25	35	15	29	Inadequate
11.	Corner block	25	35	15	29	Inadequate
12.	Floats wooden	10	35	05	13	Inadequate
13.	Hawks	30	35	15	38	Inadequate
14.	Straight edges	20	35	10	25	Inadequate
15,	Spot boards	20	35	05	30	Inadequate
16.	Head pans	20	35	10	25	Inadequate
17.	Shovels	20	35	15	20	Inadequate
18.	Spades	20	35	15	20	Inadequate
19.	Pix axes	20	35	10	25	Inadequate
20.	Tape measures (30 x 26 meter)	20	35	10	25	Inadequate
21.	Steel rules	10	35	05	13	Inadequate
22.	Tilting mixer	01	35	01	01	Inadequate
23.	Block and brick moulds	10 each	35	05	13	Inadequate
24.	Levelling instruments (dump level	10	35	05	13	Inadequate
25.	and engineering precision level)	20	35	15	20	Inadequate
26.	Levelling staff	02	35	01	03	Inadequate
27.	Mechanical vibrators	02	35	02	02	Inadequate
28.	Site square	01	35	01	01	Inadequate
29.	Block making machine	01	35	01	01	Inadequate
30.	Brick making machine	01	35	01	01	Inadequate
31	Terrazzo floor washing machine	02	35	01	03	Inadequate
32.	Slump cones	10	35	05	13	Inadequate
33.	Club hammers.	1each	35	02	14	Inadequate
34.	B.S. Sieves (different sizes)	20	35	05	30	Inadequate
35.	Ranging poles	10	35	04	14	Inadequate
36.	Buckets	05	35	02	07	Inadequate
37.	Wheel barrows	10	35	05	13	Inadequate
38.	Diggers Watering cans	05	35	02	07	Inadequate

Table 2: List of tools, equipment/machines use for block laying and concreting work in Technical College 2.

S/N	Description of Items	Minimum Qty Rqd	No. of Students	Qty. Avail	Short Fall	Remark (s)
1	Brick trowels	25	25	12	19	Inadequate
2.	Pointing trowels	25	25	10	21	Inadequate
3.	Plastering trowels	25	25	15	16	Inadequate
4.	Spirit levels	20	25	05	20	Inadequate
5.	Plumb bulbs	20	25	10	15	Inadequate
6.	Builders squares	25	25	10	21	Inadequate
7.	Chisels	20	25	15	10	Inadequate
8.	Chip hammers	10	25	05	08	Inadequate
9.	Sledge hammers	10	25	04	09	Inadequate
10	Lines	25	25	15	16	Inadequate
11.	Corner block	25	25	15	16	Inadequate
12.	Floats wooden	10	25	05	08	Inadequate
13.	Hawks	30	25	10	28	Inadequate
14.	Straight edges	20	25	10	15	Inadequate
15,	Spot boards	20	25	10	15	Inadequate
16.	Head pans	20	25	05	20	Inadequate
17.	Shovels	20	25	05	20	Inadequate
18.	Spades	20	25	06	19	Inadequate
19.	Pix axes	20	25	10	15	Inadequate
20.	Tape measures (30 x 26 meter)	20	25	10	15	Inadequate
21.	Steel rules	10	25	04	09	Inadequate
22.	Tilting mixer	01	25	01	00	Inadequate
23.	Block and brick moulds	10 each	25	03	10	Inadequate
24.	Levelling instruments (dump level	10	25	05	08	Inadequate
25.	and engineering precision level)	20	25	10	15	Inadequate
26.	Levelling staff	02	25	01	02	Inadequate
27.	Mechanical vibrators	02	25	01	02	Inadequate
28.	Site square	01	25	01	00	Inadequate
29.	Block making machine	01	25	01	00	Inadequate
30.	Brick making machine	01	25	01	00	Inadequate
31	Terrazzo floor washing machine	02	25	01	02	Inadequate
32.	Slump cones	10	25	05	08	Inadequate
33.	Club hammers.	1each	25	05	06	Inadequate
34.	B.S. Sieves (different sizes)	20	25	10	15	Inadequate
35.	Ranging poles	10	25	04	09	Inadequate
36.	Buckets	05	25	02	04	Inadequate
37.	Wheel barrows	10	25	03	10	Inadequate
38.	Diggers Watering cans	05	25	02	04	Inadequate

Table 3: List of tools, equipment/machines use for block laying and concreting work in Technical College 3.

S/N	Description of Items	Minimum Qty Rqd	No. of Students	Qty. Avail	Short Fall	Remark (s)
1	Brick trowels	25	30	20	18	Inadequate
2.	Pointing trowels	25	30	15	23	Inadequate
3.	Plastering trowels	25	30	10	28	Inadequate
4.	Spirit levels	20	30	10	20	Inadequate
5.	Plumb bulbs	20	30	05	25	Inadequate
6.	Builders squares	25	30	10	28	Inadequate
7.	Chisels	20	30	10	20	Inadequate
8.	Chip hammers	10	30	05	10	Inadequate
9.	Sledge hammers	10	30	06	09	Inadequate
10	Lines	25	30	10	28	Inadequate
11.	Corner block	25	30	15	23	Inadequate
12.	Floats wooden	10	30	10	05	Inadequate
13.	Hawks	30	30	15	30	Inadequate
14.	Straight edges	20	30	10	20	Inadequate
15,	Spot boards	20	30	05	25	Inadequate
16.	Head pans	20	30	10	20	Inadequate
17.	Shovels	20	30	10	20	Inadequate
18.	Spades	20	30	08	22	Inadequate
19.	Pix axes	20	30	10	20	Inadequate
20.	Tape measures (30 x 26 meter)	20	30	07	23	Inadequate
21.	Steel rules	10	30	05	10	Inadequate
22.	Tilting mixer	01	30	01	01	Inadequate
23.	Block and brick moulds	10 each	30	03	12	Inadequate
24.	Levelling instruments	10	30	03	12	Inadequate
25.	Levelling staff	20	30	06	24	Inadequate
26.	Mechanical vibrators	02	30	01	02	Inadequate
27.	Site square	02	30	01	02	Inadequate
28.	Block making machine	01	30	-	02	Inadequate
29.	Brick making machine	01	30	-	02	Inadequate
30.	Terrazzo floor washing machine	01	30	01	01	Inadequate
31	Slump cones	02	30	01	02	Inadequate
32.	Club hammers.	10	30	05	10	Inadequate
33.	B.S. Seives (different sizes)	1 each	30	02	12	Inadequate
34.	Ranging poles	20	30	10	20	Inadequate
35.	Buckets	10	30	04	11	Inadequate
36.	Wheel barrows	05	30	01	07	Inadequate
37.	Diggers	10	30	05	10	Inadequate
38.	Watering cans	05	30	02	06	Inadequate

Table 4: List of tools, equipment/machines use for block laying and concreting work in Technical College 4

S/N	Description of Items	Minimum Qty Rqd	No. of Students	Qty. Avail		Remark (s)
1	Brick trowels	25	20	20	05	Inadequate
2.	Pointing trowels	25	20	10	15	Inadequate
3.	Plastering trowels	25	20	15	10	Inadequate
4.	Spirit levels	20	20	10	10	Inadequate
5.	Plumb bulbs	20	20	07	13	Inadequate
6.	Builders squares	25	20	15	10	Inadequate
7.	Chisels	20	20	10	10	Inadequate
8.	Chip hammers	10	20	05	00	Inadequate
9.	Sledge hammers	10	20	06	05	Inadequate
10	Lines	25	20	10	15	Inadequate
11.	Corner block	25	20	10	15	Inadequate
12.	Floats wooden	10	20	05	05	Inadequate
13.	Hawks	30	20	15	15	Inadequate
14.	Straight edges	20	20	10	10	Inadequate
15,	Spot boards	20	20	10	10	Inadequate
16.	Head pans	20	20	10	10	Inadequate
17.	Shovels	20	20	05	15	Inadequate
18.	Spades Pix axes	20	20	05	15	Inadequate
19.	Tape measures (30 x 26 meter)	20	20	10	10	Inadequate
20.	Steel rules	20	20	10	10	Inadequate
21.	Tilting mixer	10	20	05	05	Inadequate
22.	Block and brick moulds	01	20	01	00	Adequate
23.	Levelling instruments	10 each	20	02	08	Inadequate
24.	Levelling staff	10	20	05	05	Inadequate
25.	Mechanical vibrators	20	20	10	10	Inadequate
26.	Site square	02	20	-	02	Inadequate
27.	Block making machine	02	20	01	01	Inadequate
28.	Brick making machine	01	20	01	00	Adequate
29.	Terrazzo floor washing machine	01	20	-	01	Inadequate
30.	Slump cones	01	20	-	01	Inadequate
31.	Club hammers.	02	20	01	01	Inadequate
32.	B.S. Seives	10	20	04	06	Inadequate
33.	(different sizes)	1each	20	02	07	Inadequate
34.	Ranging poles	20	20	05	15	Inadequate
35.	Buckets	10	20	03	07	Inadequate
36.	Wheel barrows	05	20	02	03	Inadequate
37.	Diggers	10	20	04	06	Inadequate
38.	Watering cans	05	20	03	02	Inadequate

Table 5: List of tools, equipment/machines use for block laying and concreting work in Technical College 5.

S/N	Description of Items	Minimum Qty Rqd	No. of Students	Qty. Avail	Short Fal	Remark (s)
1	Brick trowels	25	22	10	18	Inadequate
2.	Pointing trowels	25	22	12	16	Inadequate
3.	Plastering trowels	25	22	05	23	Inadequate
4.	Spirit levels	20	22	01	21	Inadequate
5.	Plumb bulbs	20	22	05	17	Inadequate
6.	Builders squares	25	22	10	18	Inadequate
7.	Chisels	20	22	10	12	Inadequate
8.	Chip hammers	10	22	10	01	Inadequate
9.	Sledge hammers	10	22	05	06	Inadequate
10	Lines	25	22	10	18	Inadequate
11.	Corner block	25	22	10	18	Inadequate
12.	Floats wooden	10	22	05	06	Inadequate
13.	Hawks	30	22	15	18	Inadequate
14.	Straight edges	20	22	10	12	Inadequate
15,	Spot boards	20	22	05	17	Inadequate
16.	Head pans	20	22	10	12	Inadequate
17.	Shovels	20	22	15	07	Inadequate
18.	Spades	20	22	15	07	Inadequate
19.	Pix axes	20	22	10	12	Inadequate
20.	Tape measures (30 x 26 meter)	20	22	08	14	Inadequate
21.	Steel rules	10	22	04	07	Inadequate
22.	Tilting mixer	01	22	01	00	Inadequate
23.	Block and brick moulds	10 each	22	03	08	Inadequate
24.	Levelling instruments	10	22	05	06	Inadequate
25.	Levelling staff	20	22	10	12	Inadequate
26.	Mechanical vibrators	02	22	01	01	Inadequate
27.	Site square	02	22	01	01	Inadequate
28.	Block making machine	01	22	01	00	Inadequate
29.	Brick making machine	01	22	01	00	Inadequate
30.	Terrazzo floor washing machine	01	22	01	00	Inadequate
31.	Slump cones	02	22	02	00	Inadequate
32.	Club hammers.	10	22	05	06	Inadequate
33.	B.S. Sieves (different sizes)	1each	22	05	05	Inadequate
34.	Ranging poles	20	22	10	12	Inadequate
35.	Buckets	10	22	04	07	Inadequate
36.	Wheel barrows	05	22	02	04	Inadequate
37.	Diggers	10	22	04	07	Inadequate
38	Watering cans	05	22	03	03	Inadequate

Table 6: Workshop assistants mean ratings on the adequacy of block laying & concreting work equipment in Tech Coll 1, 2, 3, 4 &5.

S/No	Mean Short Falls Tech. College 1, 2, 3.	Mean Short falls Tech. College 4,5.	Total means	Df	P	X^2 calculated	X^2 critical	Decision
1.	22	11	33	37	1.0	**8.445**	**43.80**	**Not signif.**
2.	26	15	41					
3.	28	16	44					
4.	22	16	38					
5.	23	15	38					
6.	28	14	42					
7.	18	11	29					
8.	10	01	11					
9.	10	06	16					
10.	24	16	40					
11.	23	16	39					
12.	08	06	14					
13.	32	17	49					
14.	20	11	31					
15	23	14	37					
16.	22	11	33					
17.	20	11	31					
18	20	11	31					
19	20	11	31					
20	21	12	33					
21.	10	06	16					
22.	01	00	01					
23.	11	08	19					
24.	11	06	17					
25.	20	11	31					
26.	02	02	04					
27.	02	01	03					
28	01	00	01					
29	01	01	02					
30.	01	01	02					
31.	02	01	03					
32.	10	06	16					
33.	11	06	17					
34.	22	14	36					
35.	11	07	18					
36.	06	03	09					
37.	11	07	18					
38.	06	02	08					
	559	**323**	**882**					

RESEARCH HYPOTHESIS 1

$H_{0\ 1}$: There is no significant difference between the mean ratings of Workshop assistants on the adequacy of Block laying and Concreting Trade Equipment in Technical Colleges 1, 2, 3, 4 &5 for National Technical Certificate in Kano State

The results in Table 6 shows that the null hypotheses is not rejected, this is because the calculated chi- square value is less than the tabulated chi- square value; hence, rejection of the alternate hypotheses.

FINDINGS OF THE STUDY

The major findings of the study were:

1. All (100%) of both Technical Colleges 1,2,3,4 &5 had Inadequate Equipment per Students Ratio. Also, (100%) of Technical Colleges 4, 5 had inadequate Equipment per Students ratio.

DISCUSSION OF THE FINDINGS

The findings revealed that (100%) of both Technical Colleges 1,2,3,4&5 had Inadequate Equipment per Students Ratio which might leads to overstretching the available equipment. This may invariably reduce the life span of the equipment at the same time making some students sustain injuries as a result of using faulty equipment.

These findings are in agreement with Aina (2000) who stated lack of adequate Equipment for effective learning environment in Technical Colleges, which resulted in inability to skillfully train the Technical College Students as designed in Technical Education Curriculum in Nigeria. In a related development, Amoor (2008) has indicated inadequacy of equipment in Technical Colleges. According to him, many Technical Colleges offering Technical Education in Nigeria today lack adequate equipment for effective instruction and learning.

CONCLUSION

The study has identified gross inadequacy of Technical Colleges Equipment per student's ratio. This might resulted to less or no skill acquisition which invariably affects students' skill acquisition. Hence, for a sound skill acquisition in Block laying and Concreting Trade, adequate number of equipment had to be provided to students to meet up with the minimum number of equipment stipulated in the NBTE Manual.

RECOMMENDATIONS

The following recommendations were made based on the findings of the study:

1. Administrators and government should make adequate provision for the supply and distribution of Equipment in the Technical Colleges.

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