ASSESSMENT OF FACILITIES FOR TEACHING METALWORK IN COLLEGES OF EDUCATION IN THE NORTH EASTERN STATES OF NIGERIA

BY

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M.TECH/TE/06/0033

APRIL, 2012.

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A THESIS SUBMITTED TO THE DEPARTMENT OF TECHNOLOGY EDUCATION, SCHOOL OF TECHNOLOGY AND SCIENCE EDUCATION, MODIBBO ADAMA UNIVERSITY OF TECHNOLOGY, YOLA,
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTERS OF TECHNOLOGY IN INDUSTRIAL TECHNOLOGY EDUCATION

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DECLARATION

I Bwala, Maina Bukar , a post graduate student in the Department of Technology Education with registration number M. Tech/TE/06/0033 do declare that the Research work described in this thesis/dissertation represents my original work and has not been previously submitted in part or full to any university or similar institution for any degree or certificate.

Sign:…….. Date:……

APPROVAL PAGE

This thesis entitled the Assessment of Facilities for Teaching Metalwork in Colleges of Education in North-Eastern States of Nigeria by Bwala Maina Bukar M. Tech/TE/06/003 governing the award of degree in Industrial Technology Education. Modibbo Adama University of Technology Yola, School of Technology and Science Education, and is approved for its contribution to knowledge and its literally presentation.

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DEDICATION

This work is dedicated to my father Maina Bwala, and my late mother Yashwa Yagami who initiated my academic training, my wife Mrs. Naomi Bukar and my children Asabe, David, Comfort, Bitrus and kubili for their patience during the period of my studies.

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ABSTRACT

The study sets out to assess facilities for teaching metalwork in the six Colleges of Education offering metalwork as a progrmme in North Eastern Nigeria. Specifically, the study seeks to find out the adequacy of facilities, rate of facility utilization, and adequacy of funds and staff

for teaching metalwork. The adequacy of facilities for teaching metal work programme in colleges of education that offer metalwork Technology at the Nigeria Certificate in Education (Technical) level is guided by the National Commission for Colleges of Education Minimum Standards. The check list gave the detailed facilities per 30 students. Based on these purposes, four research questions were answered and four hypotheses were tested at .05 level of significance. The study employed survey research design where opinions of respondents were sought. The area covered were six Colleges of Education that offer metalwork as a subject of study in the six states in North Eastern Nigeria. The population for the study was made up of 64 respondents which comprised of 30 metalwork teachers and 30 workshop staff. The instrument for data collection used in the study was a 40 item structured questionnaire with five point Likert scale. The item statements were validated by four experts where their comments, advice, and suggestions were used in improving the final instrument. The reliability of the item on the questionnaire was found to have a coefficient of .82. Data collected was analyzed using means and standard deviation where The Z-test was used for testing the hypotheses at .05 level of significance. The findings of the study showed that facilities such as workshop spaces are inadequate for students practice, office and toilet facilities were inadequate. The study further found out that machine tools are inadequate just as water and electricity supply were inadequate during practical. Funds provided for facilities and consumable materials were inadequate, and that workshop staff are inadequate in number in the metalwork departments.

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

Technical education has been existing in Nigeria before the advent of the missionaries. Fafunwa (1990) referred to technical education as African traditional education and observed that its teaching was informal, practical, utilitarian and general to the needs of the society. The curriculum was neither documented nor written but had to do with the needs of individual and the society in which parent, grand parents and elders serve as teachers to the young learners. With the coming of the missionaries, technical education became more organized with prescribed curriculum. Aliyu (1988) defined curriculum as one of the branches of education, the vertex in which other studies begins. Okafor and Odigbo (1999) stated that technology education curriculum is a master-plan of an appropriate set of facilities and experiences involving both human and material resources that will precipitate the desired technology education outcomes. The emphasis placed on assessment in educational system has made it necessary for technical teachers to use technical facilities for effective teaching and learning so that goals and objectives of technical education are met.

The goals of technical education programme in Nigeria as contained in Section 7 of the National Policy on Education (revised 2004) are to:

a) Provide trained manpower in applied science, technology and business particularly at craft, advanced craft and technical level.

b) Provide the technical knowledge and vocational skills necessary for agricultural, commerce, technological and economic development; and

c) Give training and impart the necessary skills to individuals who shall be self-reliant economically.

The goals of metalwork technology programme in colleges of education as contained in the NCCE minimum standard (2004) includes:

- To Produce qualified metalwork teachers and practitioners of technology capable of teaching basic technology in the junior secondary schools.
- To produce metalwork NCE Teachers who will be able to inculcate scientific and technological development right from the Nigerian schools.
- To prepare metalwork teachers so as to qualify them for a post-NCE Degree programme in technical education.

The realization of the goals of Metalwork technology programme in a college of education relies therefore on practical skills developed in the student-teachers. This can only be achieved when the Colleges of Education are well equipped with infrastructural facilities like workshops, laboratories, studios, machines, hand tools, consumables, instructional materials and other equipment, which are essential for teaching and learning.

To teach metalwork successfully, the course requires practical and theory Sillo (1987) stated that:

> A competent instructional staff is the most important element of a technical programme. The initial preparation of an instructor for technical subject demands a balance of general, technical and professional teacher education courses combined with work experience closely related to the field in which the teacher will instruct using facilities (P.3).

The philosophy of Nigeria Certificate in Education (Technical) is to provide technical teachers with the intellectual and professional background adequate for teaching technical subjects, make them adaptable to any changing situation in technological development not only in Nigeria but also in the world at large (National Commission for Colleges of Education 2002). The Federal Ministry of Education in the year 1985 imported technical equipment and distributed it to schools in a bid to make technical education have sound

foundation through the provision of the facilities and equipment. When learners choose occupations of interest and disabilities, with adequate facilities which were properly maintained, their performance was usually quite satisfactory (Onwuka 1996). Attah (1997) observed that despite supplies of equipment, it was still inadequate and that some of the equipment have rotten away in containers and that students were not taught properly due to lack of equipment and facility maintenance.

According to the National Commission for Colleges of Education (NCCE 2002) Colleges of Education offering technical courses are mainly concerned with the production of Technical Teachers and the objectives can be achieved with proper and regular maintenance of equipment. It is worth nothing that the tools and equipment are liable to breakdown after some time when in use. In view of this, equipment and tool maintenance leads to positive teaching and learning, as such, effective teaching is quite fundamental to development of skill among students in the colleges to meet the needs of the Nigerian society.

Gibson (2004) stated that teaching is planned interaction between the learner and the learning activities through which learning takes place. Teachers use various methods such as demonstration, experiments and use of materials like workshop tools and equipment to bring about the desired learning outcomes that lead to effective teaching and learning when the facilities are available, adequate and of the required standard. Akpan and Nuhu (2001) observed that workshop tools, equipment and materials used in Nigerian Secondary Schools were of sub-standard, damaged and not maintained.

Ashilokun (2007) observed that the provision of necessary infrastructure in educational institutions especially technology institutions in Nigeria was not encouraging and that the quality of infrastructure were grossly inadequate. A study also conducted by Babangida (2001) showed that technical facilities were grossly inadequate which resulted into ineffective teaching and learning in Nigerian Technical Colleges. The study further

showed that the available facilities were not properly maintained and resulted to poor teaching and learning. Miller (2006) stated that the facilities in colleges of education despite the tremendous growth in student enrolment have put pressure on the existing facilities and that college administrators have not shown serious concern. He further stated that government on the other hand has failed to increase budgetary allocation to these institutions and that such technical facilities have been allowed to decay due to ineffective management and poor maintenance culture by the administrators of the colleges.

Metalwork facilities in colleges of education according to Bodams (2007) suffered inadequate supply and utilization which affects teaching of the subject. The metalwork facility in colleges of education according to the (NCCE) includes the spaces and equipment. In view of this, what constitutes facilities for teaching and learning metalwork technology includes the workshops the basic hand tools, the consumables, the machines for practical, the instructional materials, the library, and the studios for drawing, funds, for facility procurement, and technical stores. This demands that metalwork facilities must be adequately utilized and available according to the NCCE minimum standard.

1.2 Statement of the Problem

The acquisition of technical knowledge and appropriate skill is one of the objectives of technical education as contained in the National Policy on Education (FRN, 2004). Metal work programme is one of the programme in Colleges of Education which success depends on availability of facilities. Technical education has to do with a lot of facilities as observed by Sanusi (2003), Omozokpia (2007), Ashilokun (2007) and Hassan (2007) who gave their various opinions on inadequacy of facilities for teaching and learning in some schools. The researcher noticed that students specializing in metalwork as a subject do not have adequate skills. The adequacy of facilities for teaching metal work programme in colleges of education that offer metalwork Technology at the Nigeria Certificate in Education (Technical) is guided

by the National Commission for Colleges of Education Minimum Standards where faculties specified by check list. The check list gave the detailed facilities per class of 30 students. This challenge can be traceable to inadequacy or absence of metalwork facilities for teaching metalwork as a subject in the colleges of education. The problem that this study intend to address is the condition of facilities and their availability/adequacy and utilization factors that have resulted in metalwork students not being skilled enough in metal work progrmme.

1.3 Purpose of the Study

The main purpose of the study was to assess the facilities for effective teaching of metalwork technology subject in Colleges of Education in North Eastern States of Nigeria in line with the NCCE minimum standard (1990). The study was specifically to determine:

1. The adequacy of facilities for effective teaching of metalwork programme in colleges of education.
2. The rate of utilization of the available facilities in metal work programme
3. The adequacy of funds for facility procurement in metalwork as a programme.
4. The adequacy of metal work teacher and workshop staff in relation to metalwork facilities. Metal work programme.

1.4 Research Questions

The following research questions in line with the NCCE minimum standard were posed to guide the study:

(i) How adequate are the available facilities for effective teaching of metalwork programme?

(ii) How frequent are the facilities being utilized for teaching metalwork programme?

(iii) How adequate are funds provided for facilities in metal work programme?

(iv) How adequate are the number of metalwork teacher and workshop staff in handling facilities metal work programme?

1.5 Hypotheses

The following hypotheses were tested at 0.05 level of significance:

Ho_1- There is no significant difference in the mean response of metalwork teachers and workshop staff on the availability of facilities for effective teaching in metalwork programme.

Ho_2- There is no significant difference in the mean response of metalwork teachers, and workshop staff on the rate of utilization of available facilities for effective teaching of metalwork programme

Ho_3- There is no significant difference in the mean response of teachers and workshop staff on the provision of funds for facilities in metal work prgoramme.

Ho_4- There is no significant difference in the mean response of metalwork teachers and workshop staff on the number of qualified staff in relation to facilities in metalwork programme.

1.6 Significance of the Study

The result of this study would be significant, as it would contribute to the development of technical education in Nigeria, thus students expected learning outcomes in skill acquisition using facilities in metalwork technology will bring effective utilization of tools and equipment. The study would also be of great importance to college administrators in estimating areas of need through facility procurement and in term of machines and tools, thereby reducing costs.

The findings of this study would further be of benefit to maintenance personnel in Colleges of Education and relevant bodies such as the National Commission of Colleges of Education and the Business and Technical Examination Board in developing their curriculum. Finally, it was believed that the government would find the study of importance in a bid to minimize huge importation of spare parts; tools and equipment as well as help

metalwork teachers in their delivery of lessons. Students carrying out research work on similar topics would also find the work useful. These educational bodies, colleges and the students would also find the study significant when metalwork facilities are ordered to obtain their adequacy.

1.7 Scope of the Study

This study was focused on assessment of facilities, utilization of equipment and tools in metalwork for effective teaching of the subject in colleges of education that offer such subjects in the North Eastern States of Nigeria. These colleges include those in the six states that are obtained in the North East of Nigeria.

1.8 Assumption of the Study

The following assumptions were made in the study:

1. The metalwork teachers are be honest in their responses to the questionnaires
2. That the instrument was appropriate and adequate for the collection of data.
3 That the act of effective facility utilization would help in teaching of metalwork as a programme study.

CHAPTER TWO
REVIEW OF RELATED LITERATURE

This chapter provides the review of related literature under the following sub-headings:-

1. Conceptual Framework of the study
2. Availability of Facilities for Teaching Metalwork
3. Utilization of Facilities for Teaching Metalwork
4. Funding Technical Education Facilities
5. Adequacy of teachers and workshop Staff
6. Related Empirical Studies
7. Summary of Review of Related Literature

2.1 Conceptual Framework of the study

Teaching in colleges of Education especially vocational and Technical Education invariably involves practical activities. These practical activities cannot be meaningfully taught without adequate provision of teaching facilities. Workshops are usually equipped with machines, hand tools, consumable materials and other instructional facilities to enhance skill acquisition by technical students. However, visits to some f these college workshops these facilities which has result in poor skill acquisition by the students. Olaitan (1996) maintained that workshop instructional faculties when adequately supplied and put to use cam bring high attainment of goals and objectives.

Assessment can be said to be a broad term and the scope of its application depends on the purposes for which it is intended. The concept of assessment may be used in relation to programme in which case it is systematic process of assessing the appropriateness or otherwise of an established programme. It may also mean a process of ascertaining whether or not objectives of programmes are achieved. In both cases, assessment is done with a view to taking administrative decision. It could also be an assessment of the quality of products for

example the quality of student teachers produced in the Colleges of Education (Technical) where skills acquisition is important.

This study assesses facilities in metalwork programme in Colleges of Education at the Nigeria Certificate in Education Level. The input evaluation theory of Stufflebean (CIPP) model was employed in this study in line with Okoro (1991) evaluation of technical education programme. The National Commission for Colleges of Education Minimum Standards (2002) has stated that an institution offering the Nigeria Certificate in Education (Technical) programme at the Colleges of the Education should provide facilities like units shops in each given area of specialization and equip them. In addition, the institution should provide integrated workshops equipped with standard introductory technology equipment similar to that which was supplied to the secondary schools. The minimum standard stated that another important aspect is offices facilities such that comfort of staff and relevant equipment such as computers and reproduction machines are essential. The college library also should have enough books to cover the areas of subjects in the ratio of one student to ten books.

Kurya (1995) observed that in most schools, the teachers are crowded in a single room designated as staff room which also serves as their offices with broken tables and chairs with non-existence of toilet facilities, library and laboratories/workshops, and where they are available are not inadequate number. Udofia (2007) also indicated that reasonable number of technical equipment and machineries are neither installed nor utilized since their arrival into the country, Udofia further said that some are still packed in creates and cages at the mercy of cobwebs, rats and unfriendly climatic environment. Udo (2007) has also noted the inability of schools, government and the private sector to provide adequate facilities such as laboratory, workshop and relevant teaching materials for learning to become effective. He went further to say that there is no effective skill training when there is inadequate supply of equipment for

training and where equipment and facility exist, they are obsolete, and that many machines may be out of use for a longtime until parts are ordered from the country of manufacture. Acquisition of skills is therefore the foundation on which technology revolves and the acquisition cannot be effective without adequate facilities for teaching and learning to be effective in metalwork technology education in colleges of education offering metal as a subject.

Assessment is a concept viewed by many educators differently. Okoro (1991) for example viewed evaluation as involving collection of information at regular intervals about an on-going programme within a school and making analysis. Olaitan (2003) on the other hand saw assessment as making judgment based on information where decision can be made on performance in relation to standards. James (2006) and Mohammed (2006) stated that assessment is a decision enabling process which the success depends on bringing people, facilities and money together necessary for deciding failure or success of teaching and learning activities in education institution.

Facilities whether complex or simple, expensive or cheap, standard or below standard in educational institutions need to be assessed from time to time to bring about effective teaching and learning. James (2006) and Mohammed (2006) have both ascertained that assessment is decision enabling process in which success depends on bringing facility, people, instructional materials, teaching aids, tests and money together at the same time in teaching and learning process.

2.2 Availability of Facilities in Teaching Metalwork

Olaitan (1996) stated that the condition under which vocational and technical education is imparted in most Nigerian institutions is poor, and that such institutions are experiencing shortage in training facilities and equipment thus causing such schools standing the risk of putting the learners through obsolete programme, rendering them unemployable

after graduation which is dangerous for national development as well as the image of technical education in Nigeria. He further reported that the Federal Ministry of Information observed that:

> If Nigeria has not achieved as much as it should have been done in primary, secondary and university education…, if there is shortage of manpower in all sectors of the economy, then there is more serious deficiency of manpower in terms of quality and quantity in the technical sector of the economy together with its facilities (PP.48).

Enwereji (1995) stated that schools may not make materials and other facilities available for practical skill acquisition to students and that where materials and facilities were provided; it may not be enough for adequate practical training among the students. He further stated that colleges are in most cases equipped with obsolete machines and tools, many of which have broken down for long. The probability was high thus some students graduate without adequate practical training in their chosen programme. Enwereji further stated that those who were opportune would not have enough practice thereby leading to half-backed products. According to Bulama (2001), the problem of educational facilities in the North East region comprising Adamawa, Bauchi, Borno, Gombe, Taraba and Yobe States the problem of educational facilities in technical colleges appeared to be severe.

Miller (2006) noted that the state of facilities in Nigerian Colleges of Education has called for serious concern despite the tremendous growth in student-teacher enrollment which has put pressure on the existing facilities in colleges and that administrators of such colleges have not shown serious concern. Diraso and Ndomi (2007) carried out study to find out some training needs of workers in manufacturing industries in the North Eastern States and highlighted the need for facilities in school and training of newly recruited staff.

The introductions of technical subjects at the secondary schools have increased the number of students aspiring for technical skills and knowledge. Aina (1991) was of the view that the large enrollment in secondary schools would mean an increase in technical staff, classrooms, workshops more equipment, modern teaching aids, and other facilities to be used by the teacher. He further stated that inadequate training facilities was one of the drawbacks in teaching technical subject. Poor training facilities, worn out and outdated, machines utilize do not make students to acquire skill.

The NCCE minimum standard (2002) has listed the following as tools and equipment required for metalwork technology for producing of NCE (Technical) graduates. Standard work benches with vices, lathe machines, pillar/table drilling machine, grinding machine, forge, welding machine (Arc and Gas), bench shear, files (assorted), try square, micrometer screw gauge, venire calipers, spring dividers, hammers (assorted), taps, and dies, wings dividers, odd leg calipers, steel rule, snips, drills, hacksaw frames and blades, buffing discs, oil canes, folding and bending machines, shaping machine, foundry and forging tools and venire protractors.

The above listed facilities/equipment can be classified as instructional facilities in metalwork technology. Castaldi (1994) stated that instructional materials and services are the facilities that facilitate teaching and learning. He however, classified educational production facilities as buildings, laboratories, equipment, machinery, furniture, electrical fixtures and water are taken for granted because they are usually on ground and usually not given proper attention.

Ihebuzor (1995) stated that instructional facilities are seen and considered as the devices developed and acquired to help the technical teacher in transmitting skills, attitudes, and organized knowledge to students as learners in schools to acquire skills for work. The World Bank (1988) however stated that with little expenditure on educational materials,

teachers would find it hard to teach well and advice that only when a substantial multiple of this amount is made available for teaching facilities those teachers in African schools become pedagogically productive in his work. The African Development Bank (1986) reported that the supply of appropriate teaching facilities were particularly inadequate in many parts of Africa and argues that urgent need for facilities that were closely in tune with realities of the needs of the African society in general was needed upper most. In teaching metalwork subject, the adequate number of facilities was very essential if teaching and learning were to be successful.

2.3 Utilization of Facilities for Teaching Metalwork

The Oxford Learners' Dictionary (2000) defined utilization as to make use of facilities especially for practical purpose. An instructional facility for teaching and learning in technical education refers to the arrays of stimulus of materials which were provided to facilitate teaching and learning in technology teacher education institutions. Gayus, Ikwuakam, Mohammed and Solomon (2002) have stated that facilities were utilized purposely for communicating facts, information process and expressing ideas which were all geared towards effective teaching and learning technical courses.

The instructional facilities in metalwork as a subject of study which teachers and the students utilize includes hand and machines tools, equipment, the workshop and consumable materials for carrying out practical. These facilities were used by the metalwork teacher to impart practical skills to the students to acquire the needed skills at different levels in the Colleges of Education. It has been observed by different researchers that metalwork facilities in colleges of education were not properly utilized for the purpose of teaching and learning which does not produce qualified technical teachers for the secondary schools to cater for basic technology as required by the National Policy on Education. Aina (1991) has stated that

most of the teaching and learning in Nigerian technical institutions were done theoretically due to lack of facilities or lack of utilizing the facilities properly.

Ali (1992) also stressed the importance of emerging educational technology in the 21st century and pointed out that the acquisition of a sound academic knowledge and technically professional skills were fundamental in the training of technical teachers. Olaitan (1996) stated that some technical educators of vocational and technical education have been emphasizing performance based teaching and learning whereby students acquired sufficient manipulative skills to perform in a real job situation and that they believe that technical courses thrive on the capability of students to perform the learned skills for completing the course of study. Assessment of learning outcomes in technical education require a more pragmatic approach and performance-based than paper and pencil learning. The intended outcome was demonstrated practically and not by memorization. An assessment that fulfils real principles creates opportunity for learning and relearning coupled with try and error until a habit of practicing that practical skill was achieved.

Olaitan, Igbo, Ekong, Nwachukwu, and Onyemachi (1999) stated that the utilization of materials involves the teacher manipulating equipment and tools, facilities, and that vocational technical skill development in colleges and schools were facilitated by the use of instructional materials. Using instructional materials according to them serve numerous purposes such as determining specific skills, carrying out manually operated functions; providing supportive functions, for the use of equipment and tools; performing mechanically operated activities; aiding students skill development activities, promoting students memory development and need; aiding the production purposes and finally assessing the success of skill acquisition among the learners. Facilities in Colleges of Education need to be accessed from time to time to find out how they were utilized. The utilization of metalwork facilities in the colleges of education depends largely on how appropriately the technical teachers put

them into use. These metalwork facilities, in terms of tools and equipment were of great importance for skill development among the student-teachers of metalwork.

Discussing utilization of tools, equipment, facilities and consumables, Olaitan et al (1999) stated that the utilization of instructional materials involves the teacher manipulating equipment and tools, facilities and consumables to facilitate in the teaching-learning process. This was so because the technical skill development among the learners was facilitated by the use of these instructional tools and materials. Olaitan et al further saw consumables as materials that were utilized or fed into machines as components of production of observable job outcomes and are basic materials needed to facilitate skill development. Metalwork consumables includes; sheet metal, rods, tubes/pipes, bar, wire, electrode, lubricants, charcoal, plates, emery cloth, paint, flux, angleiron, grinding wheels, saw, blades, and sand moulds. Which are used for various practical skills acquisition.

Madaubum (2001) emphasized this skill development when he stated that technical teachers need to be exposed to knowledge in new technologies so that they can guide the students to understand, develop, acquire and utilize the technologies. The tools, materials and consumables should be in the right number to be able to go round the number of the students. This was so because each student requires a particular tool to be able to get the appropriate skill as tools cannot be sheared conveniently.

2.4 Funding Technical Education Facilities

The economic depression which has trailed Nigeria since 1982 has been a mixed grill to technical education (Olaitan 1996). However, on the positive side; economic hardship has forced many Nigerian to accept the potential of technical education which could be a mean of unemployment in Nigereia. The Federal Republic of Nigeria (FRN, 2004) stated that no educational system can be better than the quality of its teachers. This assertion was true of

technical teacher education in Nigeria which suffered set back as a result of the economic depression.

Technical teacher education in Nigeria dates back to the early 1950s with the establishment of the Technical Teacher Training course at the Yaba Higher College which was established and funded by UNESCO, when technical education was still a neglected aspect of Nigerian education system. The programme was an experiment with no concerted efforts made at training sufficient number of teachers.

Later in 1962 the department of vocational teacher education being the first indigenous degree awarding tertiary institution was established at the University of Nigeria Nsukka. It was established and financed by the Michigan State University and later years received assistance from the Ford Foundation and now these agencies have withdrawn their support leaving it to the Federal Government of Nigeria.

Funding of Education is the allocation of fund to run educational programme for colleges of education to be functional. It requires money to finance educational programmes in terms of teaching and learning. Madu (2003) stated that technical education is the type of education and training that equip the beneficiaries at work place as well as educational institutions with basic scientific knowledge and practical skills for organized production, provision, distribution as well as maintenance of goods and services.

Olaitan (1996) also has stressed the need for proper funding of vocational and technical education saying that there is minimum level of funding below which technical education cannot be attempted to take-off and be successful. Olaitan further stated that technical education is expensive in nature. The Federal Republic of Nigeria (2004) stated that education is expensive and social service requires adequate financial provision from all tiers of government. Technical Education programmes are capital intensive and require proper

funding due to the numerous equipment, machines and other technical facilities all requires substantial funding.

Kurya (1995) stated that educational institutions were under funded by the government, because they are rendering social services and not directly generating revenue to the government. This fact has resulted into inadequate supply of necessary facilities and other materials to aid teaching and learning in colleges of education.

2.5 Adequacy of Teachers and Workshop Staff

The necessary pre-requisite for advancement in technical education lies in the creation of qualified and dedicated teaching and non-teaching staff. Okafor (1996) observed that qualified personnel in any field of human endeavour are referred to those individuals who have prolonged and specialized training in that particular field and that it requires sufficient training based on systematic knowledge which must also show evidence of skills that are needed. The training must equip the individual involved in the programme with attributes that makes them effective and also efficient in their jobs.

The trend as a result of advancement in science and technology demands that the modern technical teacher must be qualified educationally to put into practice the occupational skills and knowledge as stressed by the (National Commission for Colleges of Education Minimum Standards, 2002). The philosophy of technical education programme, is to provide technical teachers with the intellectual background adequate for teaching of technical subjects and to make them adaptable to any changing situation in technological development not only in the country Nigeria but also the world at large.

The philosophy behind the establishment of Colleges of Education (Technical) as stated in the NCCE minimum standards for the Nigeria Certificate in Education (Technical) hand book of 1996 spelt out that NCE aims at producing vocational and technical education

teachers who will in turn produce young people that would grow in and move Nigeria forward. It goes further to list the goals of the programme as follows:-

(i) To produce competent technical teacher for primary and junior secondary school classes in Nigeria

(ii) Produce trained man-power in applied sciences, technology and commerce at sub-professional levels

(iii) To produce the technical knowledge and vocational skills necessary for agricultural, industrial and economic development of the nation.

(iv) To produce skilled self-reliant and enterprising craftsmen and technicians. (NCCE, 2004)

With such lofty ambitious goals of the technology teacher education of the colleges of education, there is the need to explore the best ways of achieving the goals. Aina (1991) concurred with this statement when he said that the training of technical education teachers is seen as a vehicle for the production of technicians which in itself is considered as a pre-requisite for technological development and that Nigeria is grossly deficient in number and standard of technical teachers. He noted that the quality of technical education depends on the teachers as they occupy an important place in modern society and that the technical teacher is the link between industrial society and the educational system. It is therefore expected that technical teacher should posses' good knowledge and skill for preparing his students for future job.

2.6 Review of Related Empirical Studies

Patizhiko (2006) carried out a study titled teachers competency in the utilization of instructional facilities in automobile technology in Colleges of education in Niger State.

The purpose of the study was to:

1) Find the qualification and competency of automobile technology teachers in colleges of education in Niger State.
2) To find out the availability of instructional facilities and how they have been utilized in colleges of education in Niger State.

The population of the study consists of 56 teachers were involved in teaching automobile technology in tertiary institutions in Niger State offering the programme. The general approach used by the researcher was a survey design, where he sought the opinions of the respondents on each item. The questionnaire was constructed based on the following: qualifications of teaching staff, availability of instructional facilities, and how often the facilities are put in use.

Based on the results of the study, the researcher identified that the teachers engaged in the teaching of automobile technology education in tertiary institutions of Niger State are qualified. While in terms of the availability of the materials and equipment, majority agreed to this fact in terms of its availability and utilization. In the areas of teachers qualification and competency, as was analyzed, most of them were qualified and all are competent in terms of equipment preparation, presentation and utilization.

Achakpoeyere (2004), conducted investigation on the factors inhibiting effective use of instructional facilities in secondary schools, a case study of Potiskum LGA of Yobe State. The main purpose of study was to identify possible factors militating against effective utilization of instructional facilities in secondary schools in order to:

1. Determine the implications of the inhibiting factors on the teaching learning process
2. Identify factors for effective utilization of instructional facilities in secondary schools in Potiskum LGA of Yobe State
3. Examine the needs for teachers to improvise instructional facilities.

A sample of eight respondents was chosen form each of the five secondary schools. The sample included the principals, vice principals and head of departments of Mathematics, English Language, Physics, Chemistry, Biology and Geography. A questionnaire was used for data collection. Closed ended (structured) questions were presented to the respondents. The non-probability sampling technique was utilized for the study.

The researcher found out that two major items i.e. the supply of instructional facilities and the non-availability of instructional resources centre in the state were responsible for non-effective use of instructional facilities in secondary schools in Potiskum L.G.A. of Yobe State. The researcher also fund out that teachers lack training in the use of instructional facilities.

Usman and Dahiru (2005) conducted study titled: the role of instructional materials in improving quality in Teacher Education. The purpose of the study was to reveal ways teachers can improve instructional materials for teaching purposes. The population of the study constituted five secondary schools within Potiskum Local Government Area. Random sampling technique was used in the selection of the sample for the study. A total of 120 teachers were used out of the 180 teachers. Simple statistical table was used to analyze the data where frequency of responses were completed using simple percentages. Interview at random while observation guides were used for gathering the data. A cross section of teachers was selected and interview at random while observational guides were used during practical teaching.

The researcher found out that:

i. Teachers performed better when improved instructional materials were adequately used yielding high students performance.
ii. Most of the teachers interviewed in the study have not been trained on how to improvise basic instructional material for immediate use.

iii. It was revealed that must of the secondary schools were not connected with electricity power supply.

iv. That state government can not fund modern way of teaching such as E-learning.

2.7 Summary of Review of Related Literature

The present situation in the workshop and classroom give the impression in spite of the contributions in which facilities make towards effective classroom workshop training; that some teachers do not use facility in their teaching process. More so, some teachers are not adequately exposed to the knowledge and skills about the production, management, selection, operation and utilization of instructional facilities and equipment. Consequently, such teachers were not adequately aware of the vital roles instructional facilities play in technical education programme.

Instructional facilities and methods are two tools that the teachers need to combine to make a teaching and learning interesting. However, where there are impediments to the effective management and utilization of instructional facilities by the teacher and learners, the expected real and interesting situation would be illusive. Certain situation lend themselves more to the use of particular instructional facilities, especially when the real learning object is too big, too small, or too spread out to be seen effectively when an object is not available to students by any means except through the advice, or if the real object is too expensive, dangerous, or delicate for the students to use.

The recipients of technology education are expected to apply the scientific and technological knowledge acquired during training into practical form using facilities through which the nation's social, economic, practical and industrial challenges are met. With the availability and use of facilities for training or instruction in colleges of education, vital process of acquisition of skills among the students will be achieved, and this will translate to

aggressive economic development though the active participation of individual who had benefited from the system.

If instructional facilities are not properly managed and maintained, they wear out faster than their normal life span. It is therefore not out of place to say that most of the instructional facilities in the colleges today are dilapidated or become obsolete in meeting the important purpose for skill acquisition. The teacher in the college have many responsibilities of ensuring that facilities in the colleges of education are effectively managed and utilized. All these put together will enhance the teaching and learning of metalwork technology for the purpose of acquisition of technical skills and graduation of seasoned technical teachers.

CHAPTER THREE

METHODOLOGY

This chapter describes the procedure that was employed in this research work. It was discussed under the following sub-headings: The Research design of the Study, the Area of the Study, Population of the Study, Instrument for Data Collection, Validation of the Instrument, Reliability of the Instrument, Method of Data Collection and Method of Data Analysis.

3.1 Research Design

This study used a survey research design. Best and Kahn (2002) have observed that the survey design is used in a situation when the survey study employs questionnaire to assess opinions, preference, attitude and perception of respondents about an issue. The design was considered appropriate for this study because it is intended to seek opinions of teachers of metalwork, and the workshop staff on assessment of facilities for effective teaching of metalwork technology as a course in Colleges of Education in North-Eastern States of Nigeria. According to Akuezilo and Agu (2003), who stated that survey design involves the process of assessing the worth of input, process, context, output and the method adopted for an educational program on the basis of available data collected through questionnaire.

3.2 Area of the Study

This study was carried out in the North Eastern States of Nigeria which consists of Adamawa, Bauchi, Borno, Gombe, Taraba and Yobe States. The colleges covered in this study includes: College of Education Jalingo in Taraba State, College of Education Science and Technology Bama in Borno State, College of Education Azare in Bauchi State, College of Education Hong in Adamawa State Federal College of Education (Technical), Gombe in Gombe State, and Federal College of Education (Technical), Potiskum in Yobe State. The North East has geographical boundary of latitude 6.26^0 East and longitude 4.92^0 North of the Equator according to Nigeria, North East (2012). Adamawa State is bounded by the Republic

of Cameroon to the East, Bauchi State is bounded by Kano and Plateau States in the North. Borno State is bounded by Chad Republic to the East. Taraba State is bounded by Adamawa, Benue and Bauchi States while Yobe State is bounded by the Niger Republic to the North. These States were choosing because they are in the same Geographical Zone and the colleges chosen from these State offer metal work programme at the Nigerian Certificate in Education (Technical).

3.3 Population for the Study

The population for the study was sixty-four teachers and workshop staff. This consists of metalwork teachers and workshop staff in the Colleges of Education. The composition of these respondents were four metalwork teachers from college of education Azare, four metalwork teachers from College of Education Bama, ten metalwork teachers from Federal College of Education (Technical), Gombe, four metalwork teachers from College of Education Hong, three metalwork teachers from College of Education Jalingo and ten metalwork teachers from Federal College of Education (Technical), Potiskum making a total of 36 metalwork teachers from the six Colleges of Education. The workshop staff were made of 32 respondents five each from Bama, Potiskum, and Jalingo, six each from Azare and Hong while the remaining three are from Gombe. The whole population comprising 34 teachers and 30 workshop staff was used for the study as such there was no sampling used in the study as the researcher felt that the population size was manageable.

3.4 Instrument for Data Collection

A questionnaire having a likert type five-point rating scale named Assessment of Metalwork Facility Rating Scale of Colleges of Education (AMFRSCE) was developed by the researcher. Instrument was used for assessing Metalwork Facilities for effective teaching of metalwork courses in colleges of education in the North Eastern states of Nigeria to elicit the information that was used to answer the research questions.

The questionnaire was divided into two parts. The first part was structured for collecting personnel information from the respondents while the second part was designed and used for collecting information to answer the research questions. The instrument was on a five point rating scale with the following values:-

Strongly Agree = 5 points

Agree = 4 points

Undecided = 3 points

Disagree = 2 points

Strongly Disagree = 1 point

3.5 Validation of the Instrument

The validation of the instrument for the study was carried out by giving the instrument to four experts for vetting, corrections, comments and further advice. These experts were made up of three lecturers from the Department of Technology Education at the Modibbo Adama University of Technology, Yola, and one lecturer, from the Vocational Technology Education Programme, Abubakar Tafawa Balewa University, Bauchi. The comments, advice, and suggestions from these experts were used to develop the instrument for the study.

3.6 Reliability of the Instrument

Reliability of the instrument was determined using the split-half technique. The instrument was administered to 16 respondents from Federal College of Education (Tech) Bichi. The items were splitted into two that was even and odd numbers. The results of the two halves were correlated using the Spearman's Rank order correlation coefficient.

The formula given as:

$$r = \frac{1-\partial\sum d^2}{n\,(n^2 - 1)}$$

Where

n = number of pair items

∂ = difference between ranks x and y

n^2 = number of pairs x + y in the data

Source: Uzoagulu (1998)

The correlation coefficient were corrected by the application of Spearman Brown prophecy formula:

$$r_t = \frac{2r}{1 + r}$$

Where

r_t = to reliability of the whole test

r = correction coefficient of the split test

Source: Akuezulo and Agu (2003).

The analysis of data yielded reliability of .84, .75, .80, and .89 for each research question. The whole instrument yielded reliability coefficient of .82.

3.7 Method of Data Collection

The questionnaire was administered personally to the respondents by the researcher and research assistants thus enabling him to have direct interaction with the respondents. This lead to quick completion and high rate of return of the questionnaire by the respondents as two days each was given as interval after which the researcher collected the 64 completed questionnaires out of the 68 making a return rate of 94.12 percent.

3.8 Method of Data Analysis

The data obtained from the respondents was analyzed using means and standard deviation to answers the research questions, the Z-test was employed to test the null hypothesis at 0.05 level of significance. The study was analyzed using computer Statistical Package for Social Science (SPSS). The limit of the assign value of the response categories was used to make decision on the availability and utilization of Metalwork Facilities and equipment in teaching and learning of metalwork technology as subject of study in Colleges of Education. The value of 2.50 which is the lower limit of the agree category was used as the cut-off point in the study.

For the Z-test, the formula for the calculation was:-

$$Z = \frac{\overline{X_1} - \overline{X_2}}{\sqrt{\frac{S^2_1}{n_1} + \frac{S^2_2}{n_2}}}$$

Where:

$\overline{X_1}$ = Mean of metalwork teachers

$\overline{X_2}$ = Mean of workshop staff

S^2_1 = Standard deviation of metalwork teachers

S^2_2 = Standard deviation of workshop staff

n_1 = Number of metalwork teachers

n_2 = Number of workshop staff

The real limit of the five point scale showed below was used to determine the decision used:

Scale	Scale Point	Lower limit	Upper limit
Strongly agree	5	4.50	5.49
Agree	4	3.50	4.49
Undecided	3	2.50	3.49
Disagree	2	1.50	2.49
Strongly Disagree	1	0.50	1.49

CHAPTER FOUR

RESULTS AND DISCUSSION

In this chapter, the data collected has been presented. It deals with the analysis of data collected following the order in which the research questions and hypotheses appear in chapter one of the study.

4.1 Research Question 1:

How adequate are the available facilities for teaching of metalwork programme in line with the NCCE minimum standard check list in metal work?

Table 1: Mean Response of Metalwork Teachers and Workshop Staff on Adequacy of Facilities in Metalwork

S/N	Item Statement	$\bar{X}$	S^2_1	$\bar{X}_2$	S^2_2	$\bar{X}_G$	Remark
1.	Number of building are suitable for Metalwork training needs	2.99	0.54	2.37	0.93	2.58	Agree
2.	The size of sites are adequate for training needs	2.35	1.01	2.37	0.93	2.36	Disagree
3.	Workshop spaces are adequate for Students industrial needs	2.59	1.02	2.30	1.06	2.45	Disagree
4.	Toilet facilities are adequate for users	1.89	0.82	2.33	0.71	2.09	Disagree
5.	Workshops are provided with adequate Lighting and ventilation for users	2.65	0.92	2.33	0.71	2.49	Disagree
6.	Floor areas are specious and adequate for machines, workbenches and equipment	2.76	0.70	2.57	0.77	2.67	Agree
7.	Adequate hand tools are provided and in good working condition	2.41	0.82	2.37	0.89	2.39	Disagree
8.	Consumables and supplies for practical are adequate in relation to number of students	1.91	0.83	1.73	0.74	1.82	Disagree
9.	Water and electricity supply are adequately supplied	2.18	0.87	1.67	0.89	1.93	Disagree
10.	Library is provided with adequate						

Metalwork textbooks	2.41	1.08	2.10	0.89	2.26	Disagree
11. Office facilities are adequate for staff	2.26	0.86	2.17	0.75	2.22	Disagree

Where

$\bar{X}_1$ = Mean ratings for metalwork teachers

$\bar{X}_2$ = Mean ratings for workshop staff

S^2_1 = Standard deviation for metalwork teachers

S^2_2 = Standard deviation for workshop staff

$\bar{X}_G$ = Grand mean

N_1 = Number of metalwork teachers

N_2 = Number of workshop staff

Table 1 showed nine out of eleven items were rated below 2.50 indicated their disagreement, while number one and six were rated above 2.50 which agreed that the number of buildings are adequate for metalwork training needs, floor areas are spacious and adequate for machines, workbenches and equipment.

4.2 Research Question 2:

How are metalwork facilities being utilized for teaching and learning metalwork subjects?

Table 2: Mean Response of Metalwork Teachers and Workshop Staff on Facility Utilization in line with NCCE minimum Standard.

S/N	Item Statement	$\bar{X}_1$	S^2_1	$\bar{X}_2$	S^2_2	$\bar{X}_G$	Remark
12.	Machines provided are utilized effectively for teaching/learning	2.53	0.71	2.20	0.92	2.37	Disagree
13.	Hand tools are being utilized effectively for teaching	2.56	0.93	2.17	0.79	2.37	Disagree
14.	Facilities are over utilized due to high number of students	2.21	1.15	2.17	0.79	2.19	Disagree
15.	Library facilities are utilized effectively						

	by metalwork staff and students	2.29	1.12	2.07	1.29	2.18	Disagree
16.	There is adequate time for practical which allow utilization of facilities	2.15	1.16	2.57	0.68	2.36	Disagree
17.	Equipment are adequately maintained which brings effective utilization	2.50	0.83	2.30	0.79	2.40	Disagree
18.	Issuance of tools and equipment for practical is properly supervised	2.59	1.13	2.73	0.91	2.66	Agree
19.	Power supply is constant during practical, making machine utilization effective	2.26	0.86	2.00	0.53		Disagree
20.	Instructional facility utilization in the college workshop are consistent to the course curriculum.	2.53	0.90	2.80	0.71	2.67	Agree

Table 2 reveals that two items out of the nine items relating to metalwork facility utilization agree that issuance of tools and equipment for practical is properly supervised and that also instructional facilities in college workshops are consistent with the curriculum.

4.3 Research Question 3

How adequate are funds provided for metalwork facilities?

Table 3: Mean Response of Teachers and Workshop Staff on Adequacy of Funds For Metalwork Facilities according to NCCE minimum standard

S/N	Item Statement	$\bar{X}_1$	S^2_1	$\bar{X}_2$	S^2_2	$\bar{X}_G$	Remark
21.	Funds provided for the procurement of tools in metalwork are adequate	1.82	0.87	1.50	0.68	1.66	Disagree
22.	Consumable materials purchase is adequately funded	1.91	0.71	1.60	0.62	1.76	Disagree
23.	Broken machines are repaired by providing funds immediately	2.09	0.71	1.63	0.67	1.86	Disagree
24.	Adequate funds are provided from time to time for maintenance	1.74	0.90	1.60	0.62	1.67	Disagree
25.	Adequate fund is provided to metalwork department for her departmental needs	1.79	0.91	1.67	0.55	1.73	Disagree
26.	Funds allocated to the department is adequately utilized.	2.29	1.17	1.70	0.95	2.00	Disagree
27.	Adequate fund is provided for final year metalwork practical projects	1.65	0.95	1.83	0.46	1.74	Disagree
28.	Departmental library is adequately funded and kept up to date	1.85	0.86	1.70	0.79	1.78	Disagree

Where:

$\bar{X}$ = Mean ratings for metalwork teachers

$\bar{X}_2$ = Mean ratings for workshop staff

S^2_1 = Standard deviation for metalwork teachers

S^2_2 = Standard deviation for workshop staff

$\bar{X}_G$ = Grand mean

n_1 and n_2 are the number of metalwork teachers and workshop staff in metalwork

The analysis in table 3 shows that the respondents rated all the eight item statements below 2.50 which shows that they disagree with the adequacy of funds provided.

4.4 Research Question 4

How adequate are the number of staff in metalwork programme in line with NCCE minimum standard?

Table 1: Mean Response of Metalwork Teachers and Workshop Staff on the Adequacy of Staff in Metalwork Programme.

S/N	Item Statement	$\bar{X}_1$	S^2_1	$\bar{X}_2$	S^2_2	$\bar{X}_G$	Remark
29.	The number of teachers are adequate compared to number of students and facilities.	2.79	0.81	2.23	0.94	2.49	Disagree
30.	The number of workshop staff in metalwork is adequate to number of students and facilities	2.53	0.86	2.03	1.07	2.28	Disagree
31.	Adequate opportunity is given to staff for training when new facilities are procured	2.65	0.92	2.17	1.15	2.41	Disagree
32.	Technical storekeeper Is available to handle facilities	2.09	1.06	1.83	1.05	1.96	Disagree
33.	Ratio of teachers to students are adequate in line with the NCCE minimum standards and facilities	2.65	0.69	2.27	1.14	2.46	Disagree
34.	Adequate teachers have the required qualifications to handle facilities	2.97	0.80	2.53	1.17	2.75	Agree
35.	Adequate workshop staff are available to handle facilities	2.59	0.66	2.13	0.94	2.36	Disagree

Where :

$\bar{X}$ = Mean ratings for metalwork lecturers

$\bar{X}_2$ = Mean ratings for workshop staff

S^2_1 = Standard deviation for metalwork lecturers

S^2_2 = Standard deviation for workshop staff

$\bar{X}_G$ = Grand mean

n_1 and n_2 are the number of metalwork teachers and workshop staff in metalwork

Table 4 shows out of the seven item statement only one were rated as agree while the remaining six item statements have been rated as disagree by all the respondents respectively.

4.5 Hypothesis 1

There is no significant difference between the mean response of metalwork teachers and workshop staff on the availability of facilities for teaching metalwork programme.

Table 5: Z-test Result Comparing Mean Response of Respondents on Availability of Facilities For Teaching Metalwork programme n1 = 34, n_2=30, df = 62

Subject	N	$\bar{X}$	SD	Standard error	Z –cal	Z-crit	Remark
Metalwork Teachers	34	2.38	0.86	0.25	0.68	1.96	Accept
Workshop Staff	30	2.21	0.84				

The analysis of table 5 shows the Z-calculated value of 0.68 at 0.05 level of significance is less than the Z-critical value of $\pm$ 1.96. Since the value of Z-calculated is less than the crucial value, the null hypothesis is accepted. This implies that there is no significant difference in the mean ratings of metalwork teachers and workshop staff on the availability of facilities for teaching metalwork subject in colleges of education in North Eastern states of Nigeria.

4.6 Hypothesis 2:

There is no significant difference between the mean response of metalwork teachers and workshop staff on the utilization of facilities for effective teaching of metalwork Programme.

Table 6: Z-test Result Comparing the Mean Response of Metalwork Teachers and Workshop Staff on Facility Utilization. $n_1 = 34$, $n_2 = 30$, $df = 62$

Subject	N	$\bar{X}$	SD	Standard error	Z –cal	Z-crit	Remark
Metalwork teachers	34	2.40	0.98	0.25	0.28	± 1.96	Accept
Workshop Staff	30	2.33	0.82				

The analysis of table 6 shows that the Z-calculated value 0.28 at 0.05 level of significance is less than Z-critical value of ± 1.96. The null hypothesis is therefore accepted. This shows that there is no significant different in the mean response of the metalwork teachers and workshop staff on the utilization of facilities for teaching metalwork programme.

4.7 Hypothesis 3:

There is no significant difference in the mean ratings of metalwork teachers and metal workshop staff on the adequacy of funds provided for facilities in teaching metalwork programme.

Table 7: Z-test Result Comparing the Mean Response of Teachers and Workshop Staff on the Availability of Funds. $n_1 = 34$, $n_2 = 30$, $df = 62$

Subject	N	$\bar{X}$	SD	Standard error	Z –cal	Z-crit	Remark
Metalwork Teachers	34	1.89	0.89	0.25	1.09	± 1.96	Accept
Workshop Staff	30	1.65	0.67				

In table seven, the Z-calculated is less than Z-critical value of 1.96 at 0.05 level of significance, the null hypothesis is accepted. Therefore there is no significant difference in the mean response of Teachers and workshop Staff on the availability of funds provided for metalwork facilities.

4.8 Hypothesis 4:

There is no significant different in the mean response of metalwork teachers and workshop staff on the adequacy of teachers and workshop staff for teaching metalwork programme in colleges of education in North Eastern States.

Table 8: Z-test Result Comparing the Mean Response of Staff on the Adequacy of Qualified Staff in Relation to Facilities $n_1 = 34$, $n_2 = 30$, $df = 62$

Subject	N	$\overline{X}$	SD	Standard error	Z –cal	Z-crit	Remark
Metalwork teachers	34	2.61	0.83	0.25	1.76	1.96	Accept
Workshop Staff	30	2.17	1.07				

In table 7, the Z-calculated is less than the Z-critical value of 1.96, at 0.05 level of significance. The null hypothesis is accepted. Therefore there is no significant difference in the mean response of the teachers and the workshop staff on the adequacy of qualified staff for teaching metalwork programme.

4.9 Findings of the Study

The following findings have been made based on the results of data analysis for this study in line with the metal work facility check list of the NCCE minimum standard (1990):

1. Facilities were not adequately available for teaching metalwork subject such as machine and hand tools for students practical
2. The number of workshop and offices in the buildings were inadequate and going the number students enrollment in metalwork programme.

3. Toilet facilities were inadequate in workshop areas for users especially students
4. Machines and hand tools were not effectively utilized due to lack of power supply in the workshop
5. Utility services like power and water supply were grossly inadequate and therefore affect practical training in the workshop negatively
6. Funds provided for tools, consumable materials, equipment maintenance, final year practical projects, and for departmental needs were inadequate which affects teaching of metalwork
7. The number of workshop and supporting staff were inadequate considering the increasing population of students offering metalwork from NCE 1, NCE II and NCE III.
8. Adequate opportunities were not provided for training when new machines are procured.

4.10 Discussion of the Findings

Based on the adequacy of facilities which has been raised in the purpose of the study, the findings were discussed. In table 1, the results showed that the responses for 9 item statements out of the 11 items statement were rated below 2.50 while only two item statement were rated above 2.50 revealing that the facilities for teaching metal work subject are inadequate compared to the 2 items statement referring to the number of building and spaciousness of floor areas for machines, work benches and other equipment which were considered as adequate. The finding of this study was in agreement with Adesina (1990), Bulama (2001) and Chaldo (2004) observed that instructions offering vocation and technical education programme in Nigeria experienced gross inadequacy of facilities for teaching and learning. They further stated that where equipments are available they were updated which leads to production of unskilled products.

Table 2 shows the results of the analysis of the mean rating of the respondents on how the metal work facilities are being utilized. Out of the 9 item statements, two item statements were rated below 2.50. This statement showed that issuance of tools and equipment for practical were not properly supervised just as instructional facilities were not utilized in line

with the metalwork programmed. The analysis showed that machines provided were not utilized and maintained effectively due to lack of staff training on new machines. It also showed that power supply thus electricity and water supply have been hampering the teaching and learning of metalwork courses just as the library facilities have not been properly utilized by the students. These findings were in line with Ehiametalor (2001) when he observed that facilities if not properly maintained will wear out faster than their normal life span.

Table 3: shows the mean ratings of the metalwork teachers and the workshop staff on the adequacy of funds provided for metalwork facilities. All the 8 items statements were rated below 2.50 which shows that all the respondents disagreed on the adequacy of funds in relation to procurement of tools, consumable material, maintenance of machines and other equipment, departmental fund allocation and final year practical projects. Olaitan (1996) when he stressed the need for proper funding of vocational and technical education in which it stated that if below minimum level will not be successful. Oranu (1995) said that it was quite evident that technical and vocational education is expensive than liberal education and that it requires adequate funding. He further stated that vocational and technical education in Nigeria was underfunded. The facilities for teaching and learning metalwork courses therefore needs proper and adequate funding in terms of hand tools machines, consumable materials, maintenance of broken down tools, and adequate provision of funds at the departmental level.

Table 4 shows the mean response of the respondents, on the adequacy of staff both teaching and non-teaching staff in relation to facilities and students on ground. Out of the 7 item statements, two item statements agreed that the number of staff were not adequate. Thus having mean of 2.50 and above on the number of teachers compared to facilities/students and on the academic qualifications of staff to handle the metalwork facilities. The remaining 5

item statements were all having mean below 2.50. Thus indicating disagree with the statements on the number of workshop staff and other supporting staff, the adequacy of technical store keeper, the ratio of lecturers to students compared to facilities, and opportunity given to staff for further training when new equipment is procured. From the analysis; one can state that the number of workshop staff and other supporting staff are inadequate comparing the enrolment of students and the facilities on ground in the colleges if the teaching and learning of metalwork courses is to be achieved in line with the NCCE minimum standards.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter presents the summary of the study, and the conclusions drawn from the findings of the study. Recommendations were given based on the findings of the study while implications resulting from non-implementations of the recommendations are stated. The chapter concluded with suggestions for further study on related topic.

5.1 Restatement of the Problem

An important issue in assessing quality of education is the condition of facilities for teaching and learning (Adesina, 1990). While many educationists such as Bulama (2001), Akpan and Nuhu (2001), Sanusi (2003), Omozopia (2007), Ashilokun (2007) and Hassan (2007) have discussed on facilities in technical institutions. This study however saw that little or no mention was made specifically on facilities for teaching of metalwork subject in colleges of education and which has made students in metalwork subject not having the required skills. These challenges are traceable to inadequacy or absence of metalwork facilities for teaching and learning even if the facilities are available they have not been utilized.

The availability, utilization, funds, and staff in relation to metalwork facilities are all important factors in the production of metalwork teachers at the N.C.E level. It was not clear whether or not the available metalwork facilities and equipment were being effectively utilized. The problem that this study is set out to address was the availability and adequacy of facilities, funds, personnel and utilization of the facilities that would proffer solutions to the training of the graduate in metalwork technology as a subject of study.

5.2 Summary of Procedures Used for the Study

A survey research design was used to elicit response on facilities for teaching metalwork technology education subject in colleges of education in North-Eastern states of Nigeria. Based on the purpose of the study, four research questions and four null hypotheses were formulated which guided the researcher in this study. Literature related to the study was reviewed from which questionnaires items used as research instruments were generated for the study. Four experts in technology education validated the research instruments. Their advice, comments and suggestions were used for the final development of the instrument. The reliability of the instrument was determined using 16 respondents from Federal College of Education (Tech), Bichi for the validity of the instrument.

The population of the study was made up of 64 respondents consisting of 34 metalwork teachers and 30 workshop staff drawn from the 6 colleges of education that offer metalwork technology education as a subject in North Eastern states of Nigeria. All the 64 respondents returned the questionnaire to the researcher. The data collected from the research questions drawn was analyzed using the mean and standard deviation. The Z-test was used to test the hypotheses at .05 level of significance.

5.3 Summary of Major Findings

In line with the NCCE minimum standard for Colleges of Education metal work check list the following summary of major findings were made.

1. Facilities were not adequately available for teaching metalwork subject
2. Number of workshop of buildings were inadequate
3. Toilet facilities were inadequate in workshop areas for users especially students
4. Machines and hand tools were not effectively utilized
5. Power and water supply negatively affected practical training.

6. Funds provided for tools, consumable materials, equipment maintenance, final year practical projects, and for departmental needs are inadequate
7. The number of workshop and supporting staff are inadequate
8. Opportunity is not adequately provided for training when new machines are procured

5.4 Conclusion

This study came up with eight major findings that need to be highlighted as a conclusion which proprietors of colleges of education offering metalwork as a subject of study in North Eastern Nigeria especially the NCCE need to consider as a matter of serious concern. First, is the concern of facilities such as machines, hand tools and other equipment in metalwork which were inadequately provided where some of the machines and tools require proper maintenance. There is also great need for utility services such as water and electricity supply in the workshops as well as good office and office facilities for both teachers and workshop staff.

Another area of concern is the proper utilization of the available facilities for the teaching and learning process in the colleges. Although the Government may be said to be providing funds for the progress of education in these colleges, it has been noted that such funds are inadequate considering facility requirement in metalwork as a course of study. Although lecturers are available to teach the metalwork courses, there is need for further training when new machines and facilities are procured to make them up to date. It has also been noted that the workshop staff are inadequate especially lack of technical store keepers in these colleges to handle the metalwork facilities properly.

5.5 Implication for the Study

The result of the findings of the study has provided some important and useful implications. The study revealed that metalwork facilities are inadequate in colleges of

education in the North Eastern Sates of Nigeria. It also revealed that consumable materials, office facilities are inadequate too. The study further revealed that many of the facilities are not properly utilized while power water supply for practical affect the proper utilization.

With regards to funding, the study found out that adequate funding in order to make the facilities functional is lacking. While the findings revealed that there are adequate number of teachers of metalwork the number of qualified workshop staff are inadequate.

The study therefore gave some important implications to the stakeholders having the responsibility of planning and implementing the programmes thus, the NCCE, College administrators, Head of Metalwork departments, metalwork teachers and the employers. The implication from this study with regard to facilities are that metalwork facilities should be adequately provided and utilized to meet the challenges of industries and technology development.

5.6 Recommendations

The following recommendations were made based on the findings of the study: Government should provide adequate facilities in both Federal and State Colleges which offer metalwork technology education courses so that training of metalwork teachers for basic technology or introductory technology would be effective in the secondary schools.

1. The NCCE accreditation panels should not accredit any programme in metalwork where basic tools and equipment are inadequate.
2. Regular and consistent monitoring of college administrators is essential to enhance adequacy and utilization of facilities.
3. Funds provided for the procurement of facilities in metalwork should be on regular basis and properly accounted for.
4. Metalwork teachers should give professional advice on procurement of tools, machines, consumables as well as take part in machine installation and training.

5. Metalwork teachers should give professional advice when ordering new machines, consumables as well as take part in machine installation and training.

5.7 Suggestions for Further Study

It has been pointed out by Bulama (2001) that technical facilities are poorly utilized which is an indication of poor organization and management and that such affects teaching and learning. It is in line with the above that this study suggests the following measures for further study:

1. A study should be carried out on "assessment of adequacy of metal work facilities in Colleges of Education in the Northern States of Nigeria".
2. An assessment of the graduates from such colleges should be considered as a means to determine their views about such facilities they have used during their periods of study in line with NCCE minimum standard.
3. A study need to be carried out to determine the immediate community's view with regards to the effectiveness of metal work programme offered in the Colleges of Education to bring partnership

5.8 Limitation of the Study

In the conduct of this study it has been observed that 4 staff were not in their colleges and were not used in the study. One teacher was on study leave and 3 workshop staff were on annual leave. This number however might have slightly affected the results if they were used in the study, thus it becomes limitation of the study.

REFERENCES

Achakpoeyere, A.A. (2004). Factors inhibiting effective use of instructional materials in secondary schools. *Journal of Management Network* (2) 2, 1-6.

Adesina, S. (1990). *Educational management* Enugu: Fourth Dimension Publishing Co. Ltd.

African Development Bank (1986). *Education in sub-saharan Africa.* Washington D.C. The World Bank.

Aina, O. (1991). The Nigerian Teacher. *Journal of Teacher Education:* National Commission for Colleges of Education Publication 1(1) 26- 28

Akuezilo, E.O., & Agu, N. (2003). *Research and Statistics in Education and Social Science:* Methods and applications Aba Ezi publishers.

Ali, J.O. (1992). Evaluation of Technical Teacher Education Programmes. *Unpublished M.Ed Thesis. Dept. of Vocational Teacher Education University of Nigeria, Nsuka.*

Aliyu, F. (1988). *Definition and scope of curriculum lecture speech,* delivered to undergraduates in Kaduna Polytechnic.

Aminu, J. (1988). Science and National Development. *Journal of Science Teachers Association of Nigeria.* STAN 17 (3) PP 14-21.

Akpan, B., & Nuhu, S.C. (2001). Vocational and Technical Education in Nigeria: *Problems and Prospects.* Benin City, Global Printers Ltd.

Anadi, O.C. (1988). Technicalizing Education in Nigeria: The State of Arts processding at *An Annual Conference of Nigerian Association for Educational Administrators and Planning,* Kaduna.

Ashilokun, B.A. (2007). Provision of Adequate Technology Education Facilities towards Achieving Education Reform Agenda. *Processding of Twentieth Annual Conference, Nigerian Association of Technical teacher Education.*

Attah, B.N. (1997). Towards an Improved Maintenance Culture in Nigeria's Technical Institutions. *Journal of Technical Teacher Education.* 2(2) 14 – 19.

Babangida, R.O. (2001). Factors that Militate Against Effective Teaching of Metalwork in Colleges of Education in Nigeria. *Unpublished M.Ed. Thesis, University of Nigeria Nsukka.*

Best, J.W., & Kahn, J.V. (2003). *Research in Education* New Delhi: Prentice Hall Ltd.

Bodams, A. E. (2007). Reporting Metalwork Technology Education for Job Creation. *Journal of Vocational and Technical Education (JOVTED)* 1 (5) 115-119.

Bulama, K.H. (2001). An Evaluation of Educational Facilities in State Technical Colleges in North-Eastern States of Nigeria: *Unpublished P.hD. Thesis University of Nigeria Nsukka.*

Castaldi, B. (1994). Educational Facilities Planning, Modernization and Management, *Boston and Bacon Management Resources Journal* 1(1) 17.

Chado, M.I.D (2004) Strategies for Effective Teaching and Learning of Technology Education in Nigeria. Minna *Journal of Educational Studies.* 2(2) 215-227.

Diraso, D.K., & Ndomi, B.M. (2007). The Industrial Safety Training Needs of Factory Workers in North Eastern States of Nigeria. *Journal of Nigerian Association of Teachers of Technology.* 6(2) 12-15.

Ehiametalor, E. T. (2001). *School Facilities Management Practice in Nigeria, Implication for Vocational and Technical Education.* Proceedings of the 19th Annual Conference, Kwara Nigeria 248 – 250.

Fafunwa, A.B. (1990). Education in the Developing Countries with Particular Reference to Africa. Comparative Education for Nigeria. *Lagos NERDC Press.*

Federal Republic of Nigeria. (2004). *National Policy on Education*, Abuja NERDC.

Gana, I. (1988). Giant Steps in Progress and Prosperity. *A blue print of National Transfer Political Profiles in Nigeria.*

Gayus, B.J., & Ikwukum, O.T.; Mohammed, U.T. and Solomon B.I. (2002). Fundamentals of Vocational and Technical Education in Nigeria. Versatile publishers, P. 93.

Gibson, F.O. (2004). *Principles of Teaching Methods in Technical Education.* London: Creg G. and Company Ltd.

Goro, C.A. (2002). The Technological Classroom in Nigeria: Issues and Challenges *Journal of Issues in Technical Teacher Education* (2) 2, 7-9.

Hassan, M.A. & Hassan, N.M. (2007). Strategies for Effective Utilization and Maintenance of Physical Facilities in Technical Schools proceedings of *20th Annual Conference, Nigerian Association of Teachers of Technology.* Pp 347-354.

Ihebuzor, N.A. (1995). Socio-pedagogical Constraints and Curriculum Innovation Communicative Language Teaching in Nigeria a case study *Journal of the world council for Curriculum and Instruction.* Region 2(2) 205-215.

Ile, E.O., & Okwuanago, A. (2000). An Evaluation of Nigerian Certificate in Education N.C.E. Business in Eastern States of Nigeria. *Journal of business Education.* 3(1) 34-36.

James, N.A. (2006). *Issues in Curriculum Development.* Lagos: Richard Publishers Ltd Lagos Nigeria.

Madu, R.M. (2003). Towards Rapid Technology Transition in Nigeria. *The Nigerian Journal of Technical Education* 2(6) 34-37.

Madabum, M.A. (2001). *Fundamental of Educational Research.* Onitsha Common Wealth publishers.

Miller, I.O. (2006). Effective Management of Facilities in Colleges of Education (Technical): Implication for Effective Technology Education for National Technology Growth. *Proceeding of 19th Annual Conference of Nigerian Association of Teachers of Technology,* (1) 372-376.

Mohammed, H.N. (1995). Relevance and Adequacy of NCE (Tech) Curriculum for Preparing Introductory Technology Teachers. *Unpublished M.Ed. Thesis, University of Nigeria Nsukka.*

Mohammed, H.N. (2006). Construction and Validation of Achievement Test in machine practice at NCE (Technical) level. *Unpublished Doctoral Thesis, Abubakar Tafawa Balewa University, Bauchi.*

Ndu, P.O. (1993). A survey of Problems of Teaching and Learning of Science and Technology in the Rural Environment in Anambra State. *Journal of Science Teachers Association of Nigeria* 22(1) 48-52.

National Commission for Colleges of Education (1999) Minimum Standard for Colleges of Education, Federal Republic of Nigeria, Abuja.

National Commission for Colleges of Education (2002). *Minimum Standards for Colleges of Education.Kaduna* Federal Republic of Nigeria.

Nigeria, North-East (2012). Nigeria North Eastern States Retrieved on 2nd -5-2012 from:http//en.m.wikipedia.org/wiki/NorthEast

Ogbodo, C.M. (1995). Managing Educational Facilities in Feretomode, V.R. (ed) *Introduction in Educational Administration, Planning and Supervision,* Lagos.

Okafor, C.N. (1996). Curriculum Development Strategies in Ogwo, B.A. (Ed) *Curriculum Development and Educational Technology.* Makurdi Onaivi Printing and publishing co.

Okarfor, C.N. & Odigbo, A. (1999). Curriculum Development Strategies in Ogwo, B.A. (Ed) *Curriculum Development and Educational Technology,* Makurdi, Onaivi printing and publishing co.

Okoro, M.O. (1991). *Programme Evaluation in Education.* Pacific Publishers. Uruoweuku, Obosi, Nigeria.

Olaitan, S.O. (1996). *Vocational Technical Education in Nigeria (Issues and Analysis).* Noble Graphics press, Onitsha.

Olaitan, S.O., Nwachukwu, C.E., Igbo, C.A., Ekong, A.O. & Onyemachi (1999). *Curriculum Development and Management in Vocational Technical Education.* Cape Publishers International Ltd. Onitsha.

Olaitan, S.O. (2003). *Understanding Curriculum.* Ndudin Printers, NSukka.

Onuaha, P.C (2000). Factors that Militate Against the Maintenance of Facilities in Institute of Management Technology. *A paper presented at the Seminar of Technical Education Department* Enugu.

Patizhiko, I.M (2006). Teachers Competency in the Utilization of Instructional Materials in Automobile Technology Education, *proceeding of 19th animal conference, Nigerian association of Teachers of Technology (NATT)* (1) 111-115.

Omozokpia, A.P. (2007). Status of Production Work in Miscellaneous Trade Clusters of Technical Colleges in Northern States of Nigeria. *Proceeding of* 20th *Annual Conference Nigerian Association of Teachers of Technology*. (1) 363-370.

Onwuka, U. (1996). *Curriculum Development for Africa.* Onisha, Africa Fep. Publishers Ltd.

Sanusi, F.C. (2003). Management of Educational Facilities for Effective Instruction. *Unpublished M.Ed. Thesis University of Nigeria Nsukka.*

Silor, C.E. (1997). The Role of Nigerian Universities in the Development of Vocational Technical Education in Nigeria. *Lecture Paper at College of Education Katsina Ala 29/4/87.*

Taiwo, O. (1988). Technical Teachers in Anambra State. *Journal of Technical Teachers Association.* 14(2) 12-14.

Udo, I.A. (2007). The State of Technical Facilities and Technical Education Reforms in Nigeria. *20th Annual Conference Nigerian Association of Teachers of Technology.* (1) 601-609.

Udofia, W.U. (2007). Maintenance Equipment Utilization and Students Skill Acquisition in Automobile Technology Workshops in Technical Colleges in Akwa Ibon State. *Unpublished M.Sc. (Ed) Thesis, University of Uyo, Uyo State.*

Usman, M. and Dahiru, A.S. (2004). The Roles of Instructional Material in improving quality in Teachers Education. Challenges in this Era of Information and Computer Technology. *Journal of Issues in Technology Teachers Education*. 2 (4) 168-173.

APPENDIX I

FEDERAL UNIVERSITY OF TECHNOLOGY, YOLA
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P.M.B. 2076, Yola
Adamawa State, Nigeria

DEPARTMENT OF TECHNOLOGY EDUCATION

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VICE-CHANCELLOR:
PROF: B. H. USMAN, BSc (Unimaid) MSc (Reading) Ph.D (London)

Our Ref:---------- Date: 14TH DEC, 2009

TO WHOM IT MAY CONCERN

The bearer ...BINACA...BUKAR....MAINA..... with ID. No.M.TECH/TE/06/0033... is a Postgraduate student in the Department of Technology Education, Federal University of Technology, Yola. He/she is here to seek for assistance in connection with his/her thesis/dissertation.

This is to request you to kindly give him/her the necessary assistance. All information will be treated confidentially and used only for academic purpose.

Thank you.

H. O. D. Technology Education
Dept. University of Technology, Yola

Dr. C. A. John
H.O.D, T.E.

APPENDIX II

Department of Technology Education,
Federal University of Technology,
Yola.
4th August, 2010

Dear Respondents.

A LETTER OF REQUEST TO RESPOND TO QUESTIONNAIRE

The researcher is a Post – Graduate Student of the Department of Technology Education, Federal University of Technology Yola. The attached questionnaire is a part of study undertaken in the Department. The purpose of this study is to assess the facilities for teaching Metalwork Technology Education as a course of study in Colleges of Education in North Eastern States of Nigeria.

It is in line of the above that your response to the items in the questionnaire is very important towards successful conduct of the study. You are therefore kindly requested to respond to all the times as objectively as possible. All information given by you will be treated confidential and used for the purpose of the research work only.

Thank you for your anticipated assistance.

Yours sincerely

Bukar Maina Bwala.

APPENDIX III

QUESTIONNAIRE ITEMS

To be completed by all respondents.

(i) Name of Institution:……

(ii) Highest Education Qualification:……

(iii) Working Experience:……..... Years

For each of the item statements in each of the sections, indicate by ticking [√] the extent to which you agree or disagree with the statement.

The responses options are Strongly Agree (SA), Agree (A), Undecided (UD), Disagree (D), and Strongly Disagree (SD).

Adequacy of Facilities

Questionnaire items below are on the adequacy of facilities for teaching and learning metalwork programme in line with NCCE minimum standard.

S/N	Item Statement	SA	A	UD	D	SD
1.	The number of buildings and sites are suited adequately for metalwork training needs.					
2.	Workshop spaces are adequate for instructional training needs.					
3.	Toilet facilities are adequate for users.					
4.	Workshops are provided with adequate lightening and ventilation for users.					
5.	Floor areas are spacious and adequate for machines, workbenches and other equipment.					
6.	Adequate number of hand tools are provided and in first class working condition.					
7.	Consumable materials and supplies for practical are adequately provided to meet the number of students.					
8.	The time allocated for practical is adequate.					
9.	The library is adequately provided with metalwork text books.					
10.	Office and office facilities are adequate for teaching and non – teaching staff.					

Facility Utilization

Questionnaire item below are on how the metalwork facilities are being utilized.

S/N	Item Statement	SA	A	UD	D	SD
11.	The machine and hand tools provided are being utilized effectively for teaching.					
12.	The facilities are over utilized due to the number of students.					
13.	The library and library facilities are effectively utilized by metalwork students.					
14.	Adequate time for practical on the time table allows for proper utilization of the workshop and tools.					
15.	The instructional facilities available in the workshop are adequately utilized.					
16.	Equipments in the metal workshop are adequately maintained for effective utilization.					
17.	Issuance of tools and equipment for practical to students is properly supervised in eh workshop.					
18.	Power supply for effective tool and equipment utilization in the college is satisfactorily utilized.					
19.	Instructional facilities utilized in the college workshop are contextual to the curriculum content.					
20.	Facilities are being utilized as consultancy services.					

Adequacy of Funds

Adequacy for funds provided for facilities required for teaching metalwork in line with NCCE minimum standard.

S/N	Item Statement	SA	A	UD	D	SD
21.	Funds provided for the procurement for tools in metalwork is adequate.					
22.	Consumable material purchase is adequately funded and when due.					
23.	Metalwork lecturers per take adequately in procurement of tools and materials.					
24.	Machines are purchased adequately to replace broken ones.					
25.	Funds are adequately provided for maintenance purposes.					

26.	Funds are adequately provided for the department to cater for the departmental need.					
27.	Funds allocated to the department are adequately utilized in relation to facilities.					
28.	An adequate fund is provided for student practical projects.					
29.	Adequate funds for facility monitoring are being carried out.					
30.	Departmental library is adequately funded.					

Adequacy of teachers and workshop staff

Questionnaire item below are on adequacy of staff in metalwork.

S/N	Item Statement	SA	A	UD	D	SD
31.	The number of metalwork teachers are adequate in relation to facilities.					
32.	The number of supporting staff in metalwork is adequate considering facilities available.					
33.	Adequate opportunity is given to teachers for further training when facilities are procured.					
34.	Teachers attend workshops and seminars adequately to update their knowledge on facilities.					
35.	Adequate instructors are available for facilities in metalwork as stated by the minimum standard for colleges of education.					
36.	Adequate qualified and storekeepers are available to handle facilities metalwork.					
37.	The number of teacher to students is adequate and in line with the NCCE minimum standard composed to facilities on ground.					
38.	Adequate numbers of cleaners are provided for the cleanliness of the workshop offices, and other facilities.					
39.	Adequate teachers/instructors posses the required academic qualifications to teach metalwork facilities.					
40.	Adequate workshop attendants and other supporting staff are available in metalwork.					

APPENDIX IV

NUMBER OF LECTURERS AND WORKSHOP STAFF

S/N	NAME OF COLLEGE OF EDUCATION	WORKSHOP STAFF	TEACHERS
1	Azare: Bauchi State	6	4
2	Bama: Borno State	5	4
3	Gombe: Gombe State	3	10
4	Hong: Adamawa State	6	4
5	Jalingo: Taraba State	5	3
6	Potiskum: Yobe Stat	5	9
	Total	**30**	**34**

Source: Field Survey: August, 2010

APPENDIX V

NCCE MINIMUM STANDARD

METAL - WORK TECHNOLOGY CHECKLIST

LIST OF EQUIPMENT FOR 30 STUDENTS

S/NO	DESCRIPTION OF ITEMS	QUANTITY
1.	Standard work benches	15
2.	Bench Vices (medium and large)	30
3.	Angle plates	4
4.	Marking out table	2
5.	Surface plates	2
6.	Hardiness testing machine with accessories	1
7.	Tensile testing machine with accessories	1
8.	Radial drilling machine with accessories	1
9.	Pillar drilling machine with accessories	2
10.	Assorted drills	5 sets
11.	Hand reamers (different sizes)	5 sets
12.	Centre drills (different sizes)	5 sets
13.	Machine reamers (assorted)	5 sets
14.	Centre lathe with accessories (standard)	10
15.	Lathe cutting tools (assorted)	100
16.	Thread cutting tools	100
17.	Shaper with accessories	3
18.	Sharper cutting tools (assorted)	100
19.	Universal milling machine with accessories	1
20.	Grinding wheels (assorted)	50
21.	Surface grinder with accessories	1
22.	Assorted grinding wheels for surface grinder	50
23.	Tool and cutter grinder with accessories	1
24.	Assorted grinding wheel for tool and cutter grinder	50
25.	Power hacksaw	1
26.	Power hacksaw blades	20
27.	Milling cutters (assorted)	15
28.	Universal cylindrical grinding m/c with accessories	1
29.	Sanding machine	1

30.	Knurling tools	10
31.	Dividing head with accessories	1
32.	Cutter sink with (assorted)	3 sets

HAND TOOLS

1.	Scriber	35
2.	Steel rule (300mm)	35
3.	Try square (engineers)	35
4.	Spring dividers	35
5.	Spring calipers	35
6.	Sliding bevel	3
7.	Scribing black	3
8.	Vernier height gauge	2
9.	(a) Flat file (bastard) 300mm	35
	(b) Flat file (second cut) 300mm	35
	(c) Hand file (second cut) 300mm	35
	(d) Hand file (smooth) 300mm	35
	(e) Half round file (bastard) 300mm	20
	(f) Half round file (second cut) 300mm	20
	(g) Round file (bastard) 300mm	20
	(h) Round file (second cut) 300mm	20
	(i) Square file (bastard) 300mm	20
	(j) Square file (second cut) 300mm	20
	(k) Triangular file (bastard) 300mm	20
	(l) Triangular file (second cut) 300mm	20
	(m) Flat file (bastard) 250mm	35
	(n) Flat file (smooth) 250mm	35
	(o) Hand file (bastard) 250mm	35
	(p) Hand file (smooth) 250mm	35
	(q) Half round file (bastard) 250mm	20
	(r) Round file (bastard) 250mm	20
	(s) Round file (smooth) 250mm	20
	(t) Square file (bastard) 250mm	20
	(u) Square file (smooth) 250mm	20
	(v) Triangular file (bastard) 250mm	20

	(w) Triangular file (smooth) 250mm	20
10.	Swiss files	5 sets
11.	Warden files	5 sets
12.	Metal scrapers	5 sets
13.	Cold chisels (set of flat, diamond point and cross cut)	15
14.	(a) Hammers (ball pein assorted sizes)	30
	(b) Hammers (cross pein assorted sizes)	30
	(c) Hammers (straight pein assorted sizes)	30
15.	Hacksaw frames	60
16.	File cords	30
17.	Vernier caliper	35
18.	Combination set	10
19.	Vernier protractor	5
20.	Set of dies and stock	3 sets
21.	Set of tapes and wretch	10
22.	(a) Micrometer 0-25mm	10
	(b) Micrometer 25 -50mm	10
	(c) Micrometer 50-50mm	10
	(d) Micrometer 50-75mm	5
	(e) Inside micrometer 0-25mm	5
	(f) Inside micrometer 25-50mm	2
23.	Micrometer set 0-75mm (outside)	1
24.	Dies test indicator with magnetic best	5
25.	Slip gauges	3 sets
26.	Limit gauges	3 sets
27.	Sine bars	3 sets
28.	Hand reamer sets	5 sets
29.	Vice grips	10
30.	Centre punch	30
31.	Depth micrometer with extension spindles 0-100mm	2

FORCE WORK TOOLS AND EQUIPMENT, AND FOUNDARY

1.	Blacksmith health	1
2.	Anvil	2
3.	Anvil stand	2

4.	Swages (assorted sizes)	10
5.	Flaters (different shapes and sizes)	10
6.	Tongs (assorted) blacksmith	10
7.	Forging hammers (assorted)	20
8.	Punches	20
9.	Old leg vice	2
10.	Soldering bits (assorted)	30
11.	Soldering flux	15 tins
12.	Emery cloth	20 pkts
13.	Blow lamps	5
14.	Electric soldering iron (15/45 watts)	15
15.	Rivet sets	15
16.	Rivet hammers	15
17.	Dolly	20
18.	Furnace for heat treatment (electrical/fuel type)	2
19.	Carbon	4 tins
20.	Pyrometer	2
21.	Equilibrium chart	2
22.	Flask (assorted sizes with cope and drog)	16
23.	Crucible furnace	1
24.	Receiver	4
25.	Dram spike	4
26.	Rammers	4
27.	Spoon tool	4
28.	Trowel	4
29.	Thermometer	4
30.	Riser	4
31.	Runner	4
32.	Quenching bathes (oil and water types)	4

SHEET METAL TOOLS AND EQUIPMENT

1.	Wing dividers	35
2.	Setting hammer	15
3.	Rising hammer	35

4.	Sheet metal and wire gauge	5
5.	Hallow punch	35
6.	Flat nose pliers	35
7.	Aviation snips	5
8.	Scroll or hawk's snips	10
9.	Squaring swears (machine)	1
10.	Lever shears	1
11.	Hand groover	10
12.	Hallow mandrel stake	5
13.	Hatchet stake	5
14.	Needle case stake	5
15.	Blow horn stake	5
16.	Bevel edge stake	5
17.	Double reaming stake	5
18.	Beak horn stake	5
19.	Brake (folding machine)	1
20.	Planishing hammers (assorted)	35
21.	Planishing stakes (assorted)	15
22.	Sheet metal work bench	4
23.	Chasing tools (tracers for sheet metal)	3sheets
24.	Buffers (buffing machine)	2
25.	Metal wedges	10
26.	Potable spot welder	1
27.	Off hand grinding machine	1
28.	Letter stamps	2
29.	Number stamp	2
30.	Pipe cutter	2

Source: Federal Republic of Nigeria – NCCE minimum standard, (1990).

APPENDIX VI

NCCE MINIMUM STANDARD FOR NCE TECHNICAL EDUCATION METAL WORK

1. The philosophy of this programme, NCE (Technical), is to provide technical teachers with the intellectual and professional background adequate for teaching technical subjects and to make them adaptable to any changing situation in technological development not only in the life of their country, but also in the wider world.

2. OBJECTIVES

The objectives of the programme shall be:

- To produce qualified technical teachers and practitioners of technology capable of teaching Introductory Technology in the Junior Secondary Schools and Technical Colleges.
- To produce technical NCE Teachers .Who will be able to inculcate the scientific and technological attitudes and values into the society.
- To produce qualified NCE Teachers motivated to start the so much desired revolution of technological development right from the Nigerian Schools.
- To prepare teachers so as to qualify them for a two (2) year post - NCE degree programme in Technical Education either in Nigerian Universities or Abroad.

3. ADMISSION REQUIREMENTS

In addition to the general admission requirements candidates wishing to offer Technical Education must have credits in MATHEMATICS, PHYSICAL SCIENCE subject and one or two from the under mentioned technical subjects:

I) Technical Drawing, Applied Electricity, Basic Electronics, Auto-Mechanics, Wood Work, and Engineering Science.

II) City and Guilds/WAEC Technical Craft/Intermediate or equivalents in Building, Wood, Mechanical or Electrical Trades respectively plus the Federal Craft Certificate (FCC) with at

least credit passes in four academic subjects including Mathematics, Science, English Languages and Social Studies.

III) National Technical Certificate

4. PROGRAMME STRUCTURE

i) All students admitted into the NCE (Technical) programme will offer all the courses listed in the first and second years. Students will choose an area of specialization in the third year selected from one of the following

i) Mechanical/Metal work Technology

ii) Building Technology

iii) Electrical/Electronic Technology

iv) Woodwork Technology

ii) A student is required to go for an Industrial Attachment in relevant Engineering firm for work experience. Such attachments should be arranged during the long vacation towards the end of the first and second years for a duration of 8 weeks in each year; making a total of 16 weeks at the end of two years.

The objectives of the student industrial work scheme (SIWES) are

1) to introduce the student to the industry
2) to expose the student to the operation and use of industrial machineries and

   3) to acquaint the student with the management structures of industrial organizations.

   iii) Supervised student teaching practice at a junior secondary school level should be arranged by the institution at convenient intervals. The student teacher should teach Introductory technology and any other chosen subject(s).
3) **DISTRIBUTION OF MINIMUM CREDITS REQUIRED FOR GRADUATION**

   Based on a minimum total credit load of 126 required for graduation, Technical education as a double major should account for a minimum of 73 credits.

This minimum standard for Technical Education Studies are distributed as follows:

- Metal Work	9	compulsory	credits	and	3	Elective	credits
-Woodwork	8	,,	,,	,,	3	,,	,,
-Electrical/Electronic Technology	6	,,	,,	,,	3	,,	,,
-Building Technology	7	,,	,,	,,	3	,,	,,
- Automobile Technology	8	,,	,,	,,	3	,,	,,
- Technical Drawing	12	,,	,,				
- Applied Mech/Eng. Science	6	,,	,,				
- Materials Technology	2	,,	,,				
- Maintenance/Repairs of Equipments	2	,,	,,				
- Workshop Management	2	,,	,,				
- Science Subjects/Maths	6	,,	,,				
- S.I.W.E.S.	2	,,	,,				
- Project	2	,,	,,				
Total	72	Credit					

Other components include:

- General Education courses with Teaching Practice 42 Credits
- General Studies 12 credit

6. PHYSICAL FACILITIES (Space and equipment)

An institution offering NCE (teaching) programme should provide unit shops in each given area of technology and equip them in accordance with the required list of equipment. In addition, the institution should provide a separate integrated workshop equipped with standard introductory technology equipment package similar to that which is supplied to the secondary schools.

7. STAFFING

The minimum teaching and technical support staff needed for each major area of specialization shall include:

1 Lecturer

1 Instructor

1 Workshop Assistant

Also at least a Lecturer or Technical Instructor should be employed to teach Technical Drawing the minimum qualification for a lecturer shall be B.Ed (Technical) degree.

The minimum qualification for an Instructor is a Higher National Diploma (HND) with teaching qualification.

TEACHICAL EDUCATION-COURSE OUTLINE
YEAR ONE- FIRST SEMESTER

COURSE CODE	**COURSE** TITLE	CONTACT HRS L-T P	CREDITS
TED 111	Introduction to Metal Work	1-0-3	2C
TED 112	Introduction to Wood Work	1-0-3	2C
TED113	Introduction to Electro Electricity/	1-0-3	2C
TED 114	Introduction to Building Technology	1-0-3	2C
TED 115	Introduction to Automobile Technology	1-0-3	2C
TED 116	Fundamentals of technical drawing	0-0-4	2C
TED 117	Mechanics	2-0-2	2C
MAT 111	Algebra and Trigonometry	2-0-0	2E
MAT **112**	Calculus	2-0-0	2E
MAT 113	Vectors and Co-ordinate Geometry	2-0-0	2E
PHY **112**	Thermal Physics I	2-0-0	2E
PHY 113	Mechanics and Properties of Matter I	2-0-0	2E
CHEM 111	Introduction to Physical Chemistry	2-0-0	2E
CHEM114	Introduction to Organic Chemistry	2-0-0	2E 18,20
	TOTAL		**18/20**

NOTE: L= Lecture
T = Tutorial
P= Practical

SECOND SEMESTER

COURSE CODE	**COURSE** TITLE	**CONTACI'** HRS **L-T-P**	**CREDITS**
TED 121	Sheet metal work, fabrication and welding	0-0-4	**2C**
TED 122	Wood technology, fasteners and adhesives, constructions and design	2-0-2	2C
TED 123	Electrostatics and Electromagnetism	1-0-4	2C
TED 124	Building Science/Materials	2-0-4	3C
TED 125	Auto-Mechanics I (Transmission System)	1-0-3	2C

TED 126	Descriptive Geometry/Pictorial Drawing	1-0-3	2C
TED 127	Fluids	2-0-2	2C
SIWES 129	S.I.W.E.S. (8 weeks)		1C
CHE 122	Introduction to Inorganic Chemistry	2-0-0	2E
	TOTAL		16/18

NOTE: All TED course at levels 100 are compulsory. Students are expected to obtain 2 credits from each of mathematics, physics and chemistry elective course elective course. Physical science to taken in the department of science (Elective course).

YEAR TWO- FIRST SEMESTER

COURSE CODE	COURSE TITLE	CONTACT HRS L-T-P	CREDITS
TED 211	Foundry and forging	2-0-4	3C
TED 212	Machine wood working I	0-0-6	2C
TED 213	**A/C** circuits and electrical ME measuring instruments	1-0-3	2C
TED 214	Construction methods I	1-0-4	2C
TED 215	Auto-mechanics II (braking and electrical systems)	1-0-3	2C
TED 216	Graphics	1-0-4	2C
TED 217	Heat Engines	1-0-1	2C
TED 218	Materials Technology	1-0-3	**2C**
	TOTAL		**16**

SECOND SEMESTER

COURSE CODE	COURSE TITLE	CONTACT HRS L-T-P	CREDITS
TED 221	Machine shop practice 1	1-0-3	2C
TED 222	Design, car case construction/wood finishing	1-0-2	2C
TED 223	Electronic Devices	1-0-3	1C
TED 224	Special methodology	1-0-1	2C
TED 225	Automobile engine	1-0-4	2C

TED 226	Electrical/Electronics Drawing	1-0-3	2C
TED 227	Strength of materials	1-0-1	1C
TED 229	S.I.W.E.S (8 week)	1-0-3	**2C**
	TOTAL		**13**

NOTE: ALL COURESE AT LEVEL 200 ARE COMPULSORY
MECHNICAL/METAL WORK TECHNOLOGY.

COURSE CODE	COURSE TITLE	CONTACT HRS L-T-P	CREDITS
TED 311	Machine SHOP practice II	2-0-4	3C
TED 312	Auto-mechanics III (fuelling and air conditioning system)	1-0-5	3C
TED 313	Research project		2E
TED 312	Construction methods II	0-0-6	3E
TED 218	Materials Technology	1-0-3	**2C**
	TOTAL		**9/11**

SECOND SEMESTER

COURSE CODE	COURSE TITLE	CONTACT HRS L-T-P	CREDITS
TEM 312	Mechanical Engineering Drawing	0-04	2C
TEM 322	Maintenance and repair of mechanical equip	0-02	1C
TEM 323	School workshop management	2-0-0	2C
TEM 322	Building Maintenance/Repairs	0-02	1E
	TOTAL		**5/6**

Source: NCCE: Miimum Standard for NCE Teachers Vocational and Technical (1990) (see appendix vi)