

ASSESSMENT OF ADEQUACY OF HUMAN AND MATERIAL RESOURCES IN BRICK/BLOCKLAYING AND CONCRETING IN GOVERNMENT SCIENCE AND TECHNICAL COLLEGES IN NORTH EAST, NIGERIA

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ABSTRACT

The study is aimed at determining the Adequacy of Human and Material Resources in Brick/Block laying and Concreting (BBC) in Government Science and Technical Colleges in North East, Nigeria. The study focused on addressing the challenges faced in technical colleges which includes; inadequate instructional materials such as; tools, equipment, machineries, consumable and infrastructural facilities. It also addressed the problem of inadequate skilled workforce in technical colleges' in North East Nigeria. It employed the descriptive survey research design with a population of 36 technical colleges workshop and 128 BBC Teachers. Three sampling technique were used to draw a sample size of 128 respondents and 36 workshop facilities. A checklist titled Brick/Block laying and Concreting Resources adapted from NBTE was used. Three experts validated the instrument for the data collection. The instrument was trial tested and the reliability coefficient of 0.84 was obtained using Cronbach alpha formula. The two research questions were percentage count The findings established that human resources in BBC are adequate, Material resources are to a larger extent inadequate in BBC trade Based on the findings, the study recommended that; Government and ministry of education should supply the necessary tools, equipment and machineries for effective delivery of BBC programme in Government Science and Technical Colleges in North East, Nigeria. Therefore, the study concluded that; BBC human resources are adequate while instructional facilities are inadequate in Government Science and Technical Colleges in North East, Nigeria.

Keywords: Human, Material resources, Brick/Block laying, Concreting, North East

1 INTRODUCTION

Technical colleges are saddled with the responsibility of training lower and middle-level workforce toward acquiring the skills for self-reliance. Science and Technical Colleges in Nigeria are established to produce artisan and craftsmen at the craft (secondary) level and master craftsmen at the advanced craft (post-secondary) level [1]. The courses offered at the technical colleges lead to the award of the National Technical Certificate NTC and Advanced National Technical Certificate (ANTC). Science and Technical colleges are the formal institutions where vocational and technical courses are offered by students for acquiring knowledge, skills and attitudes. [2] stated that technical colleges are aimed at giving training and imparting the necessary skills in various occupations such as auto mechanics, plumbing, carpentry and joinery, cabinet making, painting and decorating, welding, electrical installation, radio, and television repairs and brick/block laying and concreting leading to the production of craftsmen, technicians and other skilled personnel who will be enterprising and self-reliant among others. Brick/block laying and

concreting trade is among the trades that offer students the skills necessary for enterprising in construction industries. According to [3] brick/block laying and concreting (BBC) trade is that aspect of technical and vocational education that is meant to equip students with technical knowledge and skills that will make the trainees enterprise or become self-reliant. [3] further stated that the aims of brick/blocklaying and Concreting trade *are* designed to acquaint the trainee with the: (i) Basic construction principles, materials and methods so that he may be able to appreciate the roles of the various trades in the building industry. (ii) Essential knowledge and skills that will enable him to perform all aspects of brickwork in the construction industry. (iii) Essential knowledge and skill that will enable him to perform proficiently all aspects of block layers work in the construction industry. (iv) Basic knowledge of the properties and applications of concrete as well as the skills in the production of sound concrete structures. (v) Basic knowledge of finishing materials related to the buildings work and to enable him to apply such finishes proficiently. Resources in BBC are inputs such as human, material, financial, organizational and community resources a programme has available to direct towards doing the work. Activities entail what the programme does with the resources; the processes, tools, events, technology and actions that are an intentional part of the programme implementation [4]. Human resources in Brick/Blocklaying and concreting in technical colleges include professionally trained teaching staff, Technicians, administrators and non-teaching staff. [5] stated that there shall be available and adequate numbers of qualified teaching, administrative and non-academic staff to run the various departments who are crucial to the smooth management of the technical college and BBC programme. Material resources is a broad term used in the teaching and learning arena as infrastructural and instructional facilities that facilitate teaching and learning BBC trade in technical colleges. Infrastructural facilities can be generally defined as buildings, properties and major infrastructure which include physical and material assets commonly used for the instructional purpose in BBC trade [6]. Infrastructural facilities in technical colleges are facilities that enhance teaching and learning thereby making the process meaningful and purposeful. Facilities in technical colleges can be seen as the entire school plant which technical colleges' administrators, teachers and students' harness, allocate and utilize for the smooth and efficient management of technical colleges and for bringing about effective and purposeful teaching and learning experiences [7]. Infrastructural facilities include administrative block, health centre, convenience hostels, classrooms, workshop, studios, laboratories, library, provision of utility services such as water, electricity, transportation and communication facilities and finance. Adequacy of BBC instructional materials and infrastructural facilities means the sufficiency and functionality of the material resources and facilities in technical colleges. Resources that are sufficient and functional are necessary for effective teaching and learning BBC programme in technical colleges. According to [8] observed that facilities in technical colleges are the physical and spatial enablers of teaching and learning which will increase the production of results. According to [5] the resources (infrastructural and instructional facilities) required for teaching the BBC trade in technical colleges may be broadly divided into five types: (i) Physical facilities which include the site, accommodation for workshops, laboratories, classrooms and studios; (ii) Equipment for the workshops, laboratories, classrooms, studios; (iii) Library resources.

2 METHODOLOGY

The study adopted a quantitative descriptive survey research design. [9]observed that descriptive survey is a research design which aims at describing, recording, analyzing and interpreting existing conditions of a given population that yield valid and reliable education research results. The descriptive survey method was chosen because of its suitability to elicit the data regarding the context, input, process and product of BBC Trade programme from technical colleges' administrators, BBC teachers, Technicians and students in Science and Technical Colleges in North East Nigeria. This is to ascertain the areas of strength and weaknesses with a view to proffering solution for improvement of the programme where the need arises. The area of the study is North East geopolitical zone of Nigeria. It is located within the geopolitical boundary of latitude $9^{\circ} 08''$ North and longitude $8^{\circ} 68''$ East of the Equator [10]. Its total land mass is 103639 m^2 . North East comprises of Bauchi, Gombe, Taraba, Adamawa, Yobe and Borno States.

It shares boundary with republic of Chad and Niger by the east and Jigawa and Kano by the North and Plateau by the west and Republic of Cameroon by the south.

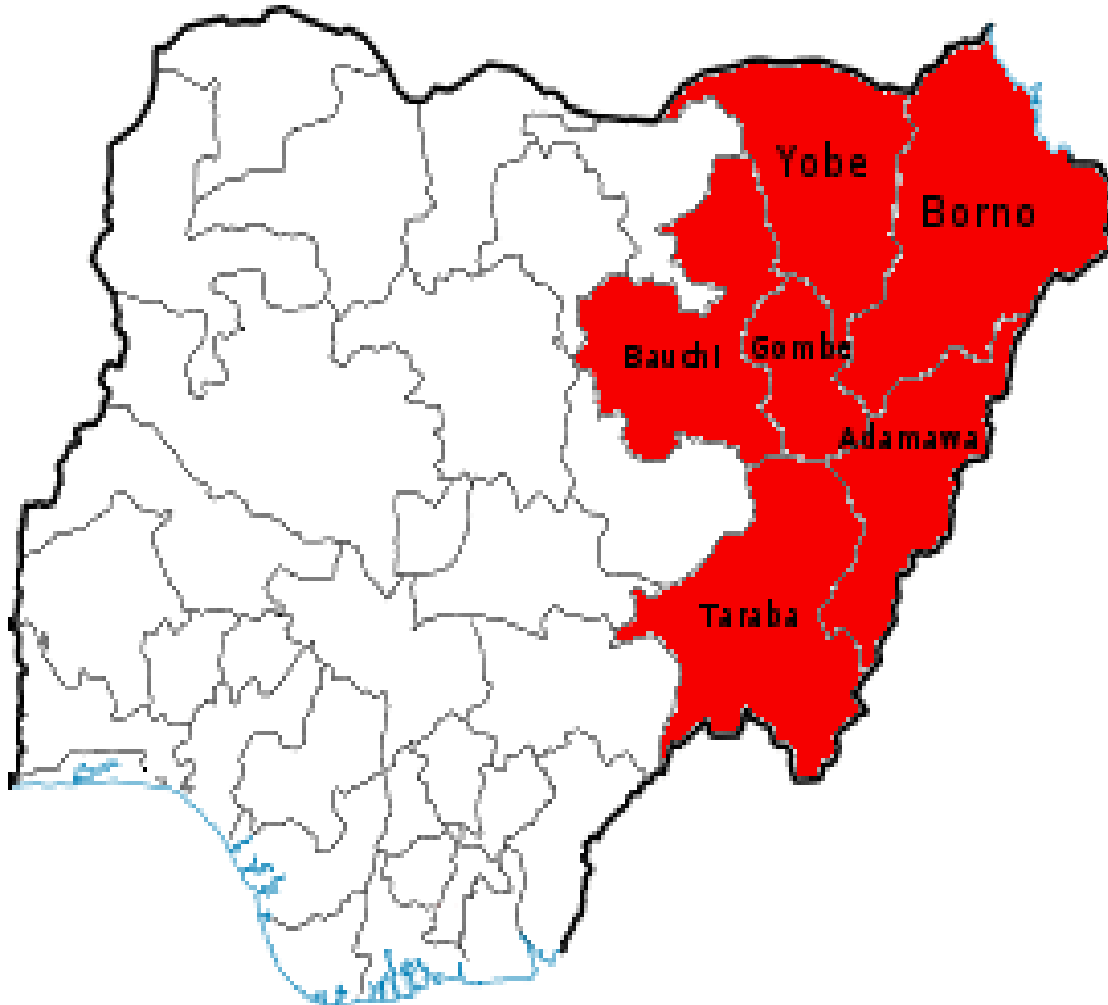


Figure 1. North East Nigeria Topographical Map

The population of the study comprised the 36 Government Science Technical Colleges workshop in North East Nigeria. The study sampled eighteen technical colleges workshop out of 36 in North East, Nigeria. Three sampling techniques were used in selecting the sample size for this study. Firstly, stratified sampling technique was used in selecting the six states of North East geopolitical zone of Nigeria, followed by sampling the technical colleges based on educational zone in each state in the North East Nigeria. Secondly, Purposive sampling technique was used in selecting the technical colleges offering BBC trade in the North East Nigeria. Thirdly simple random sampling was used in sampling one technical college workshop in a particular educational zone. The instrument for data collection was a checklist instrument was based on input of BBC programme (resources) which was adapted from the NBTE benchmark. A checklist of 43 items was used which relates the minimum number of equipment/facilities or resources required for a standard workshop setting per teacher with the present class/workshop enrolment [5]. The instrument was subjected to face and contents validity by three building technology education specialists, two from the Department of Vocational and Technology Education faculty of Technology Education Abubakar Tafawa Balewa University (ATBU) Bauchi and one from the Department of Technology Education, Faculty of Education Modibbo Adama University, Yola. The experts' observations, corrections and suggestions were effected before producing the final copy of the instrument. The reliability of the

instrument was determined through pilot testing the instrument in Government Technical College Kano state. The pilot study area was carried out outside the researcher study area. The instrument was administered on workshop facilities found and human resources in technical college. The data collected in the pilot study was statistically analysed using Cronbach alpha statistics for internal consistency with the help of SPSS version 23.0. The cronbach alpha statistics is basically for internal consistency of the items of the instrument. items on adequacy of BBC human and material resources yielded the reliability coefficient of 0.84. The researcher presented the introductory letter to principals of the Technical Colleges and appointed one research assistants and gives them induction training for each of the sampled technical colleges in North East Nigeria. The research assistant compared the resource with corresponding benchmark checklist, recorded figures of facilities found for further decision. The data collected were analyzed using percentage counts the research questions 1 and 2 were analyzed manually using percentage count. The researcher used percentage count because research question 1 and 2 are based on the checklist on adequacy of human and materials resources in Brick/Blocklaying and concreting trade programme in technical colleges in North East Nigeria. The decision rule on adequacy was any item with percentage count equal or greater than NBTE minimum requirement will be considered adequate while items with percentage count less than the NBTE minimum requirement would be considered not adequate. Therefore, the percentage count of the items is not statutory depending on material resources ratio student enrolment as provided by the NBTE standard.

3 RESULTS AND DISCUSSIONS

The results of the research questions were presented as research question one and research question two.

3.1 Research question one

What is the adequacy of human resources in BBC programme in Government Science and Technical Colleges in North East, Nigeria? Table 1 presented the descriptions of items from a checklist on BBC human resources with the corresponding NBTE Benchmark, the number of students' enrolment, the number of human resources found and the percentage of the human resources in the technical college. Item 1 to 3 showed that human resources such as BBC teachers, BBC technicians and technical colleges' administrators are substantially adequate with a percentage count of 100%.

Table 1. Percentage count on the Adequacy of Human Resources in BBC Programme in STCs in North East, Nigeria

| S/N | Description of Items | NBTE Minimum Req. (Benchmark)/35 Students | NBTE Minimum Req. for 18 Tech. Colleges | Excess or shortage | Percentage Adequate | Remark (s) |
|-----|----------------------|---|---|--------------------|---------------------|------------|
| 1 | BBC Teachers | 3 | 54 | 0 | 100% | A |
| 2 | BBC Technicians | 1 | 18 | 0 | 100% | A |
| 3 | BBC Administrators | 1 | 18 | 0 | 100% | A |

Source: Field Survey (2021), Key: A=Adequate, N/A=Not Adequate

3.2 Research question two

What is the adequacy of the material resources (instructional materials and infrastructural facilities) in brick/blocklaying and concreting programme in Government Science and Technical Colleges in North East, Nigeria? The result in Table 2 presented a description of items checklist based on BBC material resource with the corresponding NBTE minimum requirements (Benchmark) in relation to the students' enrolment against the quantity of the material resources found in the sampled Science and Technical Colleges in North East, Nigeria. Item between 4 to 7 and 10, with NBTE benchmark 25:35 per workshop and 450:630 for 18 technical colleges presented the percentage counts between 47% to 58% based on the BBC tools found ratio 630 BBC students' enrolment (NBTE standard) for the sampled of 18 STCs in North East Nigeria. This indicated that BBC tools are not adequate with the percentage counts found less than the

NBTE minimum requirement. Item 7, 13 to 17, and 22 with NBTE benchmark 360:630 presented percentage counts between 36% and 53% in relation to the BBC tools found ratio 630 students in Science and Technical Colleges in North East Nigeria. This showed that BBC tools are not adequate. Item 8, 10, 11, 18, 20 and 23 with NBTE benchmark 180:630 for 18 technical colleges presented percentage counts between 17% and 30% which is less than the NBTE benchmark which means the BBC tools in those items are not adequate in STCs in North East Nigeria except item 11 with 30% which is adequate based on NBTE benchmark standard. Item 43 with NBTE benchmark of 540:630 presented a percentage count of 55% based on BBC tool found ratio 630 students. This showed that, the BBC tool in that item is not adequate. Item 19 with NBTE benchmark of 90:630 showed a percentage count of 10% against the BBC tool found ratio 630 students. This has proved that the BBC tool is not adequate in that item in Science and Technical Colleges in North East Nigeria. However, item 21 with NBTE benchmark of 36:630 has a percentage of 6% which is adequate based on the NBTE benchmark. The cluster percentage count of the BBC tools found is 35%. This indicated substantially, the BBC tools are not adequate based on the tools found ratio BBC students' enrolment for NBTE standard in STCs in North East Nigeria. Furthermore, Item 24 and 25 with NBTE benchmark of 54:630 presented the percentage counts 7% based on the BBC equipment found ratio 630 students. This showed the BBC equipment are not adequate based the NBTE benchmark. Item 26 with NBTE benchmark of 270:630 presented a percentage count of 41% based on BBC equipment found ratio 630 which is less than the NBTE benchmark. This has shown the BBC equipment is adequate. Item 58 with NBTE benchmark of 360:630 presented a percentage count of 51% based on the BBC equipment found ratio 630 students. This showed that BBC equipment are not adequate. The cluster percentage of the BBC equipment with percentage of 27% indicated that BBC equipment are not adequate in STCs in North East. Moreover, Item 28, 30, 32 to 34 with NBTE benchmark 18:630 presented percentage counts between 0.4% to 2% based on the BBC machines found ratio 630 students. This indicated largely the BBC machines are not adequate. Item 60 and 62 with NBTE benchmark of 36:630 presented the percentage counts between 1% based on the BBC machines found ratio 630 students. This showed that the BBC machines are not adequate according to the NBTE benchmark. The cluster percentage count of 1% indicated that BBC machines are not adequate in Science and Technical Colleges in North East Nigeria. In addition, Item 35, 36, 39 and 40 with NBTE benchmark of 360:630 presented percentage counts between 37% to 54% based on the BBC measuring and testing instruments found ratio 630 students. This indicated that BBC measuring and testing instruments are not adequate since the percentage counts found are less than NBTE benchmark. Item 37 and 38 with NBTE benchmark 450:630 presented percentage counts of 60% and 55% which showed inadequacy of BBC measuring and testing instruments. Item 41 with NBTE benchmark of 18:630 presented percentage count of 2% which showed inadequacy of the measuring and testing instrument. Item 42 with NBTE benchmark 180:630 presented percentage count of 27% based on the measuring and testing instrument found ratio 630 students. This has shown the inadequacy of the BBC the measuring and testing instrument. Item 43 with NBTE benchmark 270:630 presented percentage count of 38% based on the measuring and testing instrument found ratio 630 students which showed inadequacy of the BBC measuring and testing instruments in Science and Technical Colleges in North East Nigeria. The cluster percentage count of 40% is obtained for the BBC measuring and testing instruments indicating the BBC measuring and testing instruments are not adequate in Science and Technical Colleges in North East Nigeria. Finally, Item 44 to 53 on BBC Infrastructure presented percentage counts of 100% based on NBTE minimum requirement ratio number infrastructure found in the sampled technical colleges which are adequate compared to the corresponding NBTE benchmark on BBC infrastructure except item 81 which presented a percentage count less than the NBTE benchmark. The cluster percentage count obtained is 95% which showed the BBC infrastructure are adequate in Science and Technical Colleges in North East Nigeria. The result in Table 2 presented a description of items checklist based on BBC material resource with the corresponding NBTE minimum requirements (Benchmark) in relation to the students' enrolment against the quantity of the material resources found in the sampled Science and Technical Colleges in North East, Nigeria. Item between 4 to 7 and 10, with NBTE benchmark 25:35 per workshop and 450:630 for 18 technical colleges presented the percentage counts between 47% to 58% based on the BBC tools found ratio 630 BBC students' enrolment (NBTE standard) for the sampled of 18 STCs in North East Nigeria.

This indicated that BBC tools are not adequate with the percentage counts found less than the NBTE minimum requirement. Item 7, 13 to 17, and 22 with NBTE benchmark 360:630 presented percentage counts between 36% and 53% in relation to the BBC tools found ratio 630 students in Science and Technical Colleges in North East Nigeria. This showed that BBC tools are not adequate. Item 8, 10, 11, 18, 20 and 23 with NBTE benchmark 180:630 for 18 technical colleges presented percentage counts between 17% and 30% which is less than the NBTE benchmark which means the BBC tools in those items are not adequate in STCs in North East Nigeria except item 11 with 30% which is adequate based on NBTE benchmark standard. Item 43 with NBTE benchmark of 540:630 presented a percentage count of 55% based on BBC tool found ratio 630 students. This showed that, the BBC tool in that item is not adequate. Item 19 with NBTE benchmark of 90:630 showed a percentage count of 10% against the BBC tool found ratio 630 students. This has proved that the BBC tool is not adequate in that item in Science and Technical Colleges in North East Nigeria. However, item 21 with NBTE benchmark of 36:630 has a percentage of 6% which is adequate based on the NBTE benchmark. The cluster percentage count of the BBC tools found is 35%. This indicated substantially, the BBC tools are not adequate based on the tools found ratio BBC students' enrolment for NBTE standard in STCs in North East Nigeria. Furthermore, Item 24 and 25 with NBTE benchmark of 54:630 presented the percentage counts 7% based on the BBC equipment found ratio 630 students. This showed the BBC equipment are not adequate based the NBTE benchmark. Item 26 with NBTE benchmark of 270:630 presented a percentage count of 41% based on BBC equipment found ratio 630 which is less than the NBTE benchmark. This has shown the BBC equipment is adequate. Item 58 with NBTE benchmark of 360:630 presented a percentage count of 51% based on the BBC equipment found ratio 630 students. This showed that BBC equipment are not adequate. The cluster percentage of the BBC equipment with percentage of 27% indicated that BBC equipment are not adequate in STCs in North East. Moreover, Item 28, 30, 32 to 34 with NBTE benchmark 18:630 presented percentage counts between 0.4% to 2% based on the BBC machines found ratio 630 students. This indicated largely the BBC machines are not adequate. Item 60 and 62 with NBTE benchmark of 36:630 presented the percentage counts between 1% based on the BBC machines found ratio 630 students. This showed that the BBC machines are not adequate according to the NBTE benchmark. The cluster percentage count of 1% indicated that BBC machines are not adequate in Science and Technical Colleges in North East Nigeria. In addition, Item 35, 36, 39 and 40 with NBTE benchmark of 360:630 presented percentage counts between 37% to 54% based on the BBC measuring and testing instruments found ratio 630 students. This indicated that BBC measuring and testing instruments are not adequate since the percentage counts found are less than NBTE benchmark. Item 37 and 38 with NBTE benchmark 450:630 presented percentage counts of 60% and 55% which showed inadequacy of BBC measuring and testing instruments. Item 41 with NBTE benchmark of 18:630 presented percentage count of 2% which showed inadequacy of the measuring and testing instrument. Item 42 with NBTE benchmark 180:630 presented percentage count of 27% based on the measuring and testing instrument found ratio 630 students. This has shown the inadequacy of the BBC the measuring and testing instrument. Item 43 with NBTE benchmark 270:630 presented percentage count of 38% based on the measuring and testing instrument found ratio 630 students which showed inadequacy of the BBC measuring and testing instruments in Science and Technical Colleges in North East Nigeria. The cluster percentage count of 40% is obtained for the BBC measuring and testing instruments indicating the BBC measuring and testing instruments are not adequate in Science and Technical Colleges in North East Nigeria. Finally, Item 44 to 53 on BBC Infrastructure presented percentage counts of 100% based on NBTE minimum requirement ratio number infrastructure found in the sampled technical colleges which are adequate compared to the corresponding NBTE benchmark on BBC infrastructure except item 81 which presented a percentage count less than the NBTE benchmark. The cluster percentage count obtained is 95% which showed the BBC infrastructure are adequate in Science and Technical Colleges in North East Nigeria.

Table 2. Percentage Count on Adequacy of Material Resources in BBC Programme in STCs in North East, Nigeria

| S/N | Description of Items | NBTE Minimum Req. (Benchmark) per W/shop/35 | NBTE Minimum Req. for 18 Tech. Colleges | Qty. of material Resources In the STCs Ratio 630 students found | Shortage or Excess instructional Resource | Percentage Available in the Technical Colleges | Remarks |
|---|--------------------------------------|---|---|---|---|--|---------|
| Brick/blocklaying and Concreting Tools | | | | | | | |
| 1 | Brick trowel | 25 | 450 | 367 | *83 | 58% | N/A |
| 2 | Pointing trowel | 25 | 450 | 321 | *129 | 51% | N/A |
| 3 | Plastering trowel | 25 | 450 | 299 | *151 | 47% | N/A |
| 4 | Chisels | 20 | 360 | 332 | *28 | 53% | N/A |
| 5 | Chip hammer | 10 | 180 | 163 | *17 | 26% | N/A |
| 6 | Sledge hammer | 10 | 180 | 116 | *64 | 18% | N/A |
| 7 | Corner block | 25 | 450 | 320 | *130 | 51% | N/A |
| 8 | Floats wood | 10 | 180 | 186 | >6 | 30% | A |
| 9 | Hawks | 30 | 540 | 348 | *192 | 55% | N/A |
| 10 | Straight edge | 20 | 360 | 321 | *39 | 51% | N/A |
| 11 | Head pans | 20 | 360 | 246 | *114 | 39% | N/A |
| 12 | Spot Boards | 20 | 360 | 209 | *51 | 33% | N/A |
| 13 | Spades | 20 | 360 | 257 | *103 | 41% | N/A |
| 14 | Club hammers | 20 | 360 | 226 | *134 | 36% | N/A |
| 15 | Buckets | 10 | 180 | 109 | *71 | 17% | N/A |
| 16 | Wheelbarrow | 5 | 90 | 65 | *25 | 10% | N/A |
| 17 | Diggers | 10 | 180 | 123 | *57 | 20% | N/A |
| 18 | Watering can | 2 | 36 | 39 | >3 | 6% | A |
| 19 | Shovel | 20 | 360 | 279 | *81 | 44% | N/A |
| 20 | Pix. Axe | 10 | 180 | 127 | *53 | 20% | N/A |
| 21 | Cluster % of BBC Tools | 17 | 303 | 223 | *1,114 >9 | 35% | N/A |
| Brick/blocklaying and Concreting Equipment | | | | | | | |
| 22 | Brick Moulds | 3 | 54 | 42 | *12 | 7% | N/A |
| 23 | Block Moulds | 3 | 54 | 43 | *11 | 7% | N/A |
| 24 | Levelling staff | 15 | 270 | 257 | *13 | 41% | N/A |
| 25 | Ranging pole | 20 | 360 | 321 | *39 | 51% | N/A |
| 26 | Cluster % of BBC Equipment | 10 | 185 | 166 | *46 | 27% | N/A |
| Brick/Blocklaying and Concreting Machines, | | | | | | | |
| 27 | Tilting mixer | 1 | 18 | 15 | *3 | 2% | N/A |
| 28 | Mechanical Vibrators | 2 | 36 | 11 | *25 | 2% | N/A |
| 29 | Block machine | 1 | 18 | 9 | *9 | 1% | N/A |
| 30 | Brick machine | 2 | 36 | 4 | *32 | 1% | N/A |
| 31 | Terrazzo Machine | 1 | 18 | 3 | *15 | 0.40% | N/A |
| 32 | Dumper | 1 | 18 | 4 | *14 | 1% | N/A |
| 33 | Porker Violator | 1 | 18 | 5 | *13 | 1% | N/A |
| 34 | Cluster % of BBC Machine | 1 | 23 | 7 | *111 | 1% | N/A |
| Brick/blocklaying and Concreting Measuring and Testing Instrument | | | | | | | |
| 35 | Spirit level | 20 | 360 | 236 | *124 | 37% | N/A |
| 36 | Plumb bulbs | 20 | 360 | 342 | *18 | 54% | N/A |
| 37 | Builders Square | 25 | 450 | 378 | *72 | 60% | N/A |
| 38 | Lines and pin | 25 | 450 | 346 | *104 | 55% | N/A |
| 39 | Steel rules | 20 | 360 | 256 | *104 | 41% | N/A |
| 40 | Tape | 20 | 360 | 317 | *43 | 50% | N/A |
| 41 | Slump cones | 1 | 18 | 13 | *5 | 2% | N/A |
| 42 | B.S. sieve | 10 | 180 | 169 | *11 | 27% | N/A |
| 43 | Gauge Box | 15 | 270 | 240 | *30 | 38% | N/A |
| 44 | Cluster % of BBC Meas. & Test. Inst. | 17 | 312 | 255 | *511 | 40% | N/A |
| Brick/blocklaying and Concreting Infrastructure | | | | | | | |
| 45 | Class Rooms | 3 | 54 | 58 | >4 | 107% | A |
| 46 | Workshop | 1 | 18 | 18 | 0 | 100% | A |
| 47 | Store | 1 | 18 | 18 | 0 | 100% | A |
| 48 | Library | 1 | 18 | 18 | 0 | 100% | A |
| 49 | Staff offices | 3 | 54 | 51 | *03 | 94% | A |
| 50 | Toilet | 2 | 36 | 36 | 0 | 100% | A |
| 51 | Borehole | 1 | 18 | 11 | *07 | 61% | N/A |
| | Electricity | as available | as available | Available | Available | Available | A |
| 52 | Cluster % of BBC Infrastructure | 2 | 31 | 30 | , *14 | 95% | A |

Source: Field Survey (2021)

Key: Adequate = A, Not Adequate = N/A, * = Shortage, > = Excess, 630 = students' enrolment based on NBTE, 25:30 per Tech. Coll., 450:630 per 18 Tech. Colleges.

Findings of the study shows that human resources such as Technical Colleges Administrators, BBC Teachers, BBC Technicians and Librarians are to a larger extent adequate in Science and Technical Colleges in North East, Nigeria. Brick/block laying and concreting tools, equipment, measuring and testing instrument and machines are not adequate except watering can, floating wood and infrastructure which are adequate in Science and Technical Colleges' in North East, Nigeria. The finding of research question two revealed that human resources are adequate in Science and Technical Colleges in North East Nigeria. The adequate human resources include: The Technical Colleges Administrators, the BBC Teachers, the BBC Technicians and the Librarians in Science and Technical Colleges in North East, Nigeria. This finding is in agreement with the NBTE minimum requirement for BBC human resources in government science technical colleges in North East Nigeria. However, the finding is in contrast with the finding of [11] who found that, the human resources for teaching and learning of woodwork in Delta State technical colleges were inadequate. Therefore, the inadequacy difference found might be attributed to the difference in the geopolitical zone between the North East and South-South zones of Nigeria. The finding of research question two revealed that Brick/block laying and concreting tools, equipment, measuring and testing instrument and infrastructure are adequate except machines that are not adequate in Science and Technical Colleges' in North East, Nigeria. This finding is not in agreement with the finding of [12] who established that, the instructional facilities for teaching and learning of Metalwork Technology in Colleges of Education in North Eastern States of Nigeria were low. Moreover, [13] contrarily found that instructional facilities for teaching and learning of Automobile Technology in Colleges of Education in North-East Zone of Nigeria were inadequate. In addition, the finding of the study is not in agreement with finding of [14] who found that Most of the equipment, tools, and machines available in the colleges were not enough to cater for increasing population of students' enrolment. This finding agrees with the finding of [15] who found that brick/block laying and concreting classes are adequate in all the technical colleges; workshops are available in the technical colleges, but not adequate in four of the colleges in Yobe state. This finding is in line with the policy of [5] who opined that technical college should have adequate minimum requirement of instructional material for effective delivery of goal and objectives of BBC programme in technical colleges. The adequacy of instructional materials might be attributed to adequate funding of the technical colleges by the government.

4 CONCLUSIONS

Based on the findings of this study the researcher concluded that BBC human resources are adequate in Government Science technical colleges in North East, Nigeria while material resources are to a larger extent inadequate in Government Science technical colleges in North East, Nigeria North East, Nigeria. Therefore, the inadequacy of enough BBC resources will affect the learning outcome of the learners.

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