EVALUATION OF WOODWORK CRAFTSMEN PRODUCED BY TECHNICAL COLLEGES IN NIGER STATE

BY

MUHAMMAD MUKHTAR ADAMU

2007/1/27301BT

DEPARTMENT OF INDUSTRIAL AND TECHNOLOGY EDUCATION,
FEDERAL UNIVERSITY OF TECHNOLOGY MINNA, NIGER STATE

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A PROJECT SUBMITTED TO THE DEPARTMENT OF INDUSTRIAL AND TECHNOLOGY EDUCATION, SCHOOL OF SCIENCE AND SCIENCE EDUCATION, FEDERAL UNIVERSITY OF TECHNOLOGY MINNA, NIGER STATE.

IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF BACHELOR OF TECHNOLOGY (B.TECH) IN INDUSTRIAL AND TECHNOLOGY EDUCATION

SEPTEMBER, 2012

CERTIFICATION

I, Muhammad Mukhtar Adamu Matriculation Number: 2007/1/27301BT an undergraduate student of Industrial and Technology Education Department wishes to certify that the work embodied in this research project is original and has not been submitted in any part or full for any other Diploma or Degree programmes of this or any other University.

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Name **Sign-**
Date

APPROVAL PAGE

This research project has been read and approved as meeting the requirements for the award of B.Tech in Industrial and Technology Education with option in Woodwork Technology Education. School of Science and Science Education, Federal University of Technology, Minna

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Supervisor **Signature & Date**

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Head of Department **Signature & Date**

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External Examiner **Signature & Date**

DEDICATION

This educational research project is dedicated to Almighty Allah (SWA) and His beloved Prophet Muhammad (SAW).

ACKNOWLEDGMENT

My sincere appreciation goes to the Giver and Sustainer of life Almighty Allah (SWT) for His divine protection over my life and for continually seeing me through this program. My gratitude goes to my supervisor Dr. Robert O. Okwori for his guide, criticisms, untiring efforts and assistance in making sure this work reaches its conclusion at this time. My sincere appreciation goes to the H.O.D Dr. E.J Ohize, Professor K.A. Salami, Professor G.D. Mommoh, project coordinator, Mr. T.M. Saba, Dr. A.S Ma'aji , Dr.B.N Atsumbe, Dr. Omozokpia P.A, Mal. Abdul B. Kagara, Mal.Bala Mark, Mal. Abdulkareem Wahab, Mal. Hassan Yabagi, and all other lecturers and staff for their contribution in one way or the other to ensure the successful completion of my work.

I must also acknowledge the effort of my parent Engr.Mohammed Adamu Doko, Mallama Fatima Mohammed, Mallama Aisha Mohammed, Mallama Jumai mohammed and my brothers and sisters; Ibrahim, Adamu, Zayad, Fahad,Walid and Abubakar for their undiluted love and support.

Finally, I want to specially appreciate the efforts of my Uncles Mallam Saeed Adamu Doko and Mallam Ibrahim Bala Doko and my Grandmother Hajiya Fatima Adamu Doko. Thank you

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Abstract

The study was aimed at evaluation of woodwork craftsmen produced by technical colleges in Niger State. Specifically, this study determined:- the level of skilfulness of woodwork craftsmen in using woodworking machines, the level of skilfulness of woodwork craftsmen in using consumable materials, the dexterity in the use of woodworking hand tools by woodwork craftsmen and the level of skilfulness of woodwork craftsmen in using maintenance equipment. Four research questions and two null hypotheses were formulated and tested to guide the study. Some related literatures were reviewed, among which are: the history of vocational and technical education, evaluation of vocational and technical education, practical skill development in woodwork, occupation in woodwork, woodwork training facilities in technical colleges in Niger state. The descriptive survey approach was used and the target population for this study was made up of woodwork head of sections and woodwork craftsmen. Fourty-eight (48) item-questionnaires were used as instruments for data collection which were analyzed according to research questions. The data collected from the respondents was analyzed using frequency count, mean, standard deviation and t-test. The findings among others include: woodwork craftsmen used drilling machine for boring hole on a wood surface accurately, they also used circular saw machine for ripping wood perfectly, lathe machine for cutting wood perfectly, hand planner, pincer and steel square. It was recommended that the federal and State government should partake in the effort to improve the teaching of woodwork in Technical Colleges and make adequate provisions of tools and machine that would contribute skill acquisition by students in Technical Colleges.

CHAPTER I

INTRODUCTION

Background of the Study

Wood is a hard, tough substance that forms the trunk of a tree; it has been used for thousands of years as a fuel and as a material for construction. Technically, the term *wood* includes materials in other parts of the plant including even the veins in leaves. The process of working with wood is called woodwork. Woodwork refers to wooden interior fittings in a house, as moldings, doors, staircases, or windowsills. According to the McMillan dictionary (2009), woodwork is also seen as the activity or skill of making objects from wood by woodwork craftsmen.

Woodwork craftsmen are set of craftsmen who use a wide range of tools to adjust, test, diagnose, construct and completely repair any fault on the objects made of wood (NBTE, 2001). In small shops, they may work on a wide variety of repair and construction jobs while in larger workshops, they may specialize in repairing, rebuilding and construction of an object using wood. Before woodwork craftsmen begin a job they must have a complete sets of construction drawing and must be familiar with how the drawing are prepared to comply with the requirement by reading the work order using their sight, sound, feel and smell.

It is a well known fact that effective training in skill acquisition has immensely contributed to the technological excellence and economic self-reliance of the industrialized nations. It is to this fact that Okorie and Ezeji (1988), while stressing on the importance of technical skill acquisition, they said that proper and adequate skill acquisition is a means of increasing the productivity of a nation. However, while contending the indispensable role of skill acquisition in national growth, Eze (1989) observed that Nigeria's industrial development is largely dependent on available competent workforce.

The shortage of skill personnel especially at the middle manpower level is a reflection of the state of technical education in Nigeria. The development of any nation depends largely upon the effectiveness of the vocational and technical education which should provide the needed productive labour force for economic progress of that society. In order to determine and evaluate the achievement of the aims and objectives of establishing, technical colleges in Nigeria, National Business and Technical Examination Board, (NABTEB) came into existence in 1992. The decree No 70 of 1993 that established the board was promulgated and signed into law in 1993. The Board was charged among others with the responsibility to**:-**

1. Conduct entrance examination into Technical Colleges and allied institutions in Nigeria.
2. Take over the conduct of technical and business examination hitherto conducted by Royal Society of Arts of London (RSA) and City and Guild by West African Examination Council (WAEC).
3. Conduct Examination leading to the awards of the National Technical certificate (NTC), National Business Certificate (NBC), Advanced National Technical Certificate (ANTC) and Advanced National business Certificate (ANBC). NABTEB as a board conducts examination in the engineering trades, construction trades, miscellaneous trades, Business, General Education trade and trade related subjects.

There are six state Technical Colleges and one is federal Science and Technical College in Niger state. These technical colleges run various trade courses including furniture craft, Metalwork practice, Block laying and Concreting, Electrical Installation and Maintenance Practice, painting and Decorating etc. Students admitted into these trade courses spend three (3) years in school for the award of National Technical Certificate (NTC) after

completion of the course. Holders of this certificate are grouped under craftsmen cadre. A craftsman, who is confident of his ability, does not mind whether there is job opportunity or not because he can always engage himself. Therefore, Nigeria generally and Niger State in particular are in dare need of high quality craftsmen who can help our technicians and engineers carry out production, maintenance and repair services in their various trades.

A well trained craftsman should be capable of independent work; they should interpret technical drawing and perform all the calculations relating to his/her trade. The craftsman should also have sufficient knowledge of elementary science to understand the materials in which he works with. Therefore training in technical colleges in Niger state should be geared towards achieving the aims and objectives of the programme which include:-

1. To secure employment at the end of the programme as craftsmen.
2. Set up their own businesses and become self-employed and able to employ others.
3. Pursue further education in advanced craft technical programme or in tertiary technical institutions. In this respect, the Technical Colleges curricular for craftsmen should be designed to task the ingenuity of the students to be creative, capable of producing saleable goods and services to make the graduates become self reliant and in addition where the students are interested they could aspire to progress academically (FME, 2000).

Evaluation is the process of determining the nature and extent of those changes in learner's behavior after a programmed of curriculum and instruction (Tyler 1949). However, ultimate evaluation determines how well the individual performs in their place of employment after graduation (Okoro, 1993).Therefore it is essential to know how woodwork craftsmen produced by technical colleges in Niger state perform in their places of employment.

Statement of the Problem

It has been observed that there are unemployed craftsmen in Niger State while the products of technical Colleges by the aim and objectives of technical education should not cue for jobs but rather be self-employed and employer of labour. As a result of this ugly situation, the research aims at evaluation of woodwork craftsmen produced by technical colleges in Niger State.

Purpose of the Study

The main purpose of the study is to evaluate the woodwork craftsmen produced by technical colleges in Niger State Specifically, this study sought to:

1. Find out the level of skillfulness of woodwork craftsmen produced by Niger state technical colleges in using woodworking machines.
2. Find out the level of skillfulness of woodwork craftsmen produced by Niger state technical colleges in using consumable materials.
3. Determine the dexterity in the use of woodworking hand tools by woodwork craftsmen produced by Niger state technical colleges
4. Find out the level of skillfulness of woodwork craftsmen produced by Niger state technical colleges in using maintenance equipment.

Significance of Study

The findings of this research will be of immense benefit to the National Board for Technical Education (NBTE), the government, woodwork students and the society at large.

The National Board for Technical Education (NBTE) will benefit from the research work in planning and reviewing the curriculum contents of woodwork. The government will also benefit from the research work in creating awareness of the quality of woodwork craftsmen produced by technical colleges and the causes of poor job performance. This will enable the situation to be remedied so as to improve the quality of woodwork craftsmen.

Finally, the findings of the study will also benefit the students carrying out a research work on a similar issue by equipping them with adequate literature and knowledge needed for the work.

Scope of the Study

This research work was delimited to evaluation of Woodwork Craftsmen Produced by Technical Colleges in Niger State.

The following skill areas were covered during the study. This includes furniture craft, carpentry and joinery.

Research Questions

The following research questions were developed for the purpose of this study.

1. What are the levels of skillfulness of woodwork craftsmen produced by Niger state technical colleges in using woodworking machines?
2. What are the levels of skillfulness of woodwork craftsmen produced by Niger state technical colleges in using consumable materials?
3. Which of the woodworking hand tools effectively used by woodwork craftsmen produced by Niger state technical colleges?
4. What are the levels of skillfulness of woodwork craftsmen produced by Niger state technical colleges in using maintenance equipment?

Hypothesis

The following null hypotheses were formulated to guide the study and tested at 0.05 level of significance:

1. There is no significance difference between the mean responses of woodwork craftsmen and Head of woodwork sections in using woodworking machines.
2. There is no significance difference between the mean responses of woodwork craftsmen and Head of woodwork section in using woodworking hand tools.

CHAPTER II

REVIEW OF RELATED LITERATURE

This chapter deals with the review of related literature under the following headings

1. History of vocational and technical education

2. Evaluation of vocational and technical education
3. Practical skill development in woodwork
4. Occupations in woodwork
5. Woodwork training facilities in technical colleges in Niger state.
6. Summary of literature reviewed

History of vocational and technical education

In tracing the history of vocational technical education in Nigeria, Okoro (1993) reported that the development of vocational and technical education in Nigeria was slow around 1909, only two institutions offering some form of vocation education in the country. The Hope Wadel training institute had developed a technical programme in tailoring, carpentry and some commercial subjects and the Nassarawa school established by government in 1909 had courses in metal work, carpentry, weaving and leather work.

After 1944, it became clear that Nigeria could not take off economically without technical man power, and the need for the development of technical education became paramount. In the ten year education plan (1946-1955), provision was made for the training of woodwork technicians, Craftsmen and Artisans. By 1948, the Yaba technical institute and one each in the Northern, Western and Eastern regions were established. The first technical school in Nigeria was the Roman Catholic Agriculture School established in 1948 at Badagry, where students were settled on plantation and taught the rudiments of agricultural production.

Vocational and technical education is a major means of bringing about, among other things technical changes in science, industry and Agriculture. If a country is to rank among the most highly developed and maintain the status quo, it must not only

manufacture, but invent (World bank, 1991). Therefore the type of education which is directly relevant to economic progress should be provided.

The quest for this type of functional education which will stimulate national development and empowerment of the citizen, call for government‘s continued efforts to remove area of inadequacies in various sectors and aspects of technical and vocational education. It is the light of third, Okoro (1994) reported that in 1973 the government summoned seminar of distinguished educational experts under the chairmanship of chief S.O Adebo, former permanent representative of Nigeria at the National policy on Education (FRN.1981), which define both vocational and technical education as that aspect of education which leads to the acquisition of practical and applied skills as well as basic scientific knowledge.

Furthermore, vocational and technical education is that aspect of education, which utilizes scientific knowledge in the solution of problems. But in specific terms vocational education has been described as any form of education whose primary purpose is to prepare person for employment. Therefore technical and vocational colleges thus become very strategic as suppliers of skilled manpower and as the major sector through which national goals can be given meaning and reality among the people.

In line with the new National policy on education (FRN,1981) the federal government in her effort to meet the demand of the new systems of education decided in 1982 to go ahead with the education, that will provide and sustain her quest for scientific, industrial and technological advancement. The introduction of technical education is to encourage the acquisition of practical skill in students and encourage them to use their hands in making, repairing, and assembling things Okoro (1990), writing on the objectives of technical education felt that it is increasing the employability of school leavers in technical and vocational skills and to train craftsmen, technicians, and skilled personnel’s.

The problems of technical colleges in Nigeria generally and Niger state in particular revolve around production of quality and competent woodwork craftsmen by the technical colleges. It must be bear in mind that the importance of this level of manpower to the development of Niger state and Nigeria in general cannot be under estimated.

Evaluation of Vocational and Technical Education

The term evaluation has been categorized and given different interpretations at various levels of vocational and general education by many scholars. To some scholars, it is the appraisal of the worth or value of a thing or action and the making of appropriate decision on the basis of such appraisal, Hughes (1959), Grace (1994) and Jere (1999). While to others, evaluation means the collection and the use of data to summarize information with regards to variable under study to assess the effectiveness or quality of a programme (Okoro 2000, Hartbour – Peters 1999 and Nworg, 1992).

Alkin (1970) observed explicitly, that evaluation is that process of which decisions are made in view of outcomes, by selecting appropriate information. These collation and processing of information; collation and analyzing information ; in order to give concise report, summary of empirical data, useful to administrators/ executives in selecting among alternatives. NAFDAC (1994). Supporting Okoro (1991) and Tanner (1980:151) informed us that in view of appropriate evaluation, the America research development effort “in skill Mastery as preparation” for effective vocational education, have brought about positive changes in the assessment of practical skills by Teachers and the America society.

However, in Nigeria, it is unfortunate as Okoro (2000), Okorie and Ezeji (1988) noted that one of the problems associated with skill training is its evaluation. It has been observed that a number of technical teachers trained in Nigeria are unable to evaluate the level of skills possessed by their students. Whereas the ethical demand in their training is

the development of their student skills. Accordingly, Okoro (2000), Okoro (1991) Okorie and Ezeji (1988) contended that technical teacher's pre-occupation should be to assist students acquire skills. Based on the above mention concepts, one cannot but agree with Aina's (1990) view that initial preparation of technical teachers is fundamental: if teachers are to fulfils the necessary and accepted tasks in the methodology of inculcating knowledge, practical skills techniques in students.

Okorie (2001) and Okoro (1991) supported Aina (1991) when they stressed that a good vocational technical teacher should posses the ability of considering all relevant factors, including the nature of the skill performances been tested before deciding on the type of test to use, this is in conformity with Ma'aji (1984) understanding contents of psychomotor and other relevant domains.

According to Okorie (2001) vocational technical education is concerned with equipping individuals on a worthwhile activity, such as in knowledge, attitudes and skills that will enable such an individual's enter into their chosen occupation and progress. The realization of this aim lies on the use of appropriate evaluation technique in the assessment of the level of practical skills possessed by the individual student. A thorough evaluation of student performance in technical education involves the evaluation of the attainment of cognitive, affective and psychomotor objectives in their taxonomy. This Aina (1972) graded the psychomotor domain from its lowest categories reflex movements that developed naturally to higher level of non-discursive communication which technical educators are not ordinarily concerned with unless they are engaged by inspectors. However, it is noted by Ali (1990) that the higher psychomotor process operates with cognitive and affective processes in performing an industrial operation which require skilled manipulative technique. Therefore as stated by Umeano (1999) the cognitive and affective function of a human being are related to the psychomotor processes. Every

technical teacher in context should be aware of the need to evaluate the above mentioned domains and should determine ahead of time the specific objectives needed in the achievement of these three domains.

Process/Product Evaluation

Performance test as Okoro (2000) has stated, enable us to assess the psychomotor skills possessed by student. The ability to perform complex psychomotor skill can be determined through a written cognitive test but a practical performance test is the most direct and effective method of assessing practical skill acquisition. Process evaluation involves 'check list' observing and rating the procedures adopted by students in performing a task. While product evaluation involves rating and grading the end product of the performance to determine the extent to which it satisfies previously determined criteria, (Okoro, 2000). In a woodwork practical project involving the use of lathe machine as an example. Process evaluation may involve assessing:-

1. How the student mount his job on the chuck.
2. How the student mount the turning tool on the tool post.
3. The operation of lathe control.
4. Centring the turning tool.
5. Choosing the right speed /feed.
6. Surface finishing (product).

This is done through process evaluation observation using check list and rating scales. Product evaluation , on the other hand which is a terminal grading and rating, involves assessing the final product and noting whether it is turned to specifications or not. In the above example using of the lathe machine, both methods of process and product evaluation are observed to be important. Therefore, in assessing learner performances in

vocational technical education, either process or product evaluation or combinations of both methods are used.

The neglect of process and product evaluation by technical teachers does not lead to proper evaluation of students. Teachers are observed to rely on written cognitive test as strategy for assessing practical skill acquisition in learners. The learner will be deficient in the psychomotor skill. The outermost effect of such is that the learner unconsciously and consciously imbibes the cognitive skill. This does not justify the basic need of vocational education in Nigeria school system as required by both National Policy on Education (1998) and the National Policy on Science and Technology (1988). Based on the above mentioned issues, it seem therefore necessary, that ways should be developed by the universities, Technical Teachers Colleges, Polytechnics etc. to seek ways of helping technical teachers acquire appropriate technique(s) for the assessment of learner's practical skills. Having the above insight, this study was therefore designed to investigate and determine methods of evaluation which is most appropriate for technical colleges.

Practical skill development in woodwork

The word skill has been defined as a well established habit of doing something involving the acquisition of performance capabilities in the most economic way (Okorie and Ezeji, 1988). They further observed that skill is a well research method or technique of

carrying out an economic function which is repeated with predictable regularity. These definitions imply that skill involves more than a purely physical activity as often conceived by some people. Skill indeed involves mental as well as physical activities. Cave (1986) described skill as the acquisition of knowledge such as ability, techniques or learning experience which leads to doing and making or performing things. It can be acquired within or outside the formal education.

Skill acquisition can be regarded as formal or informal depending on the way it is provided. The formal approach to skill acquisition is known to be provided through vocational and technical education. Before the advent of colonial education practical skill development was through the apprenticeship system which made the youths occupationally engaged in the affairs of the community. According to Oranu (1991) technology education existed in Nigeria before the advent of Europeans. Nigeria adopted the apprentices system to train its youths in acquiring skills in smiting, wood carving, weaving, farming and other crafts.

In developing practical skill, emphasis should be upon the practical skill activities, each moment or activity should be devoted to meaningful drilling in the skill, technical education is expected to inculcate into students certain skills, knowledge and attitudes that will prepare them for gainful employment and next stage education . in this regards, the national board for technical education suggest 60 to 40 ratio for practical and theoretical academic preparation, respectively. For all the technical colleges and similar institution of learning in the country, the 60 percent allocated to practical experience is not precisely clear on the degree of emphasis to be accorded to general occupational skills and specific job skills. In a related study, Cambell (1984) found that vocational curriculum contributes primarily to the development of job skills rather than generalized work attitude or general market skills.

Effective vocational and technical education programmes have immensely contributed to the technological excellence and economic self reliance of industrialized nation. As Nigeria embarks upon technology development, and the need for efficient and effective vocational and technical educational system becomes imperative. The national policy on education (F.R.N; 1981) recognized technical education system which leads to the:-

1. Acquisition of practical and applied skill
2. Scientific knowledge

The policy attached much importance to technical education, for it is the nation's spring – board for acquisition of relevant skills for technological and economic development with regards to the nations needs for skilled man power. The policy further maintains that technical education is designed and incorporated in three stages of education with a view of meeting the nations need for skilled man power. To support the economic state o f individual student and the nation as well.

The need for our educational system to be relevant to the economic and social development of the nation has never been so strongly emphasized in Nigeria than as is done in the present time. Sariki (1994) said the reason for this cry is not farfetched. This according to him is necessitated by millions of youths roaming about on our streets without the necessary skills required for gainful employment. Commenting on the relevance of skills on student's employability, Okorie and Ezeji (1988) advised that technical college programmes should not exchange development of practical skill with book work. They noted that adequate skill acquisition is a vital element in the training of craftsmen for fullest self satisfaction in the field of work. Therefore to eliminate unemployment problem in the country they observed that the system of occupational preparation should ensure a provision of saleable skills to all youths who can profit and progress in occupation. The

role and importance of skill acquisition cannot be over emphasized. Okorie and Ezeji (1988) stressed on the importance of technical skill acquisition and said that requisite skill is a means of increasing the productive power of a nation. Although some entry-level jobs can be learned in less than 1 year, becoming a fully trained woodworker requires many skills and generally takes at least 3 years of on-the-job training. Skill with computers and computer-controlled machinery is increasingly important.

Education and Training

Some woodworkers obtain their skills by taking courses at technical schools or community colleges. Others attend universities that offer training in wood technology, furniture manufacturing, wood engineering, and production management. These programs prepare students for jobs in production, supervision, engineering, and management and are increasingly important as woodworking technology advances.

Education is helpful, but woodworkers are primarily trained on the job, where they learn skills from experienced workers. Beginning workers are given basic tasks, such as putting a piece of wood through a machine and catching the wood at the end of the process.

As they gain experience, new woodworkers do more complex tasks with less supervision. In about 1 year, they can learn basic machine operations and job tasks. Becoming a skilled woodworker often takes three (3) or more years. Skilled workers can read blueprints, set up machines, and plan work sequences.

Important Qualities of a Woodworker

According to woodwork occupational outlook hand book, the importance quality of a woodworker cannot be over emphasized. A woodworker must be:

Detail oriented: Woodworkers must pay attention to details to be certain that the products meet specifications and to keep themselves safe.

Dexterity**:** Woodworkers must make precise cuts with a variety of saws, so they need a steady hand and good hand-eye coordination.

Math skills**:** Knowledge of basic math and computer skills are important, particularly for those who work in manufacturing, where technology continues to advance. Woodworkers need to understand geometry to visualize how the wood pieces will fit together to make a 3-dimensional object, such as a cabinet or piece of furniture.

Mechanical skills**:** Modern technology systems require woodworkers be able to use programmable devices, computers, and robots on the factory floor.

Physical strength**:** Woodworkers must be strong enough to lift bulky and heavy sheets of wood, such as plywood.

Stamina**:** The ability to endure long periods of standing and repetitious movements is crucial for woodworkers, as they often stand for extended periods when manufacturing parts and products.

Technical skills**:** Woodworkers must be able to understand blueprints and technical manuals for a range of products and machines.

Troubleshooting skills**:** To avoid unnecessary and costly waste, woodworkers must recognize mistakes during the manufacturing or finishing process.

Occupations in woodwork

Woodworkers are craftsmen who can channel their appreciation for working with wood. Operating in production environments or as independent contractors working on

small- and large-scale construction of wood products as carpenters, cabinet makers or finishers, woodworkers have diverse opportunities in this traditional craft.

Woodworkers create and repair items crafted from various sorts of lumber. As a woodworker, some of the pieces you create may include small or large furniture pieces, cabinets or wood musical instruments. While many of these products are mass produced, there are still many products crafted in small shops as well as large manufacturing operations. With modern technology, woodworking tools are primarily power tools and numerical control machines uses to cut or shape lumber in factories. Computerized equipment improves production speed and capabilities requiring advanced technical skill, but an appreciation for traditional woodworking tools and understanding of the various types of lumber and smoothing or shaping techniques are still valuable. In the production woodworker role is to set up and operate various woodworking machines including power saws, planers, sanders, lathes, jointers and routers to cut and shape pieces from wood products. With experience and broad skills.

Despite the abundance of plastics, metals, and other materials, wood products continue to be an important part of our daily lives. Woodworkers make wood products, using lumber and synthetic wood materials. Many of these products are mass produced including most furniture, kitchen cabinets, and musical instruments. Other products are custom made with specialized tools in small shops.

Although the term “woodworker” may evoke the image of a craftsman who builds ornate furniture using hand tools, the modern woodworking trade is highly technical and relies on advanced equipment and highly skilled operators. Wood workers use automated machinery such as computerized numerical control (CNC) machines to do much of the work. Even specialized artisans generally use a variety of power tools in their work. Much

of the work is done in a high-production assembly line facility but there is also some work that is customized and does not lend itself to being made in an assembly line. Woodworkers are employed in wood product industry, from sawmill to finished product and their activities vary. Woodworkers set up, operate, and use all types of woodworking machines, such as drill presses, lathes, shapers, routers, sanders, planers and wood-nailing machines. Operators set up the equipment, cut and shape wooden parts and verify dimensions using a template, calliper and rule. After wood parts are made, woodworkers add fasteners and adhesives and connect the pieces to form a complete unit. They sand, stain, and if necessary, coat the wood product with a sealer such as a lacquer or varnish.

Many of these tasks are handled by different wood workers with specialized training.

The following are types of woodworkers: According to woodwork occupational outlook hand book.

Cabinetmakers cut, shape, assemble, and make parts for wood products. They often design and create sets of cabinets that are customized for particular spaces. In some cases, their duties begin with designing a set of cabinets to specifications and end with installing them.

Furniture finishers shape, finish, and refinish damaged and worn furniture. They often work with antiques and must judge how to best preserve and repair them. They also do the staining and sealing at the end of the process of making wooden products.

Wood sawing machine setters, operators, and tenders specialize in operating specific pieces of woodworking machinery. They often operate computerized numerical control (CNC) machines.

Woodworking machine setters, operators, and tenders, except sawing, operate woodworking machines, such as drill presses, lathes, routers, sanders, and planers.

After high school, most woodworkers are trained on the job, learning from more experienced workers.

Woodwork Training Facilities in Technical Colleges

Training facilities in this study refers to all items used in technical College courses such as machines, tools, workshop, materials, text books and libraries. Many nations of the world have recognised the necessity of providing functionary education to their youths in a committed effort to achieve and sustain individual national development and productivity.

Functional technical education requires the manipulation of tools and equipments to acquire the necessary skill in the training programme. When the community or nation is serious about developing its viable technology education, then there must be a recognition and provision of necessary and relevant training facilities. FRN (1981) stated that government is aware of limited facilities existing for technology teacher's education and a conscious effort should be made to expand the facilities for training. The government has since realised the poor state of training facilities in our schools where the foundation for technology based development ought to be laid.

Olaitan (1988) reiterated the shortage of tools and equipments for the effective teaching of vocational technical education students for adequate occupation habits and skills. Similarly Osemekain (1997) observed that the approach to imparting a technical knowledge in our technical school is too abstract due to the acute storage of various infrastructural facilities necessary for dissemination of skills training in crafts and training. Thus the culture of training in the application of technical education to technical problem has continued to elude our technical schools student. Availability of adequate training facilities in technical education as observed by salihu (1998) will arouse the interest of the students while lack of it will discourage students in technical education programmes.

According to Nzelum (1993) building a well equipped workshop are of paramount importance because of the practical oriented nature of the programme. This presupposes it to give training and impact the necessary skills to the students. However, for these objectives to be achieved there must be well equipped workshops. It is an obvious truth that the realization of the objectives of technical education depends on a large extent on the availability of equipment and materials for teaching. One of the major problems facing technical education in the federation is in adequate technical equipment (Aina 1991). Lack of and poor training equipment constitute a serious drawback to the development of technical education. Lack of adequate workshops and tools could result in production of unskilled students and incompetent craftsmen.

A Woodworking machine is a machine that is intended to process wood. These machines are usually powered by electric motors and are used extensively in woodworking. Sometimes grinding machines (for grinding woodworking tools) are also considered a part of woodworking machinery. (Wikipedia, 2012).

Types of woodworking machinery

These machines are used both in small-scale commercial production of timber products and by hobbyists. Most of these machines may be used on solid timber and on composite products. Machines can be divided into the bigger stationary machines where the machine remains stationary while the material is moved over the machine, and hand-held power tools, where the tool is moved over the material.

Hand-held power tools: This hand-held includes Biscuit, Domino, Chain, Hand-held circular saw, Electric drill, Jig saw, Mitre saw, Nail gunhand-held electric plane, Reciprocating saw, Rotary tool, Router, Hand-held sanders, including belt sander, orbital sander, random orbit sander

Stationary machines: This stationary machine includes Bandsaw, Combination machine. Double side planer, Drill press, Drum sander, Bench grinder, Jointer, Wood lathe, Mortiser, Panel saw, router, Radial, Scroll saw, Spindle moulder (Wood shaper),Stationary sanders, including stroke sanders, oscillating spindle sander, belt sander, disc sander (and combination disc-belt sander).,Table saw,Tenoner or tenoning machine,Thicknesser or Thickness planer, Round, Round(Free Wikipedia 2012)

Woodwork Hand tools: This includes hammer, hand saw, screw drivers, plies, hand planer, jigsaw, sscraper, pincer, pliers, spanner, jacksaw, steel square, cutters, scissors, punch file (Wikipedia 2012).

Summary of literature reviewed

The review of the related literature revealed that Vocational and Technical Education started in Nigeria in 1909 which brings about, among other things technical changes in science, industry and Agriculture that utilizes scientific knowledge in the solution of problems to prepare person for employment. The review also went further on the evaluation of Vocational and Technical Education.

The chapter also revealed the importance of practical skill development as a baseline for assessing the quality of craftsmen in technical schools in Nigeria. It also highlighted the occupations in woodwork in the production of qualitative and effective craftsmen needed for economic development of Niger state and the chapter finally discussed the state of training facilities in technical schools in Niger state.

CHAPTER III

METHODOLOGY

This chapter described the procedure used in the course of the study. Thus, the research design, area of the study, population of the study, the sampling size and technique, instrument for data collection, validation of instrument, administration of instrument and method of data analysis.

Research Design

In carrying out this study, the descriptive survey approach was used. Yalams and Ndomi (2000) define survey research as the gathering of information about a large number of people or objects by studying a representative sample of the entire group through the use of questionnaires. In support of this, Nworgu, (1991) stated that research design is a plan or blue print which specifies how data relating to a given problem should be collected and analyzed. Therefore, the survey research was considered suitable since the study sought information from the sample that was drawn from a population using a questionnaire.

Area of the Study

The study was conducted in Niger State.

Population of the study

The target population for this study was made up of 137 Woodwork Craftsmen and 7 Heads of Woodwork section in technical colleges in Niger State.

Table 1: Shows the target population of Woodwork Craftsmen and Woodwork head of section within the selected technical colleges in Niger State.

N_1= 7, N_2= 105

S/ NO	NAME OF TECHNICAL COLLEGES	WOODWORK CRAFTMEN	WOODWORK HEADS OF SECTION
1	Government Technical College, Minna.	**38**	**1**
2	Government Technical College Eyagi, Bida.	**22**	**1**
3	Government Technical College,	**12**	**1**

	Kontagora		
4	Government Technical College, New Bussa	**18**	**1**
5	Suleman Barau Technical College, Suleja	**10**	**1**
6	Maman Kontagora Technical College, Pandogari	**16**	**1**
7	Federal Technical College, kuta	**21**	**1**
	TOTAL	**137**	**7**

Sample size and sampling techniques

A Simple Random Sampling (SRS) was employed in the selection of Woodwork Craftsmen and Heads of Woodwork section in technical colleges in Niger State giving the total of one hundred and twelve (112) respondents. The sample of the study is made up of one technical college in zone A, four technical colleges in zone B and two technical colleges in zone C of Niger State. This method was used to give every technical college in the population equal chance of being selected into the sample.

Table 2: Shows the sample of the population on of Woodwork Craftsmen and Head of Woodwork section in technical colleges within the selected area in Niger State.

N_1= 7, N_2= 105

S/ NO	NAME OF TECHNICAL COLLEGES	WOODWORK CRAFTSMEN	WOODWORK HEADS OF SECTION
1	Government Technical College, Minna.	**29**	**1**
2	Government Technical College, Eyagi Bida.	**17**	**1**
3	Government Technical College, Kontagora	**9**	**1**
4	Government Technical College, New	**14**	**1**

	Bussa		
5	Suleman Barau Technical College, Suleja	**8**	**1**
6	Maman Kontagora Technical College, Pandogari	**12**	**1**
7	Federal Technical College, kuta	**16**	**1**
	TOTAL	**105**	**7**

Instrument for Data Collection

The instrument used for data collection was a structured questionnaire developed by the researcher for this study. It consisted of two (2) parts in which the first indicate the introductory part of the respondents and the second part is divided into four sections A, B, C and D. All items were responded to the items by indicating the appropriate respondent's best perception using four point rating scales. Section A contains (15) items which deals with the level of skilfulness of woodworking craftsmen produced by Niger State Technical Colleges in using Woodworking Machines. Section B also contains (8) items which deals with the level of skilfulness of woodworking craftsmen produced by Niger State Technical Colleges in using Consumable Materials. Section C contains (16) items which deals with the Woodworking hand tools used effectively by Woodwork Craftsmen Produced by Niger State Technical Colleges. Section D contains (9) items which deals with the level of skilfulness of woodworking craftsmen in using Maintenance Equipments.

Validation of Instrument

The instrument for the data collection was designed by the researcher and was validated by (3) Lecturers, two(2) from Industrial and Technology Education Department in Woodwork Technology option and the other from the department of Woodwork

Technology, in Niger State College of Education Minna to ascertain the appropriateness of questionnaire items before administering it to respondents.

Administration of the Instrument

The instrument for the study was administered to the respondents by the researcher through the help of one research assistant from each school which was later collected through the research assistant.

Method of Data Analysis

The data were analyzed using mean and hypotheses were tested using t- test statistics. The mean was used to determine the degree of acceptance or rejection of questionnaire items, while t- test was used to test the hypotheses at 0.05 level of significance.

Decision Rule

The mean of 2.50 was used as decision point for every questionnaire item. Consequently, any item with a mean response of 2.50 and above was considered agreed and any item with a mean response of 2.49 and below was equally considered as disagreed in Section A, B, C and D respectively. Also the t- test was used to test the hypothesis at 0.05 level of significant to compare the mean response of the groups. A critical value of ±1.96 was used based on the degree of freedom at 0.05 level of significant. Therefore, any item with t- calculated value less than the critical value was regarded as not significant. While any item with calculated value equal or greater than the critical value was regarded as significant.

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

This chapter deals with the presentation and analysis of data with respect to the research questions and hypothesis formulated for the study.

Research Question I

What are the levels of skillfulness of woodwork craftsmen produced by Niger state technical colleges in using woodworking machines?

Table 3: Mean responses of the levels of skillfulness of woodwork craftsmen produced by Niger state technical colleges in using woodworking machines

N_1 = 7, N_2 = 105

S/NO	ITEMS	$\bar{X}_1$	$\bar{X}_2$	$\bar{X}_T$	REMARK
1.	Woodwork craftsmen use Drilling machine for boring hole on a wood surface accurately	3.00	2.23	2.62	Agreed
2.	Woodwork craftsmen use Bandsaw machine for making curve shapes on wood surface perfectly	2.14	2.36	2.25	Disagreed
3.	Woodwork craftsmen use Jigsaw machine for making curved shapes on wood surface accurately	2.57	2.45	2.51	Agreed
4.	Woodwork craftsmen use Circular saw machine for ripping wood perfectly	2.28	2.70	2.49	Disagreed
5.	Woodwork craftsmen use Thicknesser machine for reducing the size of a piece of wood accurately	2.57	2.34	2.46	Disagreed
6.	Wood work craftsmen used Mortising machine for making mortise joint on wood perfectly	1.71	2.20	1.96	Disagreed
7.	Woodwork craftsmen use Tenoning machine for making tenon joints on wood perfectly	1.86	2.19	2.03	Disagreed
8.	Woodwork craftsmen used Planning machine for planning wood surfaces accurately	2.71	2.73	2.72	Agreed
9.	Woodwork craftsmen use Wood Lathe machine for cutting wood perfectly	1.43	2.29	1.86	Disagreed
10.	Woodwork craftsmen use Wood Lathe machine for sanding wood surfaces accurately	1.43	2.08	1.76	Disagreed
11.	Woodwork craftsmen use Jointer machine to produce a flat surface along board's length accurately	1.57	2.19	1.88	Disagreed
12.	Woodwork craftsmen use Panel saw machine for cutting plywood into cabinet components perfectly	2.43	2.43	2.43	Disagreed
13.	Woodwork craftsmen use Radial arm saw machine for cutting stock in to pieces accurately	1.71	2.23	1.97	Disagreed
14.	Woodwork craftsmen use bench grinder machine for grinding knives and cutters perfectly	2.00	2.35	2.18	Disagreed
15.	Woodwork craftsmen use Nail gun machine to drive nail into wood	1.71	2.40	2.06	Disagreed

Key: N_1 = Woodwork Head of sections, N_2 = Woodwork Craftsmen, $\bar{X}_1$ = Mean of response of Woodwork Head of sections, $\bar{X}_2$ = Mean of response of Woodwork Craftsmen, $\bar{X}_t$ = Average mean of responses of the levels of skilfulness of woodwork craftsmen produced by Niger state technical colleges in using woodworking machines.

The analysis of mean responses of the two groups of respondents from table 3 revealed that the item 1, 3 and 8 under this sub-heading are rated as agreed with mean score ranging

between 1.76- 2.62 respectively. This signifies that the levels of skilfulness of woodwork craftsmen produced by Niger state technical colleges in using woodworking machines are appropriate.

Research Question II

What are the levels of skillfulness of woodwork craftsmen produced by Niger state technical colleges in using consumable materials?

Table 4: Mean responses of the levels of skillfulness of woodwork craftsmen produced by Niger state technical colleges in using consumable materials.

N_1 = 7, N_2 = 105

S/NO	ITEMS	$\bar{X}_1$	$\bar{X}_2$	$\bar{X}_T$	REMARK
1.	Woodwork craftsmen applies glue on wood surfaces to be joined very well	3.14	3.18	3.16	Agreed
2.	Woodwork craftsmen applies Sanding sealer on wood surface for finishing process perfectly	2.71	3.46	3.09	Agreed
3.	Woodwork craftsmen use Glass paper for smoothing wood surface perfectly	3.00	2.72	2.86	Agreed
4.	Woodwork craftsmen use formica to cover wood surface perfectly	2.71	2.03	2.37	Disagreed
5.	Woodwork craftsmen fixes Hinges to door and cabinets perfectly	3.29	3.54	3.42	Agreed
6.	Woodwork craftsmen Nails wood during rafter construction perfectly	2.86	3.26	3.06	Agreed
7.	Woodwork craftsmen uses furniture materials perfectly	3.00	2.38	2.69	Agreed
8.	Woodwork craftsmen select the right type of fabric material for upholstery work perfectly	3.00	2.37	2.69	Agreed

Key: N_1 = Woodwork Head of sections, N_2 = Woodwork Craftsmen, $\bar{X}_1$ = Mean of response of Woodwork Head of sections, $\bar{X}_2$ = Mean of response of Woodwork Craftsmen, $\bar{X}_t$ = Average mean of responses of the levels of skilfulness of woodwork craftsmen produced by Niger state technical colleges in using consumable materials.

The analysis of mean responses of the two groups of respondents from table 4 revealed that the items under this sub-heading are rated as agreed with mean score ranging between 2.69- 3.09 respectively. This signifies that the levels of skilfulness of woodwork craftsmen produced by Niger state technical colleges in using woodworking machines are appropriate.

Research Question III

Which of the woodworking hand tools are effectively used by woodwork craftsmen produced by Niger state technical colleges?

Table 5: Mean responses of the woodworking hand tools effectively used by woodwork craftsmen produced by Niger state technical colleges.

N_1 = 7, N_2 = 105

S/NO	ITEMS	$\bar{X}_1$	$\bar{X}_2$	$\bar{X}_t$	REMARK
1.	Hammer	4.00	3.86	3.93	Agreed
2.	Screw drivers	2.71	2.63	2.67	Agreed
3.	Hand planner	3.29	3.38	3.34	Agreed
4.	Jig saw	3.29	3.86	3.58	Agreed
5.	Scraper	3.00	2.00	2.50	Agreed
6.	Pincer	3.43	2.72	3.08	Agreed
7.	Pliers	2.57	2.31	2.44	Agreed
8.	Spanner	2.43	2.40	2.42	Agreed
9.	Jack saw	3.43	3.67	3.55	Agreed
10.	Steel square	3.57	2.60	3.09	Agreed
11.	Cutter	3.29	2.12	2.71	Agreed
12.	Scissors	3.43	2.33	2.88	Agreed
13.	Punch	3.00	2.11	2.56	Agreed
14.	File	3.29	2.39	2.84	Agreed
15.	Hand planes	3.71	3.41	3.56	Agreed
16.	Hand saws	3.71	3.86	3.79	Agreed

Key: N_1 = Woodwork Head of sections, N_2 = Woodwork Craftsmen, $\bar{X}_1$ = Mean of response of Woodwork Head of sections, $\bar{X}_2$ = Mean of response of Woodwork Craftsmen, $\bar{X}_t$ = Average mean of responses of the woodworking hand tools are effectively used by woodwork craftsmen produced by Niger state technical colleges.

The analysis of mean responses of the two groups of respondents from table 5 revealed that the items under this sub-heading are rated as agreed with mean score ranging between 2.44- 3.93 respectively. This signifies that the woodworking hands tools are effectively used by woodwork craftsmen produced by Niger state technical colleges are appropriate.

Research Question IV

What are the levels of skillfulness of woodwork craftsmen produced by Niger state technical colleges in using maintenance equipment?

Table 6: Mean responses of the levels of skillfulness of woodwork craftsmen produced by Niger state technical colleges in using maintenance equipment.

N_1 = 7, N_2 = 105

S/NO	ITEMS	$\bar{X}_1$	$\bar{X}_2$	$\bar{X}_T$	REMARK
1.	Woodwork craftsmen lubricate cutting blades using Oil Can very well	2.29	2.56	2.43	Disagreed
2.	Woodwork craftsmen grease chains and sprockets with grease gun perfectly	2.00	2.55	2.28	Disagreed
3.	Woodwork craftsmen tighten all loose nuts and bolts with spanner correctly	2.14	2.47	2.31	Disagreed
4.	Woodwork craftsmen covered exposed wires with insulation tapes perfectly	2.00	2.52	2.26	Disagreed
5.	Woodwork craftsmen remove sawdust inside the upper and lower wheel of band saw with brush very well	2.43	2.77	2.60	Agreed
6.	Woodwork craftsmen sharpen bits of the electrical hand drill with scrapper perfectly	2.29	2.30	2.30	Disagreed
7	Woodwork craftsmen removed all chips from Thicknessing machine with brush perfectly	2.00	2.26	2.13	Disagreed
8	Woodwork craftsmen lubricate the shaft of a jointer that carries the fence for easy movement with grease very well	2.14	2.66	2.40	Disagreed
9	Woodwork craftsmen lubricate all the nipples of a band saw machine with grease gun perfectly	1.71	2.33	2.02	Disagreed

Key: N_1 = Woodwork Head of sections, N_2 = Woodwork Craftsmen, $\bar{X}_1$ = Mean of response of Woodwork Head of sections, $\bar{X}_2$ = Mean of response of Woodwork Craftsmen, $\bar{X}_t$ = Average mean of responses of the levels of skilfulness of woodwork craftsmen produced by Niger state technical colleges in using maintenance equipment.

The analysis of mean responses of the two groups of respondents from table 6 revealed that the item 5 under this sub-heading is rated as agreed with mean score ranging between 2.44- 3.93 respectively. This signifies that the levels of skilfulness of woodwork craftsmen produced by Niger state technical colleges in using maintenance equipment are appropriate.

Hypothesis I

HO_1: There is no statistical significance difference between the mean responses of respondents on the levels of skilfulness of woodwork craftsmen and Head of sections in using woodworking machines.

The result of the test of significance difference in mean responses of respondents on the levels of skilfulness of woodwork craftsmen and Head of sections in using woodworking machines is presented in Table 7

Table 7: T– test statistical Analysis of the levels of skilfulness of woodwork craftsmen and Head of sections in using woodworking machines.

$N_1 = 7$, $N_2 = 105$

S/NO	ITEMS	SD_1	SD_2	t- cal	REMARK
1.	Woodwork craftsmen use Drilling machine for boring hole on a wood surface accurately	1.07	0.39	1.90	S
2.	Woodwork craftsmen use Bandsaw machine for making curve shapes on wood surface perfectly	1.12	0.98	- 0.42	NS
3.	Woodwork craftsmen use Jigsaw machine for making curved shapes on wood surface accurately	1.40	1.17	0.19	NS
4.	Woodwork craftsmen use Circular saw machine for ripping wood perfectly	0.88	1.10	- 0.19	NS
5.	Woodwork craftsmen use Thicknesser machine for reducing the size of a piece of wood accurately	0.50	1.13	0.77	NS
6.	Wood work craftsmen used Mortising machine for making mortise joint on wood perfectly	0.88	1.20	-1.09	NS
7.	Woodwork craftsmen use Tenoning machine for making tenon joints on wood perfectly	0.99	1.13	- 0.69	NS
8.	Woodwork craftsmen used Planning machine for planning wood surfaces accurately	0.70	1.15	- 0.05	NS
9.	Woodwork craftsmen use Wood Lathe machine for cutting wood perfectly	1.05	1.12	- 1.69	NS
10.	Woodwork craftsmen use Wood Lathe machine for sanding wood surfaces accurately	0.49	1.03	- 2.24	S
11.	Woodwork craftsmen use Jointer machine to produce a flat surface along	0.73	1.17	- 1.59	NS

	board's length accurately				
12.	Woodwork craftsmen use Panel saw machine for cutting plywood into cabinet components perfectly	0.90	1.04	0.00	NS
13.	Woodwork craftsmen use Radial arm saw machine for cutting stock in to pieces accurately	0.88	1.07	- 1.18	NS
14.	Woodwork craftsmen use bench grinder machine for grinding knives and cutters perfectly	1.20	1.06	- 0.63	NS
15.	Woodwork craftsmen use Nail gun machine to drive nail into wood	0.88	1.05	- 1.57	NS

Key: N_1 = Woodwork Head of sections, N_2 = Woodwork Craftsmen, SD_1 = Standard Deviation Mean of response of Woodwork Head of sections, SD_2= Standard Deviation Mean of response of Woodwork Craftsmen, S= Significant, NS= Not significant, t-cal= t calculated

Table 7: revealed that the t –test accept the null hypothesis only at items 2, 3, 4, 5, 7, 9, 11,12,13,14 and 15 respectively at 0.05 level of significance. Meaning that there is no statistical significance difference between the mean responses of respondents on the levels of skilfulness of the woodwork craftsmen and Head of section in using woodworking machines.

Hypothesis II

HO_2: There is no statistical significance difference between the mean responses of the level of skilfulness of the woodwork craftsmen and Head of woodwork section in using woodworking hand tools.

Table 8: T– test statistical Analysis of the levels of skilfulness woodwork craftsmen and Head of woodwork section in using woodworking hand tools.

N_1 = 7, N_2 = 105

S/NO	ITEMS	SD_1	SD_2	t- cal	REMARK
1.	Hammer	0.00	0.35	4.67	S
2.	Screw drivers	0.70	1.19	0.21	NS
3.	Hand planner	1.03	0.81	- 2.32	S

4.	Jig saw	0.45	0.35	- 7.85	S
5.	Scraper	0.64	1.03	2.94	S
6.	Pincer	0.49	1.15	2.37	S
7.	Pliers	0.73	1.03	0.68	NS
8.	Spanner	0.73	0.98	0.08	NS
9.	Jack saw	1.05	0.47	- 0.55	NS
10.	Steel square	0.49	1.11	3.34	S
11.	Cutter	0.45	0.98	4.33	S
12.	Scissors	0.49	0.93	3.93	S
13.	Punch	0.53	0.79	3.18	S
14.	File	0.45	0.73	3.75	S
15.	Hand planes	0.45	0.81	1.20	NS
16.	Hand saws	0.45	0.35	-0.75	NS

Key: N_1 = Woodwork Head of sections, N_2 = Woodwork Craftsmen, SD_1 = Standard Deviation Mean of response of Woodwork Head of sections, SD_2 = Standard Deviation Mean of response of Woodwork Craftsmen, S= Significant, NS= Not significant, t- cal= t calculated

Table 8: revealed that the t –test accept the null hypothesis only at items 2, 7, 8, 9, 15 and 16 respectively at 0.05 level of significance. Meaning that there is no statistical significance difference between the mean responses of respondents on the levels of skilfulness of the woodwork craftsmen and Head of section in using woodworking hand tools.

Findings

Findings of the study are stated based on the data collected and analyzed according to the research questions posed for the study.

Findings related to the level of skilfulness of Woodwork Craftsmen produced by Niger state Technical Colleges in using woodworking machines.

1. Woodwork craftsmen used Drilling machine for boring hole on a wood surface accurately
2. Woodwork craftsmen used Circular saw machine for ripping wood perfectly
3. Woodwork craftsmen used Wood Lathe machine for cutting wood perfectly
4. Woodwork craftsmen used Planning machine for planning wood surfaces accurately

Findings related to the effectiveness use of woodworking hand tools by woodwork craftsmen produced by Niger state technical colleges

1. Hammer
2. Hand planner
3. Pincer
4. Steel square
5. Hand saw

Discussion of Findings

The discussion of findings is based on the research questions posed for the study by the hypothesis.

The findings of the study indicated that Woodwork craftsmen used drilling machine for boring hole on a wood surface inaccurately because they fail to use the tip of the pilot pin to determine the center of the hole to be drilled, turn the arms to start drilling and apply only a slight and regular pressure when the hole cutter touch the wood; the drilling performance does not improve by putting more pressure on the tool. Too much pressure will overload the motor and the hole cutter will be worn sooner. They also fail to wear protective clothing's like the nose mask, safety goggles, and ear muffs, among others. This is considered an ignorantly risk behavior on the path of the craftsmen and it tends to undermine safety measures that might have put in place towards ensuring and promoting health safety in the workshop. The safety lives of personnel and the safeguarding of school workshop property from damage cannot be guaranteed in an atmosphere of high disregard for occupational health and safety standards and regulations (OSH, 2005).

On planning machines for planning wood surfaces, the findings of the study indicated that the Woodwork craftsmen used the planner accurately because grain considerations is

put in place when planning wood along its side grain which result in thin shavings rising above the surface of the wood as the edge of the plane iron is pushed forward, leaving a smooth surface. This is largely a matter of cutting with the grain or against the grain respectively, referring to the side grain of the piece of wood being worked. The grain direction can be determined by looking at the edge or side of the work piece. Wood fibers can be seen running out to the surface that is being planned. Woods, the grain runs in many directions and therefore working against the grain is inevitable. In this case, a very sharp and finely-set blade is required. When planning against the grain, the wood fibers are lifted by the plane iron, resulting in a jagged finish, called tear out. Planning against the grain in this manner is sometimes called "traverse" or "transverse" planning. Planning the end grain of the board involves different techniques, and frequently different planes designed for working end grain. Planes with the iron bedded at a "low angle," typically about 12 degrees, are often used for planning end grain.

The findings also indicated that wooden lathes are used to turn pieces of wood for carving bowls, spindles and furniture legs. After the wood has been carved on the lathe, it should be rough and finish sanded. Sanding on wood lathe is similar to the idea of a belt sander, but instead the wood moves and the sanding surface is stationary. If proper safety precautions are taken, sanding on a lathe is a breeze. Put on your safety glasses and dust mask. You may also wish to wear a pair of work gloves. Remove the tool rest from the lathe. Slide the piece of wood onto the lathe and clamp it down tightly. Turn on the lathe at a slow speed to start spinning the piece of wood. Fold the sandpaper into thirds and place a piece of steel wool between the sandpaper and your hands. This trick not only helps you to hold the sandpaper, but it also protects your fingers from the friction of sanding on a lathe. Use the piece of sandpaper to begin sanding at one end. If you are left-handed, start at the right end and vice versa. This makes it easier to work from one end of the piece to the

other. Slightly touch the sandpaper to the area you wish to smooth. Keep the sandpaper still while the piece of wood turns and smooth's away any rough edges. Sand the entire piece, slowly moving the sandpaper from one end to the other. Turn off the lathe, if you wish, to check your progress. Continue until you have completely sanded the entire project. Finish the piece with stain or polyurethane as desired.

The findings also indicated that the Woodwork craftsmen used hammer to deliver an impact to an object driving nails, fitting parts and breaking up objects. Hammer is a basic tool that is used by the craftsmen and often designed for a specific purpose, and varies widely in their shape and structure. The usual features are handle and head, with most of the weight in the head. The basic design is hand-operated, but there are also many mechanically operated models for heavier uses, such as steam hammers.

A hand plane is a tool for shaping wood. When powered by electricity, the tool may be called a planer. Planes are used to flatten, reduce the thickness of, and impart a smooth surface to a rough piece of lumber or timber. Planning is used to produce horizontal, vertical, or inclined flat surfaces on work pieces usually too large for shaping. Special types of planes are designed to cut joints or decorative mouldings. Hand planes are generally the combination of a cutting edge, such as a sharpened metal plate, attached to a firm body, that when moved over a wood surface, take up relatively uniform shavings, by nature of the body riding on the 'high spots' in the wood, and also by providing a relatively constant angle to the cutting edge, render the planed surface very smooth. A cutter which extends below the bottom surface, or sole, of the plane slices off shavings of wood. A large, flat sole on a plane guides the cutter to remove only the highest parts of an imperfect surface, until, after several passes; the surface is flat and smooth.

The findings of the research also indicated that a pincer is a hand tool used in many situations where a mechanical advantage is required to pinch, cut or pull an object. Pincers

are first-class levers, but differ from pliers in that the concentration of force is either to a point, or to an edge perpendicular to the length of the tool. This allows pincers to be brought close to a surface, as is often required when working with nails. Carpenter's pincers are particularly suited to these tasks. Pincer is primarily used for removing objects out of a material that they have been previously applied to.

The steel square is a tool that carpenters use. They use many tools to lay out a "square" or right-angle, many of which are made of steel, but the title steel square refers to a specific long-armed square that has additional uses for measurement, especially of angles, as well as simple right-angles. Today the steel square is more commonly referred to as the framing square. It consists of a long arm and a shorter one, which meet at an angle of 90 degrees (a right angle). The steel square has many uses, including laying out common rafters, hip rafters and stairs. It has a diagonal scale, board foot scale and an octagonal scale. On the newer framing squares there are degree conversions for different pitches and fractional equivalents. Cave (1986) described skill as the acquisition of knowledge such as ability, techniques or learning experience which leads to doing and making or performing things.

The research findings also indicated that hand saws are used to cut pieces of wood into different shapes. This is usually done in order to join the pieces together and create a wooden object. They usually operate by having a series of sharp points of some substance that is harder than the wood being cut (Michael 1996), Saws can also be considered 'pull cut' or 'push cut'.

CHAPTER V

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter presents summary, conclusion, recommendations and suggestions for further study

Summary of Procedure

The total population of the study was made of 112 respondents, a breakdown of the population showed 29 craftsmen in Government Technical College, Minna, 17 in Government Technical College, Eyagi Bida, 9 in Government Technical College, Kontagora, 14 in Government Technical College, New Bussa, 8 in Suleman Barau Technical College, Suleja, 12 in Maman Kontagora Technical College, Pandogari,16 in Federal Technical College, Kuta while 7 head of section each were selected from the seven Technical colleges in Niger State respectively which made a total of 7 head of section.

The purpose of the study is to evaluate the woodwork craftsmen produced by technical colleges in Niger State Specifically, this study sought to find out: the level of skillfulness of woodwork craftsmen in using woodworking machines, the level of skilfulness of woodwork craftsmen in using consumable materials, determine the dexterity in the use of woodworking hand tools by woodwork craftsmen and the level of skilfulness of woodwork craftsmen in using maintenance equipment.

A structured questionnaire comprising of section A-D was used for gathering the data with a total of 48 items. The items were given to three experts in the industrial Technology Education Department of Federal University of Technology Minna for validation. The data collected were analyzed using standard deviation, mean and t-test. The research questions were formulated and answered and the following findings based on the research questions posed on the study by the hypothesis; woodwork craftsmen used drilling machine for boring hole on a wood surface accurately, they also used circular saw machine for ripping wood perfectly, lathe machine for cutting wood perfectly, Hand planner, pincer and steel square.

Implication of Study

The findings of this study have far reaching implications for woodwork craftsmen, trainees and government. From the result of data analyzed, interpretation and discussion, some pertinent implication have emerged. Woodwork head of sections should always endeavour to train the woodwork craftsmen well in terms of skill, knowledge and technique with the new modern machines, tools and the safety precautions in the operation .when woodwork craftsmen acquire skills using modern equipment and materials, they contribute to economic and technological development of the nation.

Conclusion

In conclusion, the study on the evaluation of woodwork craftsmen produced by Technical Colleges in Niger State plays a vital role to discover, that most of the Technical colleges in Niger State lacks machines and tools in woodwork workshops which lead to low skilled acquisition.

Recommendations

1. The Federal and State Government should partake in the effort to improve the teaching of woodwork in Technical Colleges.
2. The Federal and State Government should make adequate provisions of tools and machine in Technical Colleges.
3. The Niger State Government should Involve Companies in the state that would contribute skill acquisition by students in Technical Colleges.

Suggestions for further research

Based on the findings of this research study; the following suggestions were made for the study:-

1. Assessment of the quality of woodwork craftsmen in Niger State Technical colleges.

2. Strategies for the teaching of woodwork in Niger state Technical colleges

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APPENDIX B: QUESTIONNAIRE

FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA

SCHOOL OF SCIENCE AND SCIENCE EDUCATION

DEPARTMENT OF INDUSTRIAL AND TECHNOLOGY EDUCATION

QUESTIONNAIRE FOR THE EVALUATION OF WOODWORK CRAFTSMEN PRODUCED BY TECHNICAL COLLEGES IN NIGER STATE

PART ONE

Introduction: This research work is to evaluate the Woodwork Craftsmen Produced by Technical Colleges in Niger State.

Please kindly complete this questionnaire by ticking (√) the column that represents your perception about the above topic, marking the options that are closest to your experience. Be as honest as you can. All information provided will be highly confidential and strictly used for the purpose of this research work.

Woodwork Craftsmen ☐

Woodwork Head of section ☐

Gender. Male ☐ Female ☐

Teaching experience. 1-5years ☐ 6-10years ☐ 11-15years ☐ 20years and above ☐

Place of work: ☐

☐

A four (4) point rating scale is used to indicate your opinion as stated below:-

Strongly Agreed (SA)

Agreed (A)

Strongly Disagreed (SD)

Disagreed (D)

PART TWO

SECTION A

What are the levels of skillfulness of woodwork craftsmen produced by Niger state technical colleges in using woodworking machines?

S/NO	ITEMS	SA	A	SD	D
1.	Woodwork craftsmen use Drilling machine for boring hole on a wood surface accurately				
2.	Woodwork craftsmen use Bandsaw machine for making curve shapes on wood surface perfectly				
3.	Woodwork craftsmen use Jigsaw machine for making curved shapes on wood surface accurately				
4.	Woodwork craftsmen use Circular saw machine for ripping wood perfectly				
5.	Woodwork craftsmen use Thicknesser machine for reducing the size of a piece of wood accurately				
6.	Wood work craftsmen used Mortising machine for making mortise joint on wood perfectly				
7.	Woodwork craftsmen use Tenoning machine for making tenon joints on wood perfectly				
8.	Woodwork craftsmen used Planning machine for planning wood surfaces accurately				
9.	Woodwork craftsmen use Wood Lathe machine for cutting wood perfectly				
10.	Woodwork craftsmen use Wood Lathe machine for sanding wood surfaces accurately				
11.	Woodwork craftsmen use Jointer machine to produce a flat surface along board's length accurately				
12.	Woodwork craftsmen use Panel saw machine for cutting plywood into cabinet components perfectly				
13.	Woodwork craftsmen use Radial arm saw machine for cutting stock in to pieces accurately				
14.	Woodwork craftsmen use bench grinder machine for grinding knives and cutters perfectly				
15.	Woodwork craftsmen use Nail gun machine to drive nail into wood				

SECTION B

What are the levels of skillfulness of woodwork craftsmen produced by Niger state technical colleges in using consumable materials?

S/NO	ITEMS	SA	A	SD	D
16.	Woodwork craftsmen applies glue on wood surfaces to be joined very well				
17.	Woodwork craftsmen applies Sanding sealer on wood surface for finishing process perfectly				
18.	Woodwork craftsmen use Glass paper for smoothing wood surface perfectly				
19.	Woodwork craftsmen use formica to cover wood surface perfectly				
20.	Woodwork craftsmen fixes Hinges to door and cabinets perfectly				
21.	Woodwork craftsmen Nails wood during rafter construction perfectly				
22.	Woodwork craftsmen uses furniture materials perfectly				
23.	Woodwork craftsmen select the right type of fabric material for upholstery work perfectly				

SECTION C

Which of the woodworking hand tools are effectively used by woodwork craftsmen produced by Niger state technical colleges?

S/NO	ITEMS	SA	A	SD	D
24.	Hammer				
25.	Screw drivers				
26.	Hand planner				
27.	Jig saw				
28.	Scraper				
29.	Pincer				
30.	Pliers				
31.	Spanner				
32.	Jack saw				
33.	Steel square				
34.	Cutter				
35	Scissors				
36.	Punch				
37	File				
38.	Hand planes				
39	Hand saws				

SECTION D

What are the levels of skillfulness of woodwork craftsmen produced by Niger state technical colleges in using maintenance equipment?

S/NO	ITEMS	SA	A	SD	A
40.	Woodwork craftsmen lubricate cutting blades using Oil Can very well				
41.	Woodwork craftsmen grease chains and sprockets with grease gun perfectly				
42.	Woodwork craftsmen tighten all loose nuts and bolts with spanner correctly				
43.	Woodwork craftsmen covered exposed wires with insulation tapes perfectly				
44.	Woodwork craftsmen remove sawdust inside the upper and lower wheel of band saw with brush very well				
45.	Woodwork craftsmen sharpen bits of the electrical hand drill with scrapper perfectly				
46.	Woodwork craftsmen removed all chips from Thicknessing machine with brush perfectly				
47.	Woodwork craftsmen lubricate the shaft of a jointer that carries the fence for easy movement with grease very well				
48.	Woodwork craftsmen lubricate all the nipples of a Bandsaw machine with grease gun perfectly				

APPENDIX C

EVALUATION OF WOODWORK CRAFTSMEN PRODUCED BY TECHNICAL COLLEGES IN NIGER STATE

Table 1: the mean response of Woodwork Craftsmen

Responses	X	F	fX
Strongly Agree	4	19	76
Agree	3	16	48
Strongly Disagree	2	40	80
Disagree	1	30	30
		∑f = 105	**∑fX = 234**

MEAN ($\bar{X}$) = $\frac{\sum fX}{\sum f} = \frac{234}{105}$ = 2.23

Table 2: The mean of Woodwork Head of Section

Responses	X	f	fX
Strongly Agree	4	2	8
Agree	3	4	12
Strongly Disagree	2	0	0
Disagree	1	1	1
		∑f = 7	**∑fX = 21**

MEAN ($\bar{X}$) = $\frac{\sum fX}{\sum f} = \frac{21}{7}$ = 3.00

Table 3: Standard Deviation of Woodwork Craftsmen

Responses	**X**	**F**	**FX**	$(X - \bar{X})^2$	$f(X - \bar{X})^2$
Strongly Agree	4	19	76	(4 – 2.23) = 3.133	12.53
Agree	3	16	48	(3 – 2.23) = 0.593	1.78
Strongly Disagree	2	40	80	(2 – 2.23) = 0.053	0.11
Disagree	1	30	30	(1 – 2.23) = 1.512	1.51
		∑f = 105	**∑fX = 234**		**$\sum f(X - \bar{X})^2$ = 15.93**

Variance (S^2) given as $\frac{\sum f(X-\bar{X})2}{N-1}$

$(S^2) = \frac{15.93}{105-1}$

$(S^2) = \frac{15.93}{104}$

$(S^2) = 0.15$

Standard deviation = $(S.D_1) = \sqrt{s_1}$

$(S.D_1) = \sqrt{0.15}_1$

$= 0.39$

Table 4: Standard Deviation of Woodwork Head of Section

Responses	**X**	**F**	**fX**	$(X - \bar{X})^2$	$\mathbf{f}(X - \bar{X})^2$
Strongly Agree	4	2	8	(4 – 3.00) = 1.000	2.00
Agree	3	4	12	(3 – 3.00) = 0.000	0.00
Strongly Disagree	2	0	0	(2 – 3.00) = 1.000	2.00
Disagree	1	1	1	(1 – 3.00) = 4.000	4.00
		$\sum f = 7$	**$\sum fX = 21$**		**$\sum f(X - \bar{X})^2 = 8.00$**

Variance (S^2) given as $\frac{\sum f(X-\bar{X})2}{N}$

$(S^2) = \frac{8.00}{7}$

$(S^2) = \frac{8.00}{7}$

$(S^2) = 1.142$

Standard deviation = $(S.D_1) = \sqrt{s_1}$

$(S.D_1) = \sqrt{1.142}$

$= 1.07$

T – test

$$t - test = \frac{\overline{X1} - \overline{X2}}{\sqrt{\frac{S.D_1^2}{N_1} + \frac{S.D_2^2}{N_2}}}$$

$$t - test = \frac{3.00 - 2.23}{\sqrt{\frac{(1.07)^2}{7} + \frac{(0.39)^2}{105}}}$$

$$t - test = \frac{3.00 - 2.23}{\sqrt{0.164 + 0.001}}$$

$$t - test = \frac{0.77}{\sqrt{0.165}}$$

$$t - test = \frac{0.77}{0.406}$$

t-test = 1.90