GENDER DIFFERENCE IN THE PERFORMANCE OF BRICKLAYING AND BLOCKLAYING PRACTICAL SKILL AMONG STUDENTS IN TECHNICAL COLLEGES; A CASE STUDY OF NIGER STATE.

BY

ADISA SAMSON

2007/28636BT

DEPARTMENT OF INDISTRIAL AND TECHNOLOGY EDUCATION

FEDERAL UNIVERSITY OF TECHNOLOGY,

MINNA

OCTOBER, 2012

GENDER DIFFERENCE IN THE PERFORMANCE OF BRICKLAYING AND BLOCKLAYING PRACTICAL SKILL AMONG STUDENTS IN TECHNICAL COLLEGES; A CASE STUDY OF NIGER STATE.

BY

ADISA SAMSON

2007/28636BT

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

IN PARTIAL FULLFILLMENT OF THE REQUIREMENTS OF THE AWARD OF BARCHELOR OF TECHNOLOGY (B.TECH) IN INDUSTRIAL

AND TECHNOLOGY EDUCATION

OCTOBER, *2012*

CERTIFICATION

I, Adisa Samson matric number; 2007/28636BT an undergraduate student of the department of industrial technology education certify that the work embodied in this project is original and has not been submitted in part or full for any other diploma or degree of this or any other university.

_____ _____

Name Signature and Date

APPROVAL PAGE

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

_____	_____
Supervisor	Sign/Date
_____	_____
Head of Department	Sign/Date
_____	_____
External Examiner	Sign/Date

DEDICATION

This research work is dedicated to my late father Late Mr Thomas Adisa, my mother Mrs Dorcas Adisa and my younger ones Steven Adisa, Moses Adisa, Victoria Adisa, Blessing Adisa and Damilare Adisa.

ACKNOWLEDGEMENTS

Glory to God Almighty in the highest for His mercy, love and kindness over my life for the privilege and direction to be able to come up with this study. My sincere gratitude to my inspiring supervisor Mallam Ibrahim Dauda who out of his tight schedule supervised this work. His encouragement, immeasurable assistance, useful suggestions, criticism, source of inspiration and directives on this work proved very helpful in the process of writing this research work. May God reward and bless him abundantly (Amen). My profound gratitude goes to my reader Dr P.A. Omozokpia whose comments, corrections, thoughtful suggestions and editing of this work greatly improved the quality of this work. May the Lord reward Him accordingly (Amen). , Dr Williams Akanmu from the department of building, Federal University of Technology, Minna for his all the time fatherly advice, Mr Moses Saba, department of Industrial and Technology Education, Federal University of Technology, Minna who assisted me on the statistical analysis of my data despite his busy schedule, the Head teachers and the Laboratory Technicians of the four schools in which I conducted research, who not only allowed me to conduct my research in their schools but also provided me with the necessary facilities used in the building laboratories and as well organized their students for me.

I am grateful to Dr E.J. Ohize, the Head of Department Industrial and Technology Education, Federal University of Technology for his good leadership. May God continue to strengthen and see you through in Jesus name (Amen). My appreciation goes to my dear mother Mrs Dorcas Adisa for her prayers, encouragement and support through- out my academics. Also, I thank my younger ones for their understanding when preparing this work. I can never forget my wonderful uncle for his all the time financial support. May God bless you more abundantly in Jesus name (Amen). My acknowledgement is deficient if I fail to appreciate all my lecturers both in the

department of Industrial and Technology Education and other departmentS who in one way or the other have impacted knowledge on me, may God in His infinite mercy continue to give you more wisdom, knowledge and understanding in all your endeavor in Jesus name (Amen). I am thankful to my friends; Ezekiel Adedeji for his prayers and Ajayi Tolulope Mary for sparing her time for me over this research work thank you all and God bless you in Jesus Name (Amen).

ABSTRACT

The aim of this study was to determine if there were gender differences in the performance of bricklaying and blocklaying practical skill among students in technical colleges of Niger State. There are three research questions and three null hypothesis formulated to guide the study. The study participants were drawn from four mixed technical colleges in Niger State. A total of twenty-four (24) students were used consisting of twelve (12) boys and twelve (12) girls. A true experimental research design was used and the instruments for data collection were bricklaying and blocklaying practical tasks and an assessment tool. The three research questions were answered using mean and standard deviation while the hypothesis were tested using ANOVA at 0.05 level of significance. The following were the findings: There is no significant difference between male and female students in their ability to perform the brick/block bonding practical skill, There is significant difference in the ability of the male and female students in arch construction practical skill and There is significant difference in the ability of the male and female students to construct fire place/chimney stack practical skill. Based on the findings, it was recommended that Teachers and school counselors should explore avenues, strategies and best practices in bricklaying and blocklaying manipulative skill towards improving students' commitment to building technology and that females should work conscientiously to achieve equity for females and free themselves from stereotyping roles.

TABLE OF CONTENT

CHAPTER III

METHODOLOGY

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

CHAPTER V

SUMMARY, CONCLUSION AND RECOMMENDATION

LIST OF TABLES

Table Title page

CHAPTER I

1.0 INTRODUCTION

1.1 Background of the study

Vocational education is defined as all those experiences whereby an individual learns to carry on successfully any useful occupation (Okoro 1999). Also, Okoro defines vocational education as a series of controlled and organized experiences arranged to prepare a person for socially useful employment. The statement explained that all education is vocational in so that the individual may serve happily and far as it prepares for satisfactory living. It is obvious therefore that vocational education is a term that is more all-embracing than technical education which Okoro defines as 'a post-secondary vocational training programme whose major purpose is the production of technicians'.

The National Policy on Education (Federal Republic of Nigeria 2004) says 'Technical education can be seen as the formal training of persons to become technicians in different occupations'. Thus any education that is geared towards teaching technical skills and attitudes suitable to such skills can be regarded as technical education. Therefore technical and vocational education is defined 'as a comprehensive term referring to those aspects of the educational process involving, in addition to general education, the study of technologies and related sciences and the acquisition of practica skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life'..

Vocational education is synonymous to Technical Education. Vocational education is a highly useful education because its occupational contents offer the trainees the opportunity to acquire skills, attitudes, interest and knowledge that are needed to perform socially and economically, beneficial work, not only to the recipients, but also the society (Ogunnowo, 1992).

People who are adequately trained are able to enter into paid employments in any recognized occupation. Consequently, they are able to develop themselves socially and economically as well as contribute to the development of their society. Vocational education is not a new concept in Nigeria education. In the traditional system in Nigeria, children learn by doing. That is to say, children are involved in practical farming, fishing, weaving, cooking, carving, knitting, painting and so on. According to Nwakolo (1997), Technical education in the ordinary sense involves the training of people for lower level jobs such as: Carpentry, Bricklaying, Plumbing, Painting, Ceramics, Textiles, Cabinets-making, Food Technology, Motor mechanics, Installation mechanics, Welding, Baskets-making, Computer, Hair-dressing, Leather work, Blacksmithing and so on.

Technical and Vocational education as defined by the national policy on education (Federal Government 2002) is "that aspect of education which leads to the acquisition of practical and applied skills and basic scientific knowledge". According to UNESCO 2005, technical and vocational education can be referred to as "that aspect of the education process involving an addition to general education, the study of technologies and related science and the acquisition of practical skills, attitude, understanding and knowledge relating to occupation in various sectors of economic and social life"

As stipulated in the National Policy on Education (Federal Republic of Nigeria 2004), the goals of technical education are to provide trained manpower in the applied sciences, technology and business particularly at the craft, advanced craft and technical level, provides technical knowledge and vocational skills necessary for agriculture, commercial and economic development and to impart the necessary skills into individuals in order to make them self-reliant economically.

In pursuance of these goals; the main feature of the curricular activities for technical colleges are structured in foundation and trade modules while the curriculum for each trade consist of four components namely; general education, theory and related courses, workshop practice and industrial training. The trainees upon completing technical programme shall have the options to secure employment either at the end of the course or after completing one or more modules of skills to set up their own business and become self-employed; and pursue further education in advance craft/technical programmes in post secondary institutions such as polytechnics or colleges of education (technical) and universities (Adeyemi, 2000).

In respect to the view above, Science and technology (engineering) equal opportunity act of 2000 declared: "it is the policy of the federal Government of Nigeria to encourage men and women equally, of all ethnic, racial, and economic background to acquire skills in science, technology and mathematics, to have equal opportunity in education, training and employment in scientific and technology fields and thereby promoting scientific literacy and technology" (S& E Act, 2000).

However, most technical colleges' teachers in developing countries consider practical work simply as a means to confirm technical knowledge (Monk, Fairbrother & Dillan, 1993) and give little attention to the development of practical skills in students and their assessment. Hewitt (2008) reported that the development of practical skills and abilities must form an integral part of the set of educational goals that is to be associated with Technology education. That is why practical work has traditionally played a very important part in all technology education programmes right from technical colleges to tertiary institutions. This has manifested itself in the provision of workshops, laboratories and other facilities required for practical work in technical subjects in all our educational institutions.

In building technology, the laboratory or platform is the unique forum for the pursuit of the above aims i.e. becoming self-employed as well as an employer. The expectation is that during laboratory activities, students are provided with experiences predisposing towards acquisition of technical process skills needed for the translation of ideas or instructions into a practical form. Therefore, the need to equip students with process skills during laboratory teaching becomes evident.

Yanger, Engen & Snifer (1999) suggested that the laboratory can provide an excellent opportunity for the teaching of technical skills. They found that students in "discussion" setting were able to learn some laboratory-oriented intellectual skills as efficiently as students in laboratory setting but they were unable to perform competently on a range of technical skills. Other studies by Fits and Pasner (1997) and by Gagne (2001) shows that successful acquisition of technical skills requires the learner to have an overview of the skills routine, specifically if complex tools or equipments were involved, and that learning skills required practice and competence continued to improve with practice over long periods.

Research had shown that technical colleges have very low number of female enrolment in some field of study but it is not perfect to neglect their ability in the performance of practical skills in comparism to their male counterpart. One would wonder therefore, whether there may be significant differences in the performance of bricklaying and blocklaying practical skills between males and females students. A study done by Barbara & Wayne (1996) in USA, shows that gender inequalities were most evident in laboratory assignment, consistent with Tobin's (1999) observation that female are less likely to be involved in operating laboratory equipment.

According to Wall (1997), it is the natural difference between men and women, which dictate on their occupational choice, while Liebert (1992) & Okou (1991) concluded that sex has

a strong influence on vocational aspirations. Nabulya (2004) also found out that more males than females chose vocational and technical subjects. Johnson and Murphy (1997) also reported that in Britain, girls perform consistently better than boys in observational skills while boys performed consistently better in measurement skills and computational skills. But in all process skills, Hobbs , Boldt, Erickson, Onelch, & Sieben, (1979) reported that performance between the two sexes was about the same.

1.2 Statement of the problem.

In Nigeria, the trend of academic excellence of technical students at 'O' level has shown that boys perform better than girls in building construction examination (NABTEB 2003). Building technology being one of the essential technical subjects in most of the professional courses at the university level, the poor performance in building by the girls, limit their opportunity to offer professional courses like building, building technology, building construction, civil engineering, structural engineering, architectural engineering and so on. The downward spiral of female enrolment is accompanied by decrease in achievement and interest. Poor performance in building which potentially contributes to lowering girls interest in the subjects reduces the women in technological carriers in Niger State today where we are currently in need of highly skilled human power for national development. Lack of awareness on the part of many students and their pa-rents also contribute to this.

Although, the Federal Government took various measures to allow for increase in number of enrolment of female students but had not yielded a concrete result. All these imply that there are underlying factors affecting the attitudes of young female students toward building technology that need to be addressed at the high school.

Macoby and Jackline (1991), show that gender differences in attainment were established in areas of mathematics, spatial and verbal abilities with boys excelling in the first two and girls in the later. Also, a number of studies have been done on issues about gender differences and performance in core science subjects like biology, chemistry and physics where females perform better in the first two subjects and males in the last. Evidence have not been established whether there is a gender difference between boys and girls in bricklaying and blocklaying practical skills at technical colleges of Niger State, Nigeria. Based on the above, the study seek to determine gender differences in the performance of bricklaying and blocklaying practical skills among the students in technical colleges in Niger State, Nigeria.

1.3 Purpose of the study

The main purpose of the study was to determine whether there are differences in the performance of bricklaying and blocklaying practical skill among boys and girls in technical colleges in Niger State.

This study was guided by the following objectives;

- To determine gender differences in the ability of the male and female students to perform the brick/ block bonding practical skill.
- To identify gender differences in the ability of the male and female students in arch construction practical skill.
- To assess gender differences in the ability of the male and female students to construct fire place and chimney stack practical skill.

1.4 Research questions

In order to realize the above objectives, this study sought to answer the following research questions:

- What are the gender differences in the ability of the male and female students to perform the brick/ block bonding practical skill?
- What are the gender differences in the ability of the male and female students in arch construction practical skill?
- What are the gender differences in the ability of the male and female students to construct fire place and chimney stack practical skill?

1.5 Hypothesis of the study

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

Ho. i.

There is no significant difference between male and female students in their ability to perform the brick/block bonding practical skill.

Ho. ii.

There is no significant difference in the ability of the male and female students in arch construction practical skill.

Ho.iii.

There is no significant difference in the ability of the male and female students to construct fire place and chimney stack practical skill.

1.6 Scope of the study

This study is delimited to gender differences in the performance of bricklaying & blocklaying practical skills in building technology in technical colleges. It sought to find out whether there are gender differences in performance of bricklaying & blocklaying practical skills among NTC I to III building students in Niger state mixed technical colleges.

1.7 Significance of the study

The findings of this study shall benefit bricklaying and blocklaying practice, teachers, researchers and the students.

Teachers of building (bricklaying and blocklaying) and other technology educators may understand better how boys and girls differ in their performance of bricklaying and blocklaying practical skills for both boys and girls. NABTEB examiners and bricklaying and blocklaying teachers may be able to set examinations that take into account any differences in the abilities of boys and girls in the performance of bricklaying and block-laying practical skills.

Other researchers may use these findings as a guide to further researcher in order to add more knowledge about gender and performance in bricklaying and block-laying practical skills. Also, after the implementation of this findings, the students shall be able to learn at an individual pace for proper mastery or performance in bricklaying and blocklaying practical skills.

CHAPTER II

LITERATURE REVIEW

2.1 Introduction

The literature related to the study is reviewed under the following headings:

- The concept of gender difference.
- Gender and general performance.
- Gender and the performance of manipulative task in bricklaying and blocklaying practice.
- Technical Colleges.

2.2 The concept of Gender difference

Gender is the amount of masculinity or femininity found in a person, and obviously, while there are mixtures of both in many humans, the normal male has a preponderance of masculinity and the normal female a preponderance of feminity (Robert, 1968).Gender is a range of characteristics used to distinguish between males and females, particularly in the case of men and women and the masculine and feminine attributes attached to them. Depending on the context, the discriminating characteristics vary from sex to social role to gender identity. The World Health Organization (WHO 2009), also defined gender as the result of socially constructed ideas about the behavior, actions and roles a particular sex performs. Sexologist John Money introduced the terminological distinction between biological sex and gender as a role in 1955. Before his work, it was uncommon to use "gender' to refer to anything but grammatical categories.

However, Money's meaning of the word did not become widespread until the 1970s, when feminist theory embraced the distinction between biological sex and social construct of

gender. Today, the distinction is strictly followed in some contexts, like feminist literature and in documents written by organization such as World Health Organization (WHO), but in most contexts, even in some areas of social sciences, the meaning of gender has expanded to include "sex" or even to replace the latter word. Although, this gradual change in the meaning of gender can be traced to the 1980s, a small acceleration and progress in the scientific literature was observed when the food and drug administration started to use "gender" instead of "sex" in 1993. Gender is now commonly used even to refer to the physiology of non-human animals, without any implication of social gender roles (for example dogs or cats)..

Nalalie Graffiths (2006) stated that 'Gender differences delineate those differences that exist between men and women. Gender differences by definition take into consideration the fact that outside the test tube it is impossible to control for the interactions between people and their environment. Natalie Graffiths (2006) discovered that reasons for gender difference can be categorised into three main areas –neurological, actions and roles a particular sex performs. Sexologist John Money introduced the terminological distinction between biological sex and gender as a role in 1955. Before his work, it was uncommon to use "gender' to refer to anything but grammatical categories.

However, Money's meaning of the word did not become widespread until the 1970s, when feminist theory embraced the distinction between biological sex and social construct of gender. Today, the distinction is strictly followed in some contexts, like feminist literature and in documents written by organization such as World Health Organization (WHO), but in most contexts, even in some areas of social sciences, the meaning of gender has expanded to include "sex" or even to replace the latter word. Although, this gradual change in the meaning of gender can be traced to the 1980s, a small acceleration and progress in the scientific literature was

observed when the food and drug administration started to use “gender” instead of “sex” in 1993. Gender is now commonly used even to refer to the physiology of non-human animals, without any implication of social gender roles (for example dogs or cats).

Nalalie Graffiths (2006) stated that ‘Gender differences delineate those differences that exist between men and women. Gender differences by definition take into consideration the fact that outside the test tube it is impossible to control for the interactions between people and their environment. Natalie Graffiths (2006) discovered that reasons for gender difference can be categorised into three main areas –neurological, biological and psychological.

2.2.1Neurological differences

Differences in the male and female brain and their possible influence on behaviour and learning have been extensively researched, although many results have been inconclusive. There is some belief that the types of ability that differ by sex are roughly the same as those that differentiate the brain’s hemispheres in function. Problem-solving tasks that favour women are said to be those that involve perceptual speed, displacement, ideational fluency, verbal fluency, precision manual tasks or mathematical calculation. Those favouring men involve spatial tasks, mentally rotating/manipulating an object, target-directed motor skills, disembedding tests and mathematical reasoning.

2.2.2Biological differences

Biological theorists believe that gender differences are natural and therefore unalterable. Sexual dimorphism (male-female differences) in the structure of the body and its organs are largely controlled by hormones. The secondary school years are crucial with teenagers passing through puberty and experiencing massive hormonal changes. These hormones have differing effects on the nervous system and influence both physiological processes and behaviour. It is this

effect on the nervous system that can cause typical traits such as girls being more emotive and having greater verbal ability and boys adopting more aggressive characteristics with greater spatial ability.

2.2.3 Psychological differences

There are many researchers who have attempted to prove the theory that at birth males and females are the same and that it is the way they are treated that gives them what we consider as typical male and female characteristics. Powerful stereotypes operate in the classroom and in a school that generally affect the performance of those subject to them, be they ones of gender, ethnicity or social class. The impact that teachers can have on a child's gender identity and, consequently, the way they perform in class is not to be underestimated. A teacher's prediction of a pupil's behaviour can be communicated to them, despite being unintended, and influence the actual behaviour that follows. Byrne (1978) stated that 'no single influence for conservation of change, for creating insurmountable hurdles or new opportunities, will ever be as seminal as that of the teachers in our schools.'

2.3 Gender and general performance

Gender and its manifestation in various human activities appear to be a strong predictor of human conduct. In education, many differences have been documented between achievements of males and females. (Macoby and Jackline (1991) feel that gender difference is one of the factors that affect academic performances. In review of research in the united states, Mark (1992) reported that in all studies, girls achieved consistently higher than did boys. They were less frequently retarded and were more frequently accelerated through the years of schooling than boys. When achievement test were used to assess performance rather than using school grades,

girls continued to exceed boys in performance in language studies and boys tended to perform in mathematics. The report of the International Association for the Evaluation of Educational Achievement (IEA) studies on six subjects other than science and mathematics as reported by Walker (1994), showed that in reading comprehensive tests, boys show lower performance than girls. Boys also did less well in cognitive literature test and in English as a foreign language. But in civic achievement tests, boys generally recorded higher scores than girls.

Abiam and Odok (2006) states that, in Nigeria, gender-achievement studies were carried out and the result found no significant relationship between gender and achievement in numbers and numeration, algebraic processes and statistics. According to Abiam & Odok, only weak significant relationship in Geometry and Trigonometry were found. Though globally the issue of gender inequality in Science, Technology and Mathematics Education (STME) has produced inconclusive results. One metaanalysis covering the period 1974 – 1987 on Mathematics and gender led to two conclusions: the average gender gap is very small (statistically insignificant), and the fact that the differences tend to decline with time (Friedman, 1989). Another meta-analysis of 100 studies in gender and Mathematics performance corroborated the above findings (Hyde, Fennema & Lamon, 1990).

In a study by Opolot (2005) it was found that for all the attitudinal variables (anxiety, confidence and motivation), males had higher mean scores than females. That is, differences in student attitude toward mathematics based on gender were confirmed. Attitudes are known to have positive relationship with student achievement. This may be an indication that males perform better than females mathematically as a result of their higher attitude scores.

There are no longer distinguishing differences in the cognitive, affective and psychomotor skill achievements of students in respect of gender (Arigbabu & Mji 2004;

Bilesanmi-Awoderu 2001, 2002, 2004, 2006; David & Stanley 2000; Din, Ming, & Esther, 2004; Freedman, 2002; Sungur & Tekkaya 2003). Girls are being encouraged and sensitized into developing positive attitudes towards science and technology. However, some researchers still found that there are still significant differences in the cognitive, affective and psychomotor skill achievements of students in respect of gender (Aguele & Uhumniah (2008); Eccles, Barber, 1997; Hyde & McKinley, 1997; Kolawole, 2007).

.Bilesanmi-Awoderu (2002) carried out a study on the concept-mapping, students' locus of control, and gender as determinants of Nigerian high school students' achievement in Biology using Analysis of Covariance to analyze the data collected; she found that there was no significant main effect of gender on students' achievement in Biology. Viann (2002) investigated differences and the effects of cooperative learning in mathematics classroom setting. The researcher used quasi-experimental design to compare a control section using individualized learning method with three treatment sections using cooperative learning strategy based on the Learning Together model of Johnson and Johnson (2001). The results revealed no significant gender-related differences, but females achieved slightly higher grades than males.

Pandian (2004) investigated the effects of cooperative computer-assisted learning method on male and female students' achievement in biology. The students were randomly grouped into cooperative computer assisted learning and traditional method groups. The analysis of results indicated that gender did not express any significant influence on biology achievement. However, male and female students in the cooperative computer-assisted instruction group showed remarkable post-test mean differences over their respective counterparts who learned the same biology concepts through traditional method.

Samuel & John (2004) examined how the cooperative class experiment (CCE) teaching methods affect students' achievement in Chemistry. They found that there was no significant difference in gender achievement between the experimental and control groups, but girls had a slightly higher mean score than boys did. Moreso, the girls taught through CCE method performed better than girls taught through the conventional teaching method in the post-test scores. Similarly, boys who were taught using CCE method performed significantly better than the boys in the control groups in the post-test scores. The researchers also pointed out that there was no significant difference in achievement between boys and girls exposed to CCE method, both performed significantly better than those taught through conventional lecture method..

Gender difference in achievement has been shown to arise from societal expectations. In their study, Bank (1996) discovered that there were no differences in reading abilities among girls and boys in Israel because of societal expectation of equal responsibility for men and women. However, according to them, the fact that consistently did better in verbal tasks would make for feminine superiority in all sort of schools work, involving reading, writing or reciting. According to Mark 1992, the most plausible explanation for the difference in achievement are differences in attitudes and personality traits, which enable girls to make a better impression on teachers than boys do. Tobin and Garnett (1997) found out that males tend to be more involved than females in public interactions in whole class settings. For examples, males tended to participate in a more overt manner than females by responding to teachers' questions by raising their hands when teachers asked questions in a class setting.

Welch (1998), while analyzing National Assessment Data in the united states of America between 1996-1997, found out that boys achieved higher than girls on concepts of experiments design, models, hypotheses and errors of measurement. Spear (2003) also carried out a similar

study on work related attributes in England. He reported that teachers thought that boys were more original, constructive, experimental and logical than girls. Boys were also judged to be more analytical and better able to understand and apply general principles. He further concluded that work attributed to a boy was generally rated higher for scientific accuracy, richness of ideas and organization of ideas than identical work attributed to a girl. In the same study, spear observed that girls were seen to be more initiative, persevering, industrious and neat.

Across different cultures and time, the pattern of gender differences in performance may take on surprisingly different directions. In Taiwan, Chou (1990) found out that girls consistently performed better than boys in all achievement variables. While Marsh (1998) reported that girls were able to earn better grades, to spend more time on homework, to be more conscientious in school work and to be slightly more likely to attend college or university.

2.4 Gender and the performance of manipulative task in bricklaying and blocklaying practice.

In the twentieth century we entered a world of technological achievements both here on earth and outside. Like other aspects of life, gender plays an important role in technology. Technology is not new; it existed for thousands of years. Even though the use of technology was limited in ancient times, still they did enjoy some technological achievements. Most of these technological achievements occurred in the military sector, for protection and expending their empires, Stromqish (1992). Ancient societies created the gender inequalities in their technology fields. Men in ancient societies enjoyed innovating and deploying technology driven goods, while women do domestic work, Andrewson (1990). Higher education was limited to only few fortuned men. Women attending higher institutions such universities were considered taboo by most societies and cultures, Haskel (1994).

Today, depending on where you live, gender inequalities in technology can range from slightly to drastically prevalent. Gender relating issues are present in work places and in higher education institutions. “All students of both gender need to acquire the skills necessary to become consumers capable of critically assessing the technologies they use, resulting in the ability to make more informed decisions”, (Journal of Technology Education).Research into the physical structure of the brain does show differences between boys and girls, which may go some way to explaining differential attainment (Nikolaenko, 2005). Boys are better at mental manipulation of images, which may benefit problem-solving, design and construction skills. Gross motor skills such as running, jumping and climbing tend to develop slightly faster in boys. Fine motor skills, including the ability to hold and use a pencil, develop faster in girls. This may be one factor in giving girls an advantage in school through written or oral but below standard in manipulative task (workshop practice), (Piek, 2006).

The current trends in women enrolment in technical/technological subjects like bricklaying, blocklaying and concreting related subjects remain a growing concerns of scholars all over the world. Many countries continue to offer sex-differentiated courses, particularly with regards to practical activities. Girls continues to be placed in Home Ecomonics courses and boys in mechanical and related courses in many African and middle Eastern countries. In Middle Eastern and North African countries, girls have little access to Technical and Vocational Education El-Sanabary,(1999).

Duru (1997), reported that more women than men enrolled in vocational courses. However, very few women enrolled in Industrial Technical courses. Nwosu Izuwah (1997), noted that females have not been well represented in technical programmes. As a result,

Bricklaying, Blocklaying and Concreting as a core subject of building technology in Technical Colleges suffers a very low enrolment of the female students Gbemi (2001).

Meanwhile, El-Sanabary (1999), observed that boys demonstrate competency and proficient performance and shows a thorough and effective application of knowledge and skills that meet the standard in blocklaying and bricklaying practice. Specifically, the students perform the following tasks with adequate skills: build brick/block partition with control joints, cut brick/block to known dimensions, lay against metal door frames, and install bond beams correctly. Application of knowledge and skills is thorough and effective and the student can work independently whilst it is vice-versa in the girls performance.

2.5 Technical college

Technical education is the training of technically oriented personnel who are to be the initiators, facilitators and implementers of technological development of a nation by adequately training its citizenry on the need to be technologically literate, leading to self-reliance and sustainability. Technical education more than any other profession, has more direct impact on national welfare (Uwaifo 2009).

Technical education contributions are widespread and visible ranging from metalwork technology, mechanical/automobile technology, electrical and electronic technology, building and woodwork technology etc. Consequently, Technical education can serve as change agents not only for technical systems but also for many other societal changes (Uwaifo 2009). The practical nature of Technical education makes it unique in content and approach, thereby requiring special care and attention. The inputs of Technical education are so visible to the extent that even an illiterate could see when ‘failures’ occur (Nwosu 2009).

All these development cannot be effectively achieved without the existence of a college. According to Wikipedia, ”A College is an educational institution or constituent part of an educational institution”. Usage of the word college varies in English-speaking nations. A college may be degree awarding tertiary educational institution, an institution within a federal university, an institution offering vocational or technical education, or a secondary school (Lawal 2011). New Zealand, Australia, Canada and other commonwealth nations define college as “may be a secondary or high school, a college of further education, a training institution that awards trade qualifications or a constituent school within a university”.

The college where these technological skills are well organized and control is the technical college. A technical college is a school in which a person can learn practical skills in the manipulation of equipments or tools to manufacture construct and repair a product or machine with a certificate in return in a specific career path (Lawal 2011). These learning institutions are no more than 3 years in length and are often linked with a larger academic institution or they might be free standing schools. Often offering continuing education to adults from all backgrounds, technical colleges can help to create learning situation which is convenient, efficient and helpful to those who want to explore other career fields.

Today, Nigeria has over 160 accredited technical colleges that offer variety of programmes to students from junior secondary schools. At the end of the course, students may take the examination for the senior school certificate. Technical education is designed to train low-level manpower and is offered in technical colleges or business and engineering skills training centre. A two-tier system of nationally certified courses is also offered, leading to award of National Technical/Business Certificates and Advanced National Technical/business certificates. The lower level programme last three years after junior secondary school and is the

equivalent of senior secondary school. The advanced programme entails two years pre-entry industrial work experience and ranks on the level of lower tertiary programmes. All certificates are awarded by the National Business And Technical Examinations Board (NABTEB).

CHAPTER III

3.0 METHODOLOGY

This chapter describes the research procedures used in carrying out this research. It includes research design, area of the study, population , instrument for data collection, method of data analysis procedure for determination of the result.

3.1 Research Design

The design intended for this research is an experimental research as it involve the assessment or observation of the differences in manipulative skills of bricklaying and blocklaying practice between a male student and a female student in four different mixed technical colleges in Niger state. Through this, data were collected and generalized to the entire population.

3.2 Area of study

This study was carried out in Niger state particularly in four (4) technical colleges which includes:

- Government Technical College, Minna.
- Government Technical College, Kontagora.
- Federal Science and Technical College, Shiroro.
- Suleiman Barau Technical College, Suleja.

3.3 Population of the study

The population of this study include all the TC I to TC III male and female students from four technical colleges in Niger state mentioned above.

- **Sample of the study**

A total of twenty-four (24) students consisting of twelve (12) males and twelve (12) females sampled using random sampling techniques as the researcher is gender sensitive.

- **Instrument for data collection**

The instrument used for data collection was a developed assessment instrument used for assessing students' manipulative skills in bricklaying and blocklaying practice at Technical Colleges level in Niger state, Nigeria.

- **Validation of the Instrument**

The assessing tool was validated by the researcher's supervisor and two other lecturers in the Department of Industrial and Technology Education from Federal University of Technology, Minna.

3.7 Administration of the Instrument

The researcher administered three tasks each one after the other to the students (male and female) independently at an individual pace at the selected schools using the assessing instrument to record their scores and compared to determine if there was any significant difference in the performance between them.

3.8 Method of Data Analysis

The research questions were answered using mean and standard deviation while t-test was used to test the hypothesis at 0.05 level of significance. A four point rating scale was employed as follows;

Very Correct	4 point
Correct	3 point
Fairly Correct	2 point
Not Correct	1 point

CHAPTER FOUR

4.0 PRESENTATION AND ANALYSIS OF DATA

This chapter decribes the presentation and analysis of data with respect to the research questions and hypotheses formulated for this study, the result of data analysis for the research questions were presented first, followed by those of the hypotheses tested for the study.

4.1 Research Question 1

What are the gender differences in the ability of the male and female students to perform the brick/ block bonding practical skill?

In determining the gender difference of male and female students of bricklaying and blocklaying practice at Government Technical College, Minna, Federal Science and Technical College, Shiroro, Government Technical College, Kotongora and Suleiman Barau Technical College, Suleja: A task (Flemish bond) was given out to the students to demonstrate their abilities and assessed. The result of the assessment is presented in the tables below:

Table 4.1:

Mean scores of students on brick/block bonding (Flemish bond type) practical task.

GENDER	N (Number of students)	SCORES	MEAN	STANDARD DEVIATION
MALE	12	72, 73,72, 79, 80, 82,73, 80, 58, 80,79 and 82	75.00	6.61
FEMALE	12	61, 62,70, 72, 70, 75,82, 75, 73, 80, 73 and 70	72.75	9.68

The data presented in Table 4.1 shows the male students have mean score of 75.00 and standard deviation 6.61 while the female students have mean score of 72.75 and standard deviation 9.68.

This reveals that the male students performed better than the female students in the brick/block bonding practical task.

4.2 Research Question 2

What are the gender differences in the ability of the male and female students in arch construction practical skill?

In determining the gender difference of male and female students of bricklaying and blocklaying practice at Government Technical College, Minna, Federal Science and Technical College, Shiroro, Government Technical College, Kotongora and Suleiman Barau Technical College, Suleja. A task, arch construction was given out to the students to demonstrate their abilities and assessed. The result of the assessment is presented in tables below:

Table 4.2:

Mean scores of students on arch construction practical task.

GENDER	N (Number of students)	SCORES	MEAN	STANDARD DEVIATION
MALE	12	62, 69, 59, 64, 71, 58, 52, 61 63, 67, 50 and 53.	60.75	6.69
FEMALE	12	75, 60, 61, 52,62, 61, 60, 51, 51, 61, 60 and 45.	58.25	7.42

The data presented in Table 4.2 shows the male students have mean score of 60.75 and standard deviation 6.69. While the female students have mean score of 58.25 and standard deviation 7.42.

This reveals that the male students performed better than the female students in the arch construction practical task.

4.3 Research Question 3

What are the gender differences in the ability of the male and female students to construct fire place and chimney stack practical skill?

In determining the gender difference of male and female students of bricklaying and blocklaying practice at Government Technical College, Minna, Federal Science and Technical College, Shiroro, Government Technical College, Kotongora and Suleiman Barau Technical College, Suleja. A task, fire place and chimney stack construction was given out to the students to demonstrate their abilities and assessed. The result of the assessment is presented in tables below:

Table 4.3:

Mean scores of students on the construction of fire place/chimney stack practical task.

GENDER	N (Number of students)	SCORES	MEAN	STANDARD DEVIATION
MALE	12	63, 68, 57, 72,68, 62,62,71, 69, 57, 62 and 68.	64.92	5.01
FEMALE	12	58, 60, 56, 65, 64, 67, 66, 61, 67, 64, 59 and 52	61.58	4.74

The data presented in Table 4.3 shows the male students have mean score of 64.92 and standard deviation 5.01 while the female students have mean score of 61.58 and standard deviation 4.74.

This reveals that the male students performed better than the female students in the construction of fire place and chimney stack practical task.

4.4 Hypothesis 1

There is no statistically significant difference in the mean performance scores between the male and female students in brick/block bonding practical skill.

Table 4.4:

T – test Analysis of the students in the performance of brick/block bonding practical skill.

GENDER	MEAN	STADARD DEVIATION	N	DEGREE OF FREEDOM (DF)	T CAL*	T CRITICAL
MALE	75.00	6.61	12	22	1.65	2.07
FEMALE	72.75	9.68	12			

Table 4.4 indicates that the calculated value t-test is 1.65. This value is less than the critical t-value found to be ±2.07 of 22 df at the significant level of 0.05. Consequently, the null hypothesis was accepted since the calculated value of t is less than the critical t-value. This implies that there is statistically no significant difference in the mean performance scores of the male and female students in the brick/block bonding practical task.

4.5 Hypothesis 2

There is no statistically significant difference in the mean performance scores between the male and female students in arch construction practical task.

Table 4.5:

T – test Analysis of the students in the performance of arch construction practical skill.

GENDER	MEAN	STADARD DEVIATION	N	DEGREE OF FREEDOM (DF)	T CAL*	T CRITICAL
MALE	60.75	6.69	12	22	2.13	2.07
FEMALE	58.25	7.42	12			

Table 4.5 indicates that the calculated value t-test is 2.13. This value is greater than the critical t value found to be ±2.07 of 22 df at the significant level of 0.05. Consequently, the null hypothesis was rejected since the calculated value of t is greater than the critical t-value. This implies that there is statistically significant difference in the mean performance scores of the male and female students in the arch construction practical task.

4.6 Hypothesis 3

There is no statistically significant difference in the mean performance scores between the male and female students in construction of fire place and chimney stack practical task.

Table 4.6:

T – test Analysis of the students in the performance of fire place and chimney stack construction practical skill.

GENDER	MEAN	STADARD DEVIATION	N	DEGREE OF FREEDOM (DF)	T CAL*	T CRITICAL
MALE	64.92	5.05	12	22	4.07	2.07
FEMALE	61.58	4.74	12			

Table 4.6 indicates that the calculated value t-test is 4.07. This value is greater than the critical t value found to be ±2.07 of 22 df at the significant level of 0.05. Consequently, the null hypothesis was rejected since the calculated value of t is greater than the critical t-value. This implies that there is statistically significant difference in the mean performance scores of the male and female students in construction of fire place and chimney stack practical task.

4.7 Findings

Based on the data collected and the analysis for this study, The following major findings were made with respect to the research questions and hypotheses.

- There is no significant difference between the male and female students in brick/block bonding practice.
- There is significant difference between the male students and the female students in the arch construction practical skill.
- There is significant difference between the male and female students in the construction of fire place chimney stack.
- The male students generally scored higher marks in all the three task.

- Some female students performed better than the male students in the brick/block bonding practical skill in some technical colleges.
- Some female students also performed better than the male students in the arch construction practical task.
- The male students are more competent in the manipulative skills than the female students.
- There is low enrollment of the female students in building technology at Technical colleges.
- The findings shows female students in some technical colleges can out-beat their female counterparts from another technical college.
- The findings reveal the level of the teaching qualities of the various schools used in this research work.

4.8 Discussion of Findings

Based on the data collected, table 4.2, 4.3, 4.5 and 4.6 revealed the existence of significant gender difference in favour of the male student in general according to El-Sanabary (1999), who observed that boys demonstrate competency and proficient performance and shows a thorough and effective application of knowledge and skills that meet the standard in blocklaying and bricklaying practice. Environmental provision for male students makes them fit and able to cope with tasks requiring high intellectual challenge, manipulative skill and rigor. This phenomenon is further compounded in Africa where sex-stereotyping is so pervasive that from birth, society fixes gender roles and conditions males to play and act within the con- fines of intellectually and physically more challenging tasks like construction, moulding, football, palm-wine tapping, climbing, agriculture, fishing and the like. Female on the other hand, are

‘sentenced’ to the kitchen and related domestic chores, including child-rearing (Andrewson, 1994).

By extension, female students in the school tend to opt for subjects like, Home Economics and at most Biology. In school, one hears female students saying that building technology is for the boys and this low motivation may further widen the gender gap in bricklaying/blocklaying achievement (Gbemi, 2005). In fact, a typical informal survey in the Nigerian classroom will readily show a greater proportion of female students opting for non-building subjects if given the opportunity. This may explain why introductory technology (Basic Technology) is made compulsory in both primary, secondary and Technical schools. Yet, till date many students still offer the subject not by conviction of its significance but on the basis of the compulsion.

Table 4.1 and 4.4 tell the female students performed equally as the male students. It is very rare to see the female students expressing greater competency in manipulative skills than the male students’ a times. This positive change could be related to environmental factor, parental influence, the way and manner an individual was brought up, readiness to learn or interest and so on. It was discovered in the data collected that there is no statistical significant difference between both genders in the brick/block practice, this could be seen to be in-line with what Natalie (2006) says about gender psychological difference that at birth males and females are the same and that it is the way they are treated that gives them what we consider as typical male and female characteristics.

CHAPTER V

5.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter deals with the summary of the study of this study, conclusion, implications of the findings, and suggestions for further studies were also highlighted.

5.2 Summary of the study

The main purpose of this study is to investigate whether there are gender differences in the performance of bricklaying & blocklaying practical skills in building technology in technical colleges of Niger State. To find out the gender differences between the male and female students in brick/block bonding, arches construction and fire plac/chimney stack practical skill between the male and female students in Technical Colleges of Niger State.

Related literatures were reviewed in the study under the following sub-headings: The concept of gender difference, Gender and general performance, Gender and the performance of manipulative task in bricklaying and blocklaying practice and Technical Colleges. T-test were used as statistical tools to analyze the data collected from the respondents (male and female students) and tested at 0.05 level of significance on the gender differences in the performance of bricklaying & blocklaying practical skills in building technology at technical colleges.

Three task in bricklaying and blocklaying namely: brick/block bonding, arches construction and fire place & chimney stack with an assessing tool were used to collect data from the individual students and analyzed according to their performance. The study reveals there is no significant difference between the male and the female students in the performance of brick/block bonding but there is significant difference in the arch construction and fire place/chimney stack practical skills.

On gender, this study has shown that the era of male complete dominance and supremacy in bricklaying and blocklaying is winding up. With scores of male and female students not significantly different in the brick/block bonding practical skills, gender stereotyping as well as the view of technology careers being for male students are gradually disappearing. The trend of boys having greater natural aptitude than girls has been proved to be a truism in some task by the finding of this study.

5.3 Implications of the study

The findings of this study have implication on the gender difference between boys and girls in the performance of bricklaying and blocklaying practical skill in technical colleges of Niger State. It aimed at checking the differences in performance of the students in various bricklaying and blocklaying practical skill like bonding, arch construction and fire place or chimney construction.

The differences will allow the teachers to know the proper teaching strategies to adopt in teaching the students qualitative bricklaying and blocklaying practical skills and to address the individual and gender differences. The finding will prepare the student for competency and improved performance in various task of bricklaying and blocklaying practice. The National Business and Technical Examination Board (NABTEB) will be able to set questions confidently on these various task in bricklaying and blocklaying practice. Also, researchers will use this findings as a basis for further findings about gender differences in bricklaying and blocklaying practice.

5.4 Conclusion

It is concluded that there exists significant gender differences between male and female students in bricklaying and blocklaying practice in technical colleges of Niger State, Nigeria.

Evidence from the study led the researcher to conclude that both the male and female students are no performing at a the same level.

5.5 Recommendation

Considering the findings of the study, it recommended that;

- Government, Teachers and school counselors should explore avenues, strategies and best practices in bricklaying and blocklaying manipulative skill towards improving students' commitment to building technology.
- Also, the role of this factor in promoting students' effective learning and acquisition of practical skills in bricklaying and blocklaying should be made known to the male and female students alike in order to generate in them the much desired motivation in building technology learning and thereby increase their aptitude, interest, attitude and ultimately achievement and practical skills in the subject.
- Every female should wake up from slumber and take up the challenges of the opposite sex in every aspect of life without neglecting their home responsibilities.
- Females should work conscientiously to achieve equity for females and free themselves from stereotyping roles.
- The male should not relent on the common notion that female cannot perform as the male can do, but should always seek to improve themselves in the bricklaying and blocklaying manipulative skill.
- More females should be enrolled in building technology through proper awareness and orientation by government and the parents.
- The students should devote more time to technical activities, discourse and take optimal advantage of the teaching-learning situation.

5.6 Suggestions for further studies

- Strategies for improving the bricklaying and blocklaying practice in Technical Colleges.
- Assessment of the teaching-learning practices of practical bricklaying/blocklaying and concreting at Technical Colleges in Niger State.

REFERENCES

Abiam, P. O. & Odok, J. K. (2006). Factors in Students' achievement in different branches of secondary school mathematics. *Journal of Education and Technology*. 1(1), 161 – 168.

Adeyemi, J.K., 2000. Academic manpower needs of Nigeria Universities. Higher Education Review, 32(2): Spring, 36-44.

Aguele, L.I. & Uhumniah, N.V. (2008). Female Participation in Science, Technology and Mathematics (STM) Education in Nigeria and National Development. *Journal of Social Science, 15 (2),* 121-126.

Andrewson, M. (1990). Improved Acess to Schooling in the Third World; An Overview. Bridges Research Report, No. 1 Cambridge, Massachusetts:Harvard University Press.

Arigbabu, A.A. & Mji, A. (2004). Is Gender a Factor in Mathematics Performance amon Nigerian Preservice Teachers? *Sex Role, 51 (11 & 12),* 749.at: http://www.who.int/gender/whatisgender/en/index.html [Accessed 28 October 2009].

Barbara, A.S & Wayne U.T, (1996). *Feminist Science Education*. New York: Teachers College Press.

Bilesanmi-Awoderu, J.B (2002). Effect of Computer-Assisted Instruction and Simulation/Games on the Academic Achievement of Secondary School Students in Biology. Sokoto Educational Review, 8(1): 49-60. Bank (1996).

Bilesanmi-Awoderu, J.B. (2001). The relationship between Nigerian High School Seniors' Performance in Theorty and Practical Biololgy. *Ife Psychological, 9 (1),* 134-140.

Bilesanmi-Awoderu, J.B. (2002). Concept-mapping, Students' Locus of Control, and Gender as Determinants of Nigerian High School Students' Achievement in Biology, *Ife Psychological, 10 (2),* 98-110.

Bilesanmi-Awoderu, J.B. (2004). Computer-assisted Instruction, Simulation/Games, and Lecture Methods as determinants of Secondary School Students' Attitude towards Biology. *Educational Perspectives, 7 (1),* 1-11.

Bilesanmi-Awoderu, J.B. (2006). Effect of Computer-assisted Instruction and Simulation/Games on the Academic Achievemnet of Secondary School Students' in Biology. *Sokoto Educational Review, 8 (1),* 49-60.

Byrne (1978) Byrnes, J. P., Hong, L. and Xing, S. (1997) Gender Differences on the Math Subtest of the Scholastic Aptitude Test May Be Culture-Specific, *Educational Studies in Mathematics*, 34, pp. 49-66.

Chou V, (1990). *Gender differences in goal fulfilment and education choices*. Stockholm: Skolverket .

David, K.D. & Stanley, H.L. (2000). Effect of Gender on Computer-based Chemistry Problem- solving. *Electronic Journal of Science*

Din Y.Y, Ming M.C, Esther S.H, (2004). Hong Kong Students Achievement in OECD-PISA Study: Gender Differences in Education; Ambrose Alli University, Ekpoma.

Duru A.I. (1997). Gender difference in admission trend into FCT, Omoku Rivers State (1999 – 2001). *Journal of technology in Nigeria*, 2, (1 and 2), 15.

Eccles, J.S, Barber, B.L, (1997). The Association of School Transition in Early *Education, 4 (4).*

El-Sanabary N, (1991). Determinant of women's Education in the Middle East and North Africa: Illustrations from seven countries. Document No. PHREE/89/14. Washington D.C. The world bank.

Federal Republic of Nigeria (2002). *National Policy on Education. Lagos: NERDC Press.*

Federal Republic of Nigeria (2004). *National Policy on Education Lagos, Federal Ministry of Education 7-50.*

Fits A.I and Pasner E.G,(1997). *Discipline of Education*. London: George.

Freedman, M.P (2002). The Influence of Laboratory Instruction on Science Achievement and Attitude toward Science across Gender Differences. J. Women Minor. Sci. Eng., 8(2): p.50.

Friedman, L. (1989). Mathematics and the gender gap: A meta analysis of recent studies on sex differences in Mathematical tasks. *Review of educational Research*, (59), 185 – 213.

Gagne R.M, (2001). Sex Differences in Intelligence and Brain Size: A Developmental Theory, *Intelligence*, 27, pp. 1-12.

Gbemi, M.J. (2001). Female Enrollment in Industrial Technical Education. A case study of Federal College of Education Technical, Omoku, River State. In Anyakoha,

A.U (ed) (2001). *Research Imperatives and Challenges for Home Economics in Nigeria.*

Haskel S.J, (1994). Changes in Women's Majors from Entrance to Graduation at Women's and Coeducational Colleges, *Industrial and Labor Relations Review*, 48, pp. 505-514.

Hewitt C.C, (2008). Vocational education: concept and operation. Belmont: Wadsworth Publishing Coy.

Hobbs V.F , Boldt N.H, Erickson H.K, Onelch F,D, & Sieben S.D, (1979). Sex Differences in Historical Knowledge and School Grades: A 26 Nation Study, *Personality and Individual Differences*, 27, pp. 1221- 1229.

Hyde, J.S., Fennema, E., & Lamon, S. J. (1990). Gender differences in mathematics performance. A meta-analysis.

Hyde, J.S., McKinley, N.M. (1997). Gender Difference in Cognition. Results from Meat-analysis. In Caplan, P.J., Crawford, M.,

John Money, 1995. "The concept of gender identity disorder in childhood and adolescence after 39 years', *Journal of Sex and Marital Therapy* **20** (1994): 163–77

Johnson, M.S and Murphy, B.M (1997). Sex Differences in Performance on the Mathematics Section of the Scholastic Aptitude Test: A Bidirectional Validity Study, *Harvard Educational Review*, 62, pp. 323-336.

Johnson, J.W.F. and Johnson, R.T. (2001). An overview of cooperative *learning* earning Mendelian Genetics Through Simple Coin Toss Game at http://www.wsu.edu/- *Journal of Biosocial Sciences*, 30, pp. 541-553.Marsh (2002).

Kolawole, E.B. (2007). Effects of Competitive and Cooperative Learning Strategies on Academic Performance of Nigerian Students in Mathematics. *Educational research Review, 3 (1)*, 33-37.

Lawal, B.O. (2011). *Trends in the Development of Technical Education in Oyo State 1977-87.* (M.Ed Thesis) Leadership Style, Students' Learning Style, and Academic Achievement: A Study on High

Liebert, V.C,(1992). Male, Female, and the Higher Learning: The Educational Significance of Differences between the Sexes, *Journal of Higher Education*, 30, pp. 67-72.

Maccoby, E.E and Jacklin, C.N (1991). The Psychology of Sex Differences. Stanford, California: Stanford University Press.

Mark,J.A,(1992). *Educational research: Quantitative, qualitative and mixed approaches* (3rd ed.). Thousand Oaks, CA: Sage. Mathematics. *Journal of Education and Technology*. 1(1), 161 – 168.

Monk, O.A, Fairbrother A.C & Dillan S.L, (1993). Relationships between Teachers' Perceived *Psychological Bulletin*, 107, 139 – 155.

National Business and Technical Examination Board (2003). Chief Examiner's Report. Benin City: NABTEB, Statistics Division.

Nabulya, A.E, (2004). Sex Differences in Occupational Selection: The Choice of College Majors, *Review of Economics and Statistics*, 66, pp. 157-163.

Nalalie G, (2006). Managing gender difference issues in the D & T workshop: a research project undertaken as part of a Gatsby Fellowship relating to a Master's degree research study.

Nikolaenko J, (2005). 'Brain Development, XI: Sexual Dimorphism', *American Journal of Psychiatry* **156** (1999): 352.

Nwakolo R.O. (1997). Vocationalization of schools in Nigeria: The way forward in Ali. A. (ed) perspective on Cracial Issues on Nigerian and African Education, 2: 25-34.

Nwosu, L.U. (1997). Female/Male Participation Studies in University Education in Nigeria (1980 – 1990), Asaba *Journal of Education Studies* 1(1), 266.

Nwosu, A. A. (2009). The effects of teachers sensitization of students' acquisition of science process skills. *Journal of the Science Teachers' Association* of Nigeria. 30 (1 & 2) 39-45.

Ogunnowo, M.O., (1992). Technical and vocational education in Nigerian schools: A re-appraisal in National school enrolment review conference proceedings, Lagos; Macmillan Nigeria Publishers Ltd., pp: 233-249.

Okoro, O.M., 1999. Principles and Methods of Vocational and teachers education. Nsukka: University Trust Publishers.

Okou, J.A,(1991).Gender and Academic Specialties: Trends among Recipients of College Degrees in the 1980s, *Sociology of Education*, 68, pp. 81-98.

Opolot-Okurot, C. (2005). Student attitudes toward mathematics in Uganda Secondary Schools. *African Journal of Research in Mathematics, Science and Technology Education*, 9 (2), 167- 174.

Pandian, S.S. (2004). Cooperative Learning in Biology: The Effect of Computers. Department of Education, Arunachi University, India.

Piek H, (2006). *Effective pre-school and primary education 3-11 project: Influences on children's cognitive and social development in year 6.* Research Brief DCSF-RB048-049, London: Department for Children, Schools and Families.

Robert Stoller, 1968). Changes in masculine and feminine traits over time: A meta-analysis. Sex Roles, 36, 305–325

Science &Education Acts, 2000. Equal Opportunity Act: *Federal Republic of Nigeria, Lagos.*

Samuel, W.W. & John, G.M. (2004). Effects of Cooperative Class Experiment Teaching Method on Secondary School Students' School Students. *Educational Psychology Journal.* Science Content, Literary Skills, and Test Item Formats. *International Journal of Science and Mathematics Education, 2 (1),* 91-

Spear V, (2003). Secondary school students IQ Tests: Gender Differences Small; IQ gains Large,

Stromqish N, (1992). Determinant of Educational participation and achievement of women in the third world: *A review of the evidence and theoretical critique. Rev. Edu. Research. 59(2). 143-83.*

Sungur, S. & Tekkaya, C. (2003). Students' Achievement in Human Circulatory System Unit: the Effect of Reasoning Ability and Gender. *Journal of Science Education and Teaching, 12 (1),* 59-64.

Tobin A.D and Garnett J.G,(1997). Revisiting gender issues in reading schemes. *Education 3-13 International Journal of Primary, Elementary and Early Years Education,* 25(1), pp. 37-43.

Tobin A.D, (1999). Sinnes, A. T. (2005). Approaches to gender equity in science education. Two initiatives in sub-Saharan African seen through a lens derived from feminist critique of science. Oslo: Unipub. http://www.ils.u10.no/forskninig/ p al idrgrad/doktorarhandlinger/doc s/AstridSinnes Avhandlingfeminist critque of science.oslo: Unipub.pdf.

UNESCO (2005).Vocational and Technical education for all: the leap for equality. Global monitoring report 2003/2004. http:// www.unesco/oc.unesco.org/education/eta-report/2005- pdf/chapter3.pdf. University of Ibadan.

Uwaifo V.O (2009). Vocational Education and General Education, Conflict or Convergence. Niger. J. Educ. Res. 4:1. Institute of Education; Ambrose Ali University, Ekpoma.

Viann, E. (2002). Gender Difference and the Effects of Cooperative Learning in College Level Mathematics. *Unpublished PhD Thesis*, Curtin University of Technology.

Walker J.P, (1994). *Masculine/Feminine or Human? An Overview of the Sociology of Sex Roles*. Itasca, Illinois: F. E. Peacock, 1994.

Wall M.S,(1997). Occupational Self-Selection: A Human Capital Approach to Sex Differences in Occupational Structure, *The Review of Economics and Statistics*, 63, pp. 60-69.

Welch R,(1998). Testing the Developmental Theory of Sex Differences in Intelligence on 12-18 Year Olds, *Personality and Individual Differences*, 36, pp. 75-82.

WHO (World Health Organization), 2009. *What do we mean by "sex" and "gender"?* Retrieved 2009-09-29. [0nline] Available. www.wikipedia.com

Yanger M, Engen E & Snifer J (1999). The Gender Gap and Classroom Interactions: Reality and Rhetoric? *British Journal of Sociology of Education*, 20, pp. 325-341.

	Task operations No.1	Ability to read and interpret drawings	Ability to analyze plan work	Ability to identify and select tools	Ability to identify and select equipment for given task.	Ability to use appropriately the identified tools & equips	Ability to prepare ground for the given task	Ability to design the given task	Ability to select suitable material for a given task	Ability to use suitable material to specification	Ability to measure accurately on a given task	Ability to read & apply easily technical information	Ability to record all dimension to specification	Ability to construct the task without visible errors	Care of tools during and after work	Care of equipment during and after work	Ability to follow correctly the various work stage	Ability to proceed logically from action and their sequences to th	Observation of safety to prevent accident to self or damage to wor	Ability to complete all the work stage of given task	Ability to answer oral question	Ability to provide level surface of given task	Comportment during and after work	Ability to assess the beauty of a finished product		

	BONDING(FLEMISHBOND)[**SCORES**]																										
	RatingScales	4321	4321	4321	4321	4321	4321	4321	4321	4321	4321	4321	4321	4321	4321	4321	4321	4321	4321	4321	4321	4321	4321	4321	4321		
1	Preparegro																										

	undforconstruction																									
2	Obtainmaterialforconstruction																									
3	Mixedmateri																									

	al (mortar) for construction																									
4	Obtain level and lay 1st and 3rd course																									
5	Obta																									

	in level and day 2nd and 4th course respectively																									
6	Clean tools and equip																									

	ment																								
7	Clean work area																								

APPENDIX II

	Task operations No. 2	Ability to read and interpret drawings	Ability to analyze plan work	Ability to identify and select tools	Ability to identify and select equipment for given task.	Ability to use appropriately the identified tools & equips	Ability to prepare ground for the given task	Ability to design the given task	Ability to select suitable material for a given task	Ability to use suitable material to specification	Ability to measure accurately on a given task	Ability to read & apply easily technical information	Ability to record all dimension to specification	Ability to construct the task without visible errors	Care of tools during and after work	Care of equipment during and after work	Ability to follow correctly the various work stage	Ability to proceed logically from action and their sequences to th	Observation of safety to prevent accident to self or damage to wor	Ability to complete all the work stage of given task	Ability to answer oral question	Ability to provide level surface of given task	Comportment during and after work	Ability to assess the beauty of a finished product		

	ARCHCONSTRUCTION [**SCORES**]																										
	Rating Scales	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1		
1	Prepare ground																										
2	Obtain and mix material for arch																										

	construction																								
3	Establish level for 1st course																								
4	Lay second course																								
5	Fix timber centerform work in position to build ar																								

	ch																								
6	Secure line at the striking point of the arch																								
7	Mark position of the vous sours around the center																								
8	Bed (fix) vous																								

	sour s in posit io n																									
9	Grout joggles with neat cement mortar																									
	Cut to shape the brick surrounding the arch																									

	Task operations No.3	Ability to read and interpret drawings	Ability to analyze plan work	Ability to identify and select tools	Ability to identify and select equipment for given task.	Ability to use appropriately the identified tools & equips	Ability to prepare ground for the given task	Ability to design the given task	Ability to select suitable material for a given task	Ability to use suitable material to specification	Ability to measure accurately on a given task	Ability to read & apply easily technical information	Ability to record all dimension to specification	Ability to construct the task without visible errors	Care of tools during and after work	Care of equipment during and after work	Ability to follow correctly the various work stage	Ability to proceed logically from action and their sequences to th	Observation of safety to prevent accident to self or damage to wor	Ability to complete all the work stage of given task	Ability to answer oral question	Ability to provide level surface of given task	Comportment during and after work	Ability to assess the beauty of a finished product		

	FIREPLACE/CHIMNEYSTACK[**SCORES**]																										
	RatingScales	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1		
1	Buildtheja																										

	mbs																									
2	Fix lintel across the opening to carry the brickwork																									
3	Form																									

	the throat behind the lintel																									
4	Build the brickworks so that it gradual																									

	lynarrowstothesizeofthefluee																									
5	Buildupthechimneybreastwith																									

	the flue opening init																									
6	Render the flue with cement and sand																									
7	Rend																									

	erexternalsurfaceofthechimneyintheroofspace																									
8	Makejunct																									

	ionofthechimneyandtheroofwatertight																									
9	Cleanworkarea																									

APPENDIX III

FORMULAR USED IN THE STUDY

The mean scores was obtained using the formulae:

$$X = \frac{\Sigma FX}{N}$$

Where:

Σ = Summation of

X = Student scores

X = Grand mean scores of the students

N = Total number of students

F = Frequency of students

The standard deviation was obtained using the formulae:

$$S.D = \sqrt{\sum f(X - X)^2 / \Sigma f}$$

Where:

Σ = Summation of

F = Frequency

X = Normal value of option

X = Mean score of students

S.D = Standard Deviation of the students score

t–test X_1-X_2

$$t\text{-cal} = \frac{\mathbf{SD^2_1}}{N_1} + \frac{\mathbf{SD^2_2}}{N_2}$$

Where:

t = Test of significant
X_1 = Grand mean score of male students
X_2 = Grand mean score of female students
N_1 = Number of male students
N_2 = Number of female students
$\mathbf{SD^2_1}$ = Standard Deviation of male students
$\mathbf{SD^2_2}$ = Standard Deviation of female students
d.f = $N_1 + N_2 - 2$ = degree of freedom

t–test was used to compare the mean of the groups. For instance the mean scores of both gender was compared. Each t–value calculated that is less than the t – critical value (±2.07) at 0.05 level of significance was accepted while t-value that is equal or exceed (±2.07) was rejected.