EFFECTS OF BUSINESS MATHEMATICS GRADES ON STUDENTS' PERFORMANCE IN FINANCIAL ACCOUNTING IN FEDERAL COLLEGES OF EDUCATION, NORTH-CENTRAL GEO-POLITICAL ZONE, NIGERIA.

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Title

EFFECTS OF BUSINESS MATHEMATICS GRADES ON STUDENTS' PERFORMANCE IN FINANCIAL ACCOUNTING IN FEDERAL COLLEGES OF EDUCATION, NORTH-CENTRAL GEO-POLITICAL ZONE, NIGERIA.

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SEPTEMBER, 2014

Declaration

I declare that the work in this thesis titled "Effects of Business Mathematics Grades on students Performance in Financial Accounting in Federal Colleges of Education,North-Central Geo-political zone, Nigeria" has been carried out by me in the Department of Vocational and Technical Education. The information derived from the literature has been duly acknowledged in the text and a list of references provided. It has never been presented for a higher degree in any form.

_____	_____	_____
Adenike 'Seyi ODEWUMI	**Signature**	**Date**

Certification

This thesis titled *EFFECTS OF BUSINESS MATHEMATICS GRADES ON STUDENTS PERFORMANCE IN FINANCIAL ACCOUNTING IN FEDERAL COLLEGES OF EDUCATION, NORTH-CENTRAL GEO-POLITICAL ZONE, NIGERIA*, written by Adenike 'Seyi ODEWUMI meets the regulations governing the award of the degree of Master of Education (M.Ed) in Business Education of the Ahmadu Bello University, Zaria, and is approved for its contribution to knowledge and literacy presentation.

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Dedication

This research work is dedicated to God Almighty, and my beloved husband – Adebayo Olatunde Odewumi.

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Table Of Contents

List of Tables

List of Appendices

List of Abbreviations

AICPA	American Institute of Certified Public Accountants
FL	Fail level
GPA	Grades Point Average
ML	Merit level
PL	passes level
SAT	Scholastic Aptitude Test
SEC	Securities and Exchange Commission
SHSA	Study Habits, Skills and Attitudes
TIMSS	Third International Mathematics and Science Study

Abstract

This study assessed the Effects of Business Mathematics Grades on Students Performance in Financial Accounting in Federal Colleges of Education, in North-Central Geo-political zone, Nigeria. Five specific objectives were raised and five research questions were set to guide the study, while the same number of hypotheses were formulated and analysed at 0.05 level of significance. An ex-post facto research design was adopted, and the population for the study comprised of 445 students in 3 Federal Colleges of Education in North Central States of Nigeria. The sampled size consisted four hundred and forty-three for those who sat for Business Mathematics and Financial Accounting. The study used students' profile of 2010-2011 in Business Mathematics and 2011-2012 of Financial Accounting. The data collected were analysed using frequencies, percentages and mean for the research questions. The data were analyzed using SPSS Statistics version 17.0 where P-value approach, stands for probability. Paired sample t-test was used to test null hypotheses 1 to 3 while independent t-test was used to test null hypotheses 4 and 5. The study revealed that both a pass, merit grade and above in Business Mathematics in NCE I have effect on students' performance in Financial Accounting in NCE II. In the same vein, a fail grade in Business Mathematics was also discovered to have a corresponding negative effect on student performance in Financial Accounting. It was concluded that there could be increased pressure of change of options from Accounting option to others as a result of poor performance in Financial Accounting. This could lead to overall poor performance of students and possible increase in drop-out rate. It could also lead to poor enrolment of students in Accounting option which, could result to insufficiency in the number of Accounting teachers in the society. This effect was established to be largely non-gender discriminatory. It was recommended, among others, that a pass in Business Mathematics should be a

continuous requirement or prerequisite for students' enrolment into Financial Accounting in Colleges of Education to curtail observable poor performances in the course.

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

There is a general understanding among accounting teachers that those who have good grades in Mathematics at O'Level result would perform better than those who do not in Business Education. In line with this Williams (2009) affirms that many teachers believe that if the school can take in more students with good grades in Mathematics for admission in colleges of education this would certainly boost their performance in Financial Accounting. If this rationale proves to be correct, by the time the school selects applicants for the NCE (a three-year course leading to the NCE certificate), priority may have to be given to those students who have good grades in Mathematics. This may affect the course design, admission decisions, and the assignment of students in Colleges of Education.

Financial Accounting is one of the business courses offered in the department of business education by NCE 2 students while business mathematics is offered at the NCE 1 in the same department. In consequence, financial accounting not only exposes students to a system of recording and summarizing business transactions, importantly, it helps students to interpret and analyze financial information which is provides crucial inputs in most business decisions. In many business programmes for non-accounting majors, however, accounting is considered to be a difficult subject to pass (Doran, Bouillon and Smith, 1991; Lane and Porch, 2002; Elias, 2005).

Business Mathematics and Accounting are indispensable tools to Business Education students and in any field of human endeavour. Business Mathematics, in particular, is the back bone of any Business Education success, hence virtually all admissions into

tertiary institutions require a credit pass in Mathematics. Business Mathematics is used by business enterprises to record and manage business operations. The National Commission for Colleges of Education (2008) requires a credit in Mathematics as one of the conditions for admission into the Business Education Department in Colleges of Education. In learning Mathematics, students frequently encounter Mathematics problems involving calculations, understanding of concepts, principles and mathematics relationship with other subjects. Azia (1992) asserts that Mathematics is one of the interesting and important subjects to learn although it is difficult.

It is important to note that there is a lot of mathematics calculations in accounting. In view of this, Li Calzi and Basile (2010) say that the first link between mathematics and accounting dates back to simple calculations of a commercial nature, which merchants had to carry out daily in ancient times. This relationship was later enriched by the financial calculations needed by investors and bankers, which developed into a basic operation of arithmetic that is nowadays called accounting. Accounting is one of the core subjects in Business Education, hence any student coming into the department must have a good knowledge of mathematics. Business education is a vital part of our educational system that has provided a solid foundation of knowledge and skills for over a century (National Business Education Association, 2001). Looking at any NCE accounting course, one could conclude that the ability to solve mathematics equations may be a requirement. Supporting this fact, Doucouliagos (1990) affirms that Mathematics has an important role to play in business education and in the world of business generally.

Mathematics which was seen initially as a way of expressing accounting concepts has increasingly become one of the languages in which accounting theory can be formulated

and communicated (Basile, 2009). Having become the fundamental language of accounting, it is now a must that all accounting students must learn.

The NCE Business Education curriculum generally focuses on basic education skills of reading Business Mathematics, Accounting, Economics, and Communications. These are core courses among others, irrespective of their area of specializations. In the light of this, Hoyt (1993) submits that higher level thinking skills are also incorporated into the NCE accounting class. NCE accounting class also requires integrated problem-solving skills, critical thinking, and analytical skills. In his view, these skills are also part of a basic algebra class. During NCE accounting class, decision-making skills will be emphasized as students gather and analyze data (Hellmuth, 1991).

Students often have problems of transferring the skills learned in an algebra class to the skills needed to solve Accounting problems. Roberts (1997) writes of a homebound student who was meeting with his school counselor to review the results of a test the student had taken. The student had done well on the test question dealing with calculating interest on a loan. When asked to solve an accounting problem, the student had difficulty. The student could not transfer the knowledge of algebra to the accounting problem that was structured similarly to a story problem. One may therefore like to find out if ability to solve algebraic equations and problems would help a student in Accounting class.

As long as the practical needs of Accounting are satisfied by the arithmetic collected in book-keeping manuals, the relationship between Mathematics and Accounting cannot be separated. Merchants need to keep their Accounts tidy and Mathematics possesses the art necessary to do this. The progressive transformation of secular accounting precepts into a social science causes a deeper relationship between Accounting and Mathematics.

The aim of this study, therefore, is to find out if Business Mathematics has any effect on students ability and their performances in Financial Accounting. Students here refer to the NCE 1 and 2 who have studied Business Mathematics and Financial Accounting in the two consecutive years in colleges of education before going to their areas of specialization in Business Education. Since the minimum requirement into Business Education in any College of Education is at least a credit pass in Mathematics as stated in the minimum standards of the National Commission for Colleges of Education, (2008) before a student can secure admission, even those admitted through pre-NCE must meet with this requirement before transiting to NCE 1.

1.2 **Statement of the Problem**

The general assumption of teachers is that students with adequate requisite knowledge of Mathematics at the secondary school level should do well in Business Education courses, especially in areas such as Financial Accounting. This assumption underlies the admission requirement of a compulsory credit pass at least in O'level Mathematics before admission into Business Education at the College level. Williams (2009) supports the existence of a relationship between ability in high school algebra course and success in high school introductory accounting course. To him, there is a relationship between the students' performance in Mathematics and Financial Accounting at the secondary school level. On the whole, it is observed that even with the requirement of a credit in Mathematics in place, performances of Business Education students in Financial Accounting still fall far below the expectation of this assumption as many students who are admitted into the programme most often still find it difficult to do well in Financial Accounting. This is evident in the NCE 1 Business Mathematics and Financial

Accounting results for first semesters of 2009/2010 and 2010/2011 academic sessions of Federal College of Education, Pankshin as summarized in table 1.1.

Table 1.1 *First Semester Examination of Business Mathematics for 2009/2010 and Financial Accounting for 2010/2011*

Grades	Bus. Mathematics (NCE 1)	Financial Accounting (NCE 2)
A	18	2
B	36	4
C	64	31
D	27	58
E	89	146
F	62	52
Total	296	241

Source: School record, F.C.E. Pankshin, 2011

From table 1.1, it can be deduced that Business Mathematics does not seem to boost the performance of students in Financial Accounting since performance obtained in Financial Accounting are bottom heavy compared to Business Mathematics performance. Majority of students fell into pass group that is D and E grades. Two hundred and four students had 40% - 49% in Financial Accounting out of 241 students. This is not a good result since majority fell into pass grades. This calls to question the rationality in placing emphasis on Mathematics for Business courses. Thus, there appears to be other variables that could stand as impediment to good performance of students in Financial Accounting rather than a good prerequisite possession of pure Mathematics skills.

Over the years, the researcher has discovered that some students with little knowledge in English Language seem to be affected in the performance of Financial Accounting since some of them complained that they got low marks in a test or examination as a result of

not fully understanding the language of the task. Marine (2003) supports this by observing that Accounting as a discipline does not profit from the knowledge of Mathematics. He emphasizes that presenting insignificant Mathematics applications to accounting students only makes matters worse.

It seems from the above that there is no agreement among scholars on a positive effect of Mathematics grades on Financial Accounting performances of students. In trying to resolve this dilemma, many works had concentrated on the effect of entry Mathematics grades in externally coordinated examinations such as West African School Certificate (WASC) and National Examination Council (NECO) to determine students' pre-requisite Mathematics skills. However, realities of recent discoveries, especially in the case of Nigeria, have come to cast aspersions on the use of such results as valid measures of competence nowadays that 'passing centres' and all manner of examination malpractices and certificate racketeering are phenomena. In this regard, the current study has moved away from examination results that are somewhat unverified to use records of internally coordinated examination results of NCE 1 Business Mathematics. This is expected to reflect an on-the-spot assessment of students competence. It is observed that so far none of the scholars had discussed the effects of Business Mathematics grades on students' performance in Financial Accounting in Federal Colleges of Education in North Central States of Nigeria. This, therefore, constitute the major problem which this study has addressed using empirical evidence.

1.3 **Objectives of the Study**

The general objective of the study is to determine the effect of Business Mathematics grades on students' performance in Financial Accounting in the three Federal Colleges of Education in North-Central, Geo-political zone, Nigeria.

The specific objectives of this study are to:

1) ascertain the extent to which attainment of merit grade and above in Business Mathematics by students have effect on their performance in Financial Accounting offered in the department of Business Education in Federal Colleges of Education, North-Central Geo-political zone, Nigeria.
2) assess the extent to which attainment of pass grades in Business Mathematics have effect on students performance in Financial Accounting offered in the department of Business Education in Federal Colleges of Education, North-Central Geo-political zone, Nigeria.
3) ascertain the extent to which attainment of fail grade in Business Mathematics by students have effect on their performance in Financial Accounting offered in the department of Business Education in Federal Colleges of Education, North-Central Geo-political zone, Nigeria.
4) ascertain the extent to which attainment of merit grade and above in Business Mathematics by male and female students have effect on their performance in Financial Accounting offered in the department of Business Education in Federal Colleges of Education, North-Central Geo-political zone, Nigeria.
5) ascertain the extent to which attainment of pass grades in Business Mathematics by female and male students have effect on their performance in Financial Accounting offered in the department of Business Education in Federal Colleges of Education, North-Central Geo-political zone, Nigeria.

1.4 **Research Questions**

The following research questions were formulated to guide the study with special focus on Federal Colleges of Education, North Central Geo-political zone, Nigeria:

1) to what extent does the attainment of merit grade and above in Business Mathematics have effect on students' performances in Financial Accounting in the department of Business Education?
2) to what extent does the attainment of pass grades in Business Mathematics have effect on students performances in Financial Accounting offered in the department of Business Education?
3) to what extent does the attainment of fail grade in Business Mathematics have effect on students performances in Financial Accounting offered in the department of Business Education?
4) to what extent does attainment of merit grade and above in Business Mathematics by male students have effect on their performances in Financial Accounting offered in the department of Business Education over female students?
5) to what extent does attainment of pass grade in Business Mathematics by female students have effect on their performances in Financial Accounting offered in Federal Colleges of Education, North Central Geo-political zone, Nigeria over male students?

1.5 **Hypotheses**

The following null hypotheses were tested at 0.05 level of significance:

Ho_1: Merit grade and above in Business Mathematics have no significant effect on the performances of students in Financial Accounting in the department of Business Education in Federal Colleges of Education, North-Central Geo-political zone, Nigeria.

Ho_2: Pass grades in Business Mathematics have no significant effect on the performances of students in Financial Accounting offered in the department of

Business Education in Federal Colleges of Education, North-Central Geo-political zone, Nigeria.

Ho_3: Fail grade in Business Mathematics have no significant effect on the performances of students in Financial Accounting offered in the department of Business Education in Federal Colleges of Education, North-Central Geo-political zone, Nigeria.

Ho_4: Merit grade and above by male students in Business Mathematics have no significant effect on their performances in Financial Accounting offered in the department of Business Education in Federal Colleges of Education, North-Central Geo-political zone, Nigeria over female students.

Ho_5: Pass grades by female students in Business Mathematics have no significant effect on their performances in Financial Accounting offered in the department of Business Education in Federal Colleges of Education, North-Central Geo-political zone, Nigeria over male students.

1.6 **Significance of the Study**

The findings of this study would be beneficial to Accounting teachers, library, curriculum planners, parents, business education department, researchers, and policy makers.

Accounting teachers: the findings of this study would provide the accounting teachers with valuable information to reach a better understanding of how Business Mathematics influence students' academic performances in Financial Accounting at NCE 2 in Federal Colleges of Education in Nigeria so as to ensure that students take business mathematics serious in NCE 1.

Add to the library: the finding of this study would add to the statistical data of prior accounting research, which would be used to improve the content, format, and teaching-learning process of the Financial Accounting course. Moreso, publishing this in educational journal would make academic researchers and Accounting lecturers to look for better ways of improving their teaching methods.

Curriculum planners and parents: the findings of this study would help the curriculum planners to realize the basic Business Mathematics concepts needed for Accounting students in colleges of education in Nigeria in order to achieve good academic performance. In addition, it would help parents to encourage their wards to have a good attitude towards their studies especially mathematics. Also, the parent should be interested in their wards academic activities right from primary school level since they would now realize the importance of business mathematics to the business education department for any of their ward who wishes to offer business education.

School administrators: the findings of this study would be of interest to the Administrator Business Education department, the Guidance department, and the Career administrators at secondary schools and Colleges of Education since this would bring to their awareness the importance of business mathematics in order to achieve the performance of students in Financial Accounting. The study would also help the business mathematics teachers to realize that the subject is very useful in all areas of study and to look for a better way(s) of teaching the subject for easy understanding by the students.

Researchers: the findings of this study would provide an empirical support for how success in NCE 1 Business Mathematics course has effect in Financial Accounting at

NCE 2 performance which would serve as a basis for further researchers. This information may be useful in any future collaborative curriculum efforts involving the Mathematics department and the Business Education department.

Policy makers: finally, the findings of this study would guide policy makers in the National Commission for Colleges of Education (NCCE) and colleges of education in taking policy decisions regarding the entry requirements for students aspiring to pursue a course in Business Education in colleges of education especially including business mathematics as a substitute for general mathematics for admission.

1.7 Basic Assumptions of the study

For the purpose of this study, the following assumptions were made:

1) The knowledge of Mathematics will improve students' performance in Business Mathematics.
2) A good participation in departmental Business Mathematics will enhance students' performance in Financial Accounting in Colleges of Education.
3) Business Educators especially those who specialized in Accounting are good teachers of Financial Accounting.
4) Students' knowledge in Business Mathematics produces better understanding to Financial Accounting.

1.5 Delimitations of the Study

This study is delimited to the effects of Business Mathematics grades on students' performance in Financial Accounting in Federal Colleges of Education, North-Central Geo-political zone, Nigeria. The study is delimited to Business Mathematics in NCE 1 and Financial Accounting in NCE 2 of Business Education students' profile. This is so because both subjects (Business Mathematics and Financial Accounting) are core

courses at NCE 1 and 2 respectively which implies that no student can graduate without passing the two courses. This is to establish their current and authentic performances in Business Mathematics since majority gained admission with credit in Mathematics at O'level.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

This review addresses the effect of Mathematics grades and the role it plays in students' success in Financial Accounting in Federal Colleges of Education North-Central Geo-political zone, Nigeria. It will focus on the following:

2.1 Theoretical Framework

There are many theories on learning but the researcher examined the Theory of Hierarchy of Needs, which is the most relevant to the work under study. The theory of Hierarchy of Needs, propounded by Abraham Maslow in psychology (1943) states that the least or basic need must be met before the next one can be satisfied. The basic assumption underlying the theory is that every need must be met before someone can reach the peak which is self actualization. This theory has to do with learning or acquiring skills. In line with this, it can be said that Financial Accounting is a skill

subject which requires thorough practicing for any student who wants to excel in the career. It is also known as D-needs, meaning that these needs arise due to deprivation. Satisfying these lower-level needs is important in order to avoid unpleasant feelings of consequences. If each level of Maslow's hierarchy is examined, teachers can ensure that they have created a classroom space and climate that acknowledges and allows for physical, mental, and emotional needs to be met, while each student is additionally nurtured to grow to his or her self-actualized potential.

Maslow's hierarchy of human needs identified six needs of human beings such as physiological needs, safety needs, love and belongingness, esteem needs, cognitive needs, aesthetic needs and finally self-actualisation. Self-actualisation is the top of the pyramid where all the needs of the human being are satisfied, and that person is operating at their absolute peak. The self-actualisation is the one that relevant to this research since this need is concerned with the human tendency for personal growth but this cannot be achieved without a full satisfaction of each level. Importantly, students must be aware of the benefits of being Business Educators in order to boost their performances in Financial Accounting.

It is important to review that, teachers should know that abnormality behaviours in students are often a reflection of unmet needs, therefore, teachers should develop a mechanism to detect their students needs.

2.2 **History of Accounting in Nigeria**

It is important to briefly review the history of the accounting in Nigeria. By the seventeenth century, double-entry book-keeping became popular in the education of young men and women. Accounting was viewed as a social instrument; a device that enabled humans to better understand and control the business world. Given this fact,

Minga (2002) observed that the history of Accounting is as old as civilization, among the most important professions in economic and cultural development, and fascinating. Accounting enables business people to quantity, summarize and interpret the abstract process of business that could be evidenced by transactions and captured within the double-entry system (Previts and Merino, 1998). Twenty-first century accounting will resemble rocket science and will continue to be among the critical professions of the new century. Accountants have not excelled in public relations, but their story is fascinating and here it is. The father of accounting is known as Fra Luca Pacioli who was born in Sansepolcro, Tuscany. He was a Mathematician. He wrote and taught in many fields including Mathematics, Theology, Architecture, games, military strategy and Commerce. One section of his book was dedicated to the description of double-entry accounting which is the basis of booking/accounting. This made Pacioli a celebrity and ensured him a place in history, as "The Father of Accounting." He invented double-entry accounting, instead, he superbly described a method used by merchants in Venice during the Italian Renaissance. However, Pacioli introduced the world to the idea of debits and credits entered into journals and ledgers to help business owners "toll how they are doing" (Le Moine, 2004). His system included most of today's accounting routines such as the use of memorandums, journals and ledgers. His ledger included assets - receivables and inventories-liabilities, capital, income, and expense accounts. He described the year-end closing entries and proposed that a **trial balance** be used to prove a balanced ledger.

Many companies and individuals began to use the public accountant's services. The courts also employed them to aid in investigations of accounting matters, today know as forensic accounting. Also, "the arrival of the income tax laws was another major event in accounting history" (Le Monie, 2004). In 1920s, the legal profession believed that "since income tax returns were legal documents, they would have exclusive rights to

prepare them. Accounts replied that since that the bulk of the work in preparing a return involved accounting calculations, they were more properly accounting work" (Le Moine, 2004). The public accounting community saw a great opportunity in the tax arena. They had begun working vigorously with tax education and preparation. Meanwhile, US law firms began challenging the accounts for practicing law without a license. "Income tax preparation had been so thoroughly identified with accountants that the attorneys lost the case" (Le Moine, 2004).

Towards the end of the decade, the great depression and the stock market crash led to an investigation into corporate accounting practices. Although, several companies' records were falsely stated due to individual's fraud, the discovery that bookkeeping was done on 'generally accepted accounting principles'. There were no established rules or standards that the profession was governed by. The problem is that "since accountants were hired by and answered to corporate management, they served the needs of management, not the public. That meant that in practice; the primary function of accounting was to make management look good" (Le Moine, 2004). The American Institute of Certified public Accountants (AICPA) was created as the profession's rule-making body. The Principles Committee was established to set standard practices for the industry. It was then decided that audited financial statements were limited to only to certified public accountants. These accountants would be held personally liable for their audit reports to the public. Also, "the new Securities and Exchange Commission (SEC) required audit reports for all publicly traded companies" (Le Moine, 2004)

Happy (2007) observed that there is no accurate record as to when book-keeping started in Nigeria before the advent of the Europeans. He observed that it can, however be said that some form of traditional book-keeping was used to record financial transactions, such as credit sales, loans and periodic contributions.

It was observed that modern Book-keeping and Accounting began in Nigeria with the amalgamation in 1914 of the Northern and Southern Provinces to form the territory now called Nigeria. Based on the British system, the Colonial Governor being the Chief Executive and Accounting officer of the Colony rendered monthly and annually accounts of the colonial government to the colonial office in London. Private sector Book-keeping and Accounting might have begun earlier with the accounts rendered to its owners in the United Kingdom by the pioneering British Private Company – the Royal Niger company which was trading then in Northern and Southern Provinces.

Since the Royal Niger Company was essentially a branch of its United Kingdom head office, it would be right to assume that the accounts were prepared in the British fashion. In the early 1930s it was recorded that clerks were trained on the job as Book-keepers to keep financial records in firms and government offices. In 1950s few Nigerians who went to the United Kingdom to study accounting returned to mount the accounting positions firms in public offices and thereby trained Nigerians in art of Accounting. Between 1959 and 1969, some Accountants in Nigeria came together and thought of how to organize themselves into one group. As a result of this, the birth of the Institutions of Chartered Accountants of Nigeria (ICAN) came into being in September, 1965 with the passage of an Act of Parliament No. 15 of 1965. The Act established the institute of a legal body responsible for the regulation of the practice of Accountancy in Nigeria. It empowered the Institute to formulate plan for the training of professional Accountants for country by organizing qualifying examinations for students and setting up regulations to control the conduct of its members.

Johnson (2009) observed that today Junior Secondary Schools, Senior Secondary Schools, Polytechnics, Colleges of Education and Universities train people in the field of

Accounting. He stressed that to be a professional Accountants, one has to pass the prescribed examination of the accounting bodies, either in Nigeria or overseas. He pointed some of the recognized accounting bodies as

1) The Institute of Chartered Accountants of Nigeria (ICAN)
2) The Institute of Chartered Accountants in England & Wales (ACA)
3) The Chartered Association of Certified Accountants (ACCA)
4) The Chartered Institute of Public Finance and Accountants (CIPFA)
5) The Chartered Institute of Cost and Management Accountants (ICMA)
6) The Institute of Certified Public Accountants (CPA), USA

In order to go further, the discussion will focus on the concept of Accounting.

2.3 **Meaning of Accounting and Financial Accounting**

Accounting is concerned with accurate numerical measurement of precisely defined operational concepts. Accounting is the system a company uses to measure its financial performance by noting and classifying all the transactions like sales, purchases, assets, and liabilities in a manner that adheres to certain accepted standard formats. It helps to evaluate a company's past performance, present condition, and future prospects. Hellmuth (1991) opined that Accounting course uses a system of debits and credits as the basis for decision-making purposes. Throughout the NCE Accounting course, students use logic and problem-solving skills to gather and analyze data. In his view much of this analysis is centered on various Mathematics calculations accounting course draws on and reinforces one's Mathematics skills.

Roberts (1997) stated that Accounting is nothing more than the utilization of basic algebra applications. In view of this, students in accounting course will utilize addition, subtraction, multiplication, and division. They may also perform fractions, ratios, and

percentages calculations during first and second-year of NCE Accounting course. According to him, Accounting students use these algebraic applications to analyze and solve financial problems that simulate the real world.

Guest (2006) defined accounting as an art of recording, classifying, summarizing in a significant manner in terms of monetary transactions and events which are in a part of at least in financial statement and there result thereof. In view of this, Revaihi (2008) defined Accounting as a systematic practice of identifying, recording, measuring, classifying, summarizing, interpreting and communicating the financial transactions in terms of money of a business firm or an individual following a set of rules and regulations. He emphasized that the function is basically carried to maintain record of the business; evaluate the performance of a business; know the financial position of the business firm; control business activity effectively and to provide business information to the stake holders of the entity.

Azik (2010) asserted that Accounting is the process of recording business transactions in a systemic form so that the financial position of the business can be communicated to the users of such accounting information. In his view, Accounting is the language of business and an integral aspect of all business activities. Mastery of fundamental accounting concepts, skills, and competencies is essential to making informed business decisions.

Fareed (2010) argued that Accounting is very much connected with our personal lives in so far as it is in respect of every business. We all with intent or unknowingly generate accounting ideas in a way when we plan what we will do with money. We need to plan how much money will be spent whilst how much of it will be kept back. This activity is called budget and we all are familiar with this concept - which is universally acceptable,

that money must be spent cautiously. The same is true of a business. It is therefore imperative for a business to know about the inflow and out-flow of economic resources and their results. Thus, Accounting is the very need of a business to provide the information which is useful for sound economic decision making process and owing to the diversification between ownership and management.

From the above definitions, it can be concluded that Accounting is a systematic way of recording financial transactions especially in monetary terms that makes it easier to take meaningful decision or for decision making of any organization or individual's business. Amber (2008) supported this by considering Accounting as system of recording, verifying and reporting the transactions of the company into the books of accounts (ledgers). These transactions are categorized as assets, liabilities, revenues, expenses and shareholders' equity in the books of accounts.

Kalbers (2003) defined Financial Accounting has "the branch of accounting that focuses on the general purpose reports on financial position and results of operations known as financial statements". He added that these statements provide a continuous quantified in monetary terms of economic resources and obligation of a business enterprise and of economic activities that change theses resources and obligations".

AccountingCoach (2010) viewed Financial Accounting as a specialized branch of accounting that keeps track of a company's financial transactions. Using standardized guidelines, the transactions are recorded, summarized, and presented in a financial report or financial statement such as an income statement or a balance sheet.

Financial Accounting is a specialized branch of accounting that keeps track of a company's financial transactions, using stardardized guidelines, and presented in a

financial report or financial statement such as an income statement or a balance sheet. (http://answers.yahoo.com/question)

Accounting Education is an option offered under business education department in universities and other degree awarding institutions as well as institutions that award National Certificate in Education (NCE). At this juncture, there will be a discussion on the importance of Financial Accounting.

2.4 **Importance of Financial Accounting**

Accounting as other subjects has many characteristics, in view of this, the researcher will discuss the importance of Financial Accounting since Accounting leads with recording of business transactions in order to take a meaningful decision.

Investment and Business Accountants (2011) identified some of the importance of accounting as follows:

a) *It is used for decision making/analysing purpose:* All businesses and economically informed decision making are based on sound analysis of financial statement which is a product of "accounting information system". Without a properly kept account, this objective will probably not been achieved and business executives will all be acting in blindness. Since investors both current and potential base their investment analysis on accounting information being received. E.g. profitability, liquidity, efficiency etc are all obtained from the information provided by accounting information system.

b) *It keeps records:* No economy will stand well economically if records are not well kept and acted upon. Accounting is one of the primary vehicles of record keeping. Data are gathered from their various sources, collated, organized, analysed, interpreted and communicated to the end users for an informed

economic decision making that will in the long run yield positive fruit. Countries are able to plan their economic activities are chiefly as a result of the valuable information gathered through all forms of accounting (making use of statistical tools). Governments use the records of companies to make fiscal and monetary policies in order to generate revenue for the country.

c) *It prevents fraud and discoveries Of fraud:* Frauds can only be discovered and prevented in an environment where there is good internal control in place. And a good internal control cannot be in place where there is no form of keeping track of events. Accounting and accounting information system is the only way of keeping track of all these in an effective and efficient manner.

d) *It keeps proper record Of fund and loans:* Proper keeping of records allow someone to get loan from financial institutions if he/she can present her financial state of affairs in an acceptable manner. Accounting as a communication tool obviously have generally accepted formats which financial institutions and banks use as a basis for measuring the risk of a business.

e) *It keeps record of the business performance:* Accounting is used for recording how the business is performing from a financial viewpoint. So, each real life activity of someone's business gets 'accounted for'. Accounting is like a language that includes a mix of words and figures. It **translates business activities into numbers** that then get organized into particular reporting formats - such as small business financial statements.

f) *Reputation and credit building is guarantee:* Reputation and business credit scores can be improved by the simple act of establishing and operating a sound accounting information system in an organization. The belief is that any company

that has the grace to have an accounting system in place will be efficient in all other aspects of business operations.

Abiola (2008) observed the following as importance of accounting in today's world as follows:

a) It provides accurate reports on financial stands of a business;
b) It provides records for tax information and assessment;
c) It provides true financial position of a business at a particular time and make financial records and information available for planning.

Cathy (2009) observed the following as the importance of Accounting Education.

a) Accounting is a life blood of running any business. It serves as a tool for improving the business and helps it reach its full potential.
b) Accounting statements are used by individuals externally to determine the value of a company.
c) A small business requires a reliable accounting system. This would help individuals to maintain an earnings record of all the revenue and the expenditure of their businesses on a daily basis.
d) It helps individuals to keep track of the progress of how their business is doing.
e) Financial accounting statements can be used to assess management effectiveness by showing the spending of allotted resources and helping to assess whether management should be sent to work in another department or replaced altogether to increase the profitability of the company.

Also, Johnson (2009) highlighted the following as importance of Accounting Education in today's world.

a) An Accounting Education is important because it can be applied in all job specialties. Secretaries must use accounting skills to manage the company cheque books and orders, auditors have to study financial statements to evaluate the accuracy and integrity of the business, and executives from the past and present. These are just a few of the many possible positions where an understanding of accounting is necessary.

b) It is important that everyone, not just business students, acquire an understanding of accounting for personal benefit. People use accounting in their daily lives when they study financial statements to make investment decisions, assess interest rates to pay off their house mortgages, and calculate rates for car payments. In the business world, accounting is utilized in much greater depth, but each individual encounters some activities in his/her everyday life that requires knowledge of accounting principles. Accounting is the most basic framework of business without an Accounting Education, students would be unprepared for the real world.

Fareed (2010) highlighted the importance of Accounting as follows.

a) It provides information to decision makers who are external to the business. Shareholders, however, need information to evaluate the performance of the business and the advisability of retaining their investment in the business. Financial accounting provides some of the information for this purpose; such information is also used by potential shareholders who are considering an investment in the business.

b) It protects the creditors and potential creditors: firms often seek loans from banks, insurance companies, and other lenders. Although creditors are not internal parties of those firms, they need information about them so that funds are loaned

only to credit-worthy organizations. Financial accounting will usually provide at least some of the information needed by these decision makers. Almost all business activities around the world use this word to make decisions, so often referred to as the language of business. The accounting definition is a process of recording, classifying, summarizing, processing and presenting data, transactions and events relating to finance, so it can be used by people who use it to easily understandable for making a decision as well as other purposes.

The primary function of accounting is as an organization's financial information, so we can see the financial position of an organization along with the changes that occur therein. This was made qualitatively with the unit of measure of money. Information on financing is needed especially by the manager or management to help make decisions of an organization. Basically, the accounting process is to make the output of the income statement, statement of changes in capital and balance sheet reports on a company or other organization. Therefore, on each report must include company name, report name, and date of preparation or the report period to facilitate other people understand it. Reports can be periodic, could also be a certain time only.

Accounting has a process that consists of the stages to be able to generate the desired reports and conducted by an accountant. The following are some of the stages.

1) Clarifying process transactions: The initial phase is to conduct a division of an organization or corporate transaction in certain types predefined. Examples of such divides transactions into the sales, purchasing, cash disbursements, cash receipts, etc. into each piece. While for a small number of transactions and rarely occurs can be equally incorporated into the same category type which various transactions.

2) Process recording and summarizes subsequent accounting process is done recording. Enter your existing transactions into the appropriate journals in the order of the transactions or events. sources that can be used as evidence of a transaction which is like a kind of business paper receipts, bills, notes, receipts, certificates, and others. Journals commonly available in the accounting journals such as the sales journal, purchases journal, cash receipts journal, cash disbursements journals and general journals. The next process is to enter into a ledger journals regularly. Results of transfer into the general ledger will be seen from the summary trial balance.

3) *Interpreting and reporting processes:* Final accounting process is to conduct activities or making conclusions of previous financial statements of work. All matters relating to corporate finance is poured on those statements. From information on the financial statements of both, in the form of income statement, statement of capital and balance sheet, then someone can find out what happens to a company, whether already in accordance with company objectives. Such information can be a reference or guidelines for the management to take policy decisions on the organization to achieve desired conditions.

The researcher views the meaning of Mathematics education as related to Accounting education.

2.5 **Meaning of Mathematics**

The literature review in this sub-heading focuses on Mathematics Education. The reform of Mathematics education in the United States has been a discussion point since the mid-1980s (Battista, 1999). However, Mathematics continues to be taught as it has traditionally been taught: the students are given several examinationples of problems to solve, they practice them in class, and then they have homework assigned that involves

similar problems. He stated that Mathematics education in the United States is Basic memorization of procedures and the eventual forgetting of these procedures since the procedures make little sense to the students which are the same thing in Nigeria schools. Much of the same Mathematicsematic concepts are taught year after year, but students never seem to actually learn and understand the concepts. Too many times students simply memorize formulas that are quickly forgotten or not completely understood. Battista further explained that much of the Mathematics taught in United States schools today is almost the same material that most adults learned when they were in school.

Making a personal and real world connection of what is being taught in Mathematics classrooms is important. Hyde (2007) stressed that classrooms that do well in international comparisons are designed with personal and real world connections. Unfortunately, the personal and real world connections are missing from many Mathematics classrooms in Nigeria. Blending Mathematics, language, and cognition is what needs to be done to build a stronger personal and real world connection. Literacy strategies of connecting new material with background knowledge can help students develop a stronger understanding of the Mathematics concepts; thus, making the necessary connections. What the student reads in the textbook must also relate with things in the real world.

He further said that to make the changes to higher level thinking and to greater achievement in the Mathematics classroom, the traditional way of teaching Mathematics must change. Hyde believed this is possible by creating classrooms and curriculum that imbed language and thought into Mathematics. In other words, teachers need to ask students relevant questions so students can make the necessary personal and real world

connections. The research will focus on the various ways in which Mathematics can be referred to as:

2.5.1 **Mathematics as a language**

Slowly and mostly unwittingly, the use of Mathematics as source of clarifying examination will lead economists to introduce a more explicitly Mathematics language in their writing. In this process of cultural enrichment, three trends emerge (LiCalzi and Basile, 2010).

The existence of this price – optimum price leads to the highest possible revenue – justifies economists' efforts to supply precepts that help businessmen determine the best price at which to sell their products. The proof is a simple but genuine application of Mathematics to accounting. Not for nothing, Cournot is often considered the father of Mathematics economics. However, scholars like Cournot remain rare until 1870 and Cournot himself will not write about economics after 1838.

More common, instead, is the tendency to introduce a more Mathematics language as a natural complement to a search for rigour, which however is not identified with Mathematics rules. The main communication means used by scholars in economics remains mainly non-Mathematics, with occasional intrusion of Mathematics terminology.

Mill states that the exchange rate of a currency must be such that the value of imports is equal to the value of exports. Expressed as "equation of international demand", the same proposition can be given in a Mathematics form. Thus, Mathematics can be used as a language to discuss accounting. The spreading among economists of the awareness that Mathematics can be a language with which one can communicate economic theory and build applications is one of the important causes of all the successive transformations in

the relationship between Mathematics and accounting. For simplicity, we will gather them in three categories.

2.5.2 **Mathematics as a knowledge tool**

The most successful applications of Mathematics to accounting have extolled its role as a knowledge tool. Numerous economic/accounting theories have been set out and perfected thanks to the systematic and enlightened use of Mathematics.

Among these applications, we will mention seven: a) the theory of general economic equilibrium, based on a Mathematics similar to that of rational mechanics and later on the methods of differential and algebraic topology; b) the theory of rational expectations, founded on statistical inference and on dynamic programming; c) game theory, which has even generated its ad hoc Mathematics; d) economics of uncertainty, based on the same theory as game theory as well as on probability calculus; e) the theory of social choice, founded on algebraic methodology; f) Mathematics finance, which has enriched the theory of continuous time stochastic processes; g) the theory of optimal resource allocation, from which linear programming – and, more generally, operational research – developed.

The first author is Frank P. Ramsey (1903–1930), who died at a very young age, but authored absolutely original contributions on three different problems: providing a general criteria for decision-making under conditions of uncertainty (1926, published posthumously in 1931); determining the best income taxation system (1927) and establishing the best way to accumulate national savings (1928). The latter work introduced the use of calculus of variation in economics, bringing to economists' attention the necessity to introduce techniques to solve dynamic optimisation problems.

The second author is John von Neumann (1901–1957): versatile genius, with sporadic interest in economics, he nevertheless provided absolutely original contributions to this discipline. In fact, he found the first general solution to purely antagonistic games between two people (1928); provided the first model of economic growth with conditions for the permanence in time of the equilibrium (1937); together with Oskar Morgenstern (1902–1977), he placed into a system framework some previous intuitions by founding game theory and decision theory (1944).

The third author, still unknown to most economists even today, is Louis Bachelier (1870–1946). In his doctoral thesis (1900) on speculation problems, he represented price movements of financial activities through random walks, anticipating by a few years Einstein's Brownian motion (1905) and by seventy years the use of martingales in the Mathematics representation of an efficient market.

The contribution of Mathematics to economics, however, is not limited to its role as a knowledge tool with respect to theories. As said earlier, starting from 1870, the marginalist revolution consciously transforms the use of Mathematics from a language into an analysis technique. In this process, economic theory is more and more characterised by the systematic use of the axiomatic formalism typical of the deductive method. The limitation of this approach is that it allows the development of theories of general importance, but does not provide predictive models bound in space and time.

Starting from 1930, under the pressure of statisticians, a second – and parallel – process of formalisation concerning empirical observations affirms itself. To understand the world and foresee what is going to happen, a quantitative science is needed which can manipulate statistical data, from which it needs to derive descriptive and predictive models, whose validity is based on formal but empirical criteria. In a sense, it is the

revenge of the inductive method over the deductive method. Next to Mathematics economics, which reduces economic phenomena to theorems, econometrics is born, with its aim to measure economic phenomena. The next paragraph focuses on the relationship between accounting and Mathematics.

2.6 **Relationship between Accounting and Mathematics**

The ability to compute complex Mathematics equations may be an advantage to a student studying accounting. Prior research by Clark and Sweeney found a relationship between college Mathematics grades and success in Intermediate Accounting (Clark and Sweeney, 1985). The study found that college Mathematics and calculus were very important areas of Mathematics for accounting students to study. Clark and Sweeney found statistically significant evidence that a student's grade in college Mathematics was a solid predictor in the student's success in later accounting classes.

Gist (1996) studied the relationship of Mathematics/algebra/calculus performance of students to the success in introductory accounting classes. The study revealed that students who had received a grade of "C" or better in calculus did better than other students in an introductory level accounting course. However, the study concluded that success in algebra and on a Mathematics pretest did not significantly increase the performance in an introductory accounting class.

In summary, Smith (1986) and Schroeder (1986), on prior accounting experience as a predictor of success in a college introductory accounting course has been contradicting; with some studies showing a strong relationship, while other studies showing a not so strong relationship. Research on Mathematics education United States, Battista, (1999) and Hyde (2007) has reported that the personal and real world connections are missing from most Mathematics classrooms. Many times students memorize procedures with

little understanding. Understanding complex Mathematics equations and process may be an advantage to a student studying accounting. Clark and Sweeney (1985) found that college Mathematics and calculus are important areas for accounting students to study. However, little research has been done on the relationship of high school Mathematics and high school accounting.

This study is similar in approach to studies which examine a broad range of cognitive and non-cognitive factors that affect accounting performance such as academic aptitude, Mathematics proficiency, age, gender, study effort, work experience, and high school accounting (Gracia & Jenkins, 2003; Gul & Fong, 1993; Naser & Peel, 1998; and Wooten, 1998).

Nick (2002) identified that there are strong parallels between accounting and two important areas of Mathematics the elementary algebra and the calculus. He added that these reflect the origins of algebra in accounting and origins of some of the basic concepts behind the calculus in accounting. Guest (2003), argued that the relational level of cognitive complexity of Mathematics that is achieved could facilitate student's performance in accounting courses thereafter, helping them to integrate relevant points into a coherent structure. He stressed that imply that the extent to which such externalities exist in teaching and learning depend on how closely the topics are related, what fundamental concepts, methods of analysis and ways of understanding are common to all of the topics. Mathematics is crucial not only for success in school, but in being an informed citizen, being productive in one's chosen career, and in personal fulfillment. Similarly, Tai; Sadler and Mintzes (2006) attempted to identify the factors that determine the final course grades of college students, and found that demographic and educational factors are both particularly significant. The educational factors included

high school Mathematics grades, Scholastic Aptitude Test scores in Mathematics, and the completion of a high school calculus course.

Budi (2007) emphasized that Mathematics is indispensable to economic and business. Mathematics is compulsory for students of accounting and business from the diploma programme up to the graduate programme. For undergraduate students, Mathematics-related courses are even given in two to three semesters. They are given under different course names: Mathematics for economics, quantitative methods, quantitative analysis, and management science. The problem is, in most universities, students of accounting and business only learn Mathematics that is of little relevance to them but of high relevance to students of economics. It is better for the students of accounting and business to know how to make a savings schedule for financial/pension planning; calculations of various yields, returns, interest rates, and stock indices; and valuations of any assets and securities (stocks and bonds) using present value approach.

This study departs from these other studies through its focus: it is primarily interested in non-cognitive factors related to the amount of work or effort students put in, and in behaviors which may influence the quality of studying. It still builds on the results of previous studies by including factors well-known to affect accounting performance as control variables to separate out the effect of Study Habits Study Attitude (SHSA) variables.

In conclusion, accounting was based on Mathematics knowledge as codified in Luca Pacioli's book of Mathematics. Using the Mathematics perspective, the present research review several basic issues in textbooks of accounting principles commonly employed so far, and presents a rationality based on clear arguments over the rules of debits and credits. In view of this, it is opened for the addition of the elements of accounting

equations as well as new accounting topics developed Mathematics. This leads to the identification of factors that influence Accounting performance.

2.7 Factors Influencing Accounting Performance

Based on this, the following factors are listed as some of the factors that influence students' performance in Accounting.

2.7.1 Control Variables

Most researchers agree that academic aptitude has a positive effect on accounting performance (Doran; Bouillon, and Smith, 1991; Eskew and Faley, 1988; Hartnett, Romcke and Yap, 2004; Tho, 1994; Tyson, 1989). There is also a similar consensus regarding Mathematics proficiency having a positive effect on accounting performance (Eskew and Faley, 1988; Tho, 1994; Tyson, 1989).

Accounting performance researches which include language proficiency as a predictor variable are rare since most of these researches are conducted in English-speaking countries such as the United States, England, and Australia.

Two researches done in Hong Kong (Gul and Fong, 1993; Wong and Chia, 1996) though, show that English proficiency is significantly positively associated with accounting performance. College students who have taken accounting studies during high school have been found to perform better in their college accounting course since they are usually tested on topics which were taken in high school (Eskew and Faley, 1988; Gracia and Jenkins, 2003; Lynn, Shehata and White, 1994; Naser and Peel, 1998; Tho, 1994). Finally, gender has been included in many studies, but the results are mixed.

Doran et al. (1991), and Koh and Koh (1999) found that males outperform females while Gracia and Jenkins (2003), Tho (1994), and Tyson (1989) found it to be the other way around. Lee (1999) and Lynn et al. (1994) found either no or inconsistent effects. It

seems that there are other intervening variables that interact with the gender variable to produce either a positive or negative effect, such as the ratio of male to female students in the class (Tho, 1994), or the students and teachers having the same gender (Lipe, 1989).

2.7.2 **Study Habits, Skills and Attitudes (SHSA) Factors**

Motivation and hardwork have been identified to be almost equally as important as, or more important than, cognitive factors in explaining students' academic performance. Students who are highly motivated achieved better grades than their peers (Harrell, Caldwell and Doty, 1985). Motivation can influence effort, which in turn significantly influences accounting performance (Wooten, 1998). Anthony (2000) found that students and faculty rate "self-motivation" highly among the factors most likely to influence success in Mathematics subjects, as shown by their drive towards completion of assignments and passing the examinations. Among the factors most likely to influence failure in Mathematics subjects, both groups rate "lack of effort" highly, and this was shown through low class attendance and less than 20% of the students spending the recommended 12-13 hours of study per week on their Mathematics course. It is notable here that these factors rate more highly than inadequate Mathematics background knowledge. Dewan and Kaplan (2005) explained why a group of students with average grades in first-year statistics and average GPA perform more poorly in their 2nd year finance course than the group of students with even lower grades in first-year statistics and GPA. They think that since the finance course requires more application, these students lack the drive for hard work to go beyond memorization despite their innate ability in the foundational subjects. Lounsbury, Gibson and Hamrick (2004), show that work drive, defined as "a disposition to Darwin D. YU work long hours, take on extra

responsibilities at work, display a high level of energy at work" (Lounsbury et al., 2004), explain as much as 13% of the variability of middle school children's GPA.

Regarding the amount of study time as a measure of "hard work", findings have been mixed so far. Nonis and Hudson (2006) found that the amount of time spent studying, measured during the ninth week of a 15-week semester, has no direct influence on academic performance, although it interacted with academic ability to affect academic performance.

On study skills and habits, the results have been mixed and may have depended on which specific study habits were measured. Positive results were found when some combination of study behaviors such as attendance, homework turned in, and use of study guide, prior preparation for the class, participating in class, and coming to class on time were used (Gracia and Jenkins, 2003; and Wooten, 1998). Group learning activities can result to an increase in students' deep learning approach, which has been known to improve analytical thinking (Hall, Ramsay and Raven, 2004).

The teacher has been identified as having substantial impact on student achievement (Nye, Konstantopolous and Hedges, 2004; Rockoff, 2004). These studies involve measuring actual teacher traits, credentials, and experiences.

Coleman et al. (1966) suggested that educational achievement is determined by factors beyond the control of educators and depends exclusively on the home environment and peer group. Hanushek, 1986, 1989; has found that school input and teachers do matter, in the present study. One of the factors commonly investigated is gender differences. Previous studies (Mullis, Mullis, Martin, Beaton, Gonzalez, Gregory, Garden, (2000) have shown that male students outperformed female students in Mathematics at junior

secondary and senior secondary school levels. Furthermore, there were significant differences in attitudes toward Mathematics between the two genders.

In 2003, TIMSS focused on just a few variables to present students' backgrounds. These variables were level of parental education, which refers to the highest educational level of either parent; student's educational aspirations; speaking the language of the test at home; having a range of study aids in the home; and computer use at home and at school. There is abundant evidence that students' achievements are related to home background factors (Mullis et al., 2000).

According to a report of TIMSS (Mullis et al., 2004), a higher level of parental education was associated with higher student achievement in Mathematics. It was also found that students had high expectations of university education, and, in particular, those who had a parent with a university education showed higher achievement. Furthermore, students expecting to finish university showed substantially greater average achievement in Mathematics than did those without university expectations. Unlike other countries in the TIMSS study, Malaysian students from homes in which the language of the test was always or almost always spoken showed lower average achievement than did those who spoke it less frequently. TIMSS also found that students with literacy resources such as books and study aids, a computer, and a study desk or table showed higher achievement than those from less advantaged backgrounds.

Besides students' backgrounds, students' activities and attitudes were also investigated in TIMSS. These variables included time spent on homework, students' self-confidence in learning Mathematics, and students' motivation to learn Mathematics, which was represented in terms of students' valuing of Mathematics. It is believed that students' motivation to learn Mathematics can be affected by the extent to which students find the

subject enjoyable, place value on the subject, and think it is important for success in school and future career aspirations (Mullis et al., 2000).

The relation between students' perceptions of being safe in school and achievements was also investigated in the TIMSS report. In general, students who had better perceptions of being safe in school scored higher than those who had worse perceptions. The next paragraph focuses on effect of attitude in Accounting education.

2.8 **Effect Of Attitude In Accounting Education**

The attitude of the students determines their performances in a subject, either positively or negatively. In view of this, the research will focus on effect of attitude in Accounting Education.

Intellectual achievement is not the only concern of education. Effective education is equally important and is also part of the teacher education curriculum. Effective education includes the confidence learners develop about their own abilities, their relationships with others and their willingness and ability to express themselves. Effective education also pertains to values and attitudes (Mpofana, 1993 in Selesho 2005). Most students have heard ''horrific'' stories about Accounting and enrol for the course with the belief that they will do poorly. As a result, learners have developed a negative attitude towards the subject and they refuse to put in the effort, necessary to do well in the course. A passing grade is all that most students seek and a passing grade is all that they achieve (Davidson, 1996:p219-231).

A considerable amount of importance is attached to the promotion of favourable attitudes among learners to the learning of Accounting. It is a general belief that a positive attitude to a subject leads to more effort being devoted to it (Jacobs, 1989:p219-220).

Consequently, interest in Accounting can leads to higher achievement and willingness to pursue Accounting in subsequent studies. Accounting students must be encouraged to develop a positive attitude towards Financial Accounting.

An investigation into attitude centres mainly on these dimensions, which are the difficulty of the subject. These dimensions are focused on Accounting as a school subject as well as on the various sections of it (Mahmoud and Nouruyi, 1993:p111-115). Accounting students who have a negative and positive attitude consider accounting useful.

It is worth mentioning that some research studies refute the idea that attitude has an effects on one's achievement. “It is difficult to determine whether attitude affect performance or vice versa” (Mpofana, 1993:p47). Nevertheless, it is inevitable to recognize attitude as a critical factor in any teaching-learning situation. It must be noted that people have a special attachment to their attitudes for idiosyncratic and other reasons (Jacobs, 1989:p219-220). That is why they are more often not unprepared to change their attitudes. There is a need for changing attitudes in view of the fact that many of the attitudes that people have are likely to be a function of "erroneous beliefs based on emotional reactions, illogical reasoning and faulty generalization" (Mwamwenda, 1996:p56).

Attitudes and values are among the vital outcomes developed at school, and they are important in determining how individuals react to situations and what they seek in life. Attitudes, to a greater extent than concepts and psychomotor abilities, are acquired through imitation and conditioning. Some attitudes are learned early and become firmly established with increasing experience while they undergo change. Most attitudes to learning and modification occur at all school levels (Atamian and Ganguli, 1993:p37-

49). The 4 phases of problem solving in Accounting education shall be examined as follows.

2.8.1 **Four Phases Of Problem Solving**

For the purpose of this research, the researcher will focus on the problem solving. Selesho, (2005) referred to Polya's 4 phases of problem-solving i.e. understanding the problem, selecting a strategy, carrying out a plan and looking back. The following are the phases of problem solving in Accounting.

2.8.1.1 **Understanding The Problem**

Naidoo (1991:p38-40) stresses the value of understanding as an aid to problem solving. The problem solver has to "internalize the information of a problem" by developing a representation of the information. It is through understanding that a decision can be taken on the strategy to be used.

Understanding allows for progress to be made towards the solution to be evaluated. Understanding promotes the transfer of knowledge so that the learner can apply his newly gained knowledge to other situations, including an extension of the particular problem. If the student can be able to understand an Accounting problem, failure to understand the Accounting problem can have a disastrous effect on the ability of the student to perform academically. Wolk and Nikolai (1997:p1-12) indicate the possibility to help the learner understand the problem that is to improve the skills and knowledge of the learner regarding Accounting targets.

2.8.1.2 **Selecting A Strategy**

The educator's role at this stage is to offer hints. Students should be allowed to find a suitable strategy for solving the problem on their own but must not be left to struggle on

their own for too long, since this decreases their motivation (Naidoo, 1991:p38). Homework and self–activity should be encouraged. Clear guidelines have to be given to the learner about what is required in the homework. Wheeler (2001:p125) said that if learners are given clear guidelines they are able to select the best strategy on how to solve the problem in Accounting. A lack of competence in Accounting is often perceived by the students as a primary cause of their failure to understand the question.

2.8.1.3 **Carrying Out The Plan**

In order to carry out the solution students must have the self-confidence to be persistent. When a particular strategy is chosen the learners should be encouraged to persevere with it until they have good reason to believe that it will work. Emphasis should be laid on thinking things through and discussing the steps of the solution within the groups (Naidoo, 1991:p39).

2.8.1.4 **Looking Back**

Naidoo (1991:p39), looking back does not simply mean evaluating the answer, but focusing on how the solution was arrived at. This can be done by allowing one or two members of the group to explain to the class how the strategy was employed, discussing the form and validity of the answer and seeing if the solution can be used in an extension of the problem. The modern ways of acquiring accounting skills are discussed as follows.

2.9 **Modern Accounting Skills required by Accounting Education students**

The modern accounting skills necessary nowadays will be discussed in this paragraph. Azik (2010) identified some of the possible ways of acquiring modern Accounting skills for Accounting Education students as follows in a - d

a) *Microsoft Excel* is a package or application that has loads of calculation capabilities that helps in computing total sales, profit and loss made by an

organization, preparation of bank and income statement etc. The graphic aspect of the Microsoft excel package is used in charts of different types and graph. Microsoft excel package helps in inventory management and it is highly suitable for preparing an organizational payroll.

b) *Sage Accounting scheme* encourages accounting trainees of all sizes to become ICT specialists. Knowledge of Sage accounting package enhances good credit control in an organization by guidance on preparation of control accounts as a result of a good design of nominal records. Sage accounting facilitates the preparation of budget and financial reports.

c) Peach tree Accounting package help the recipients develop skills in Management Information System. The training in peach tree accounting package exposes the trainees to the knowledge of inventory management records as well as management of system frauds. Adequate journal preparations are made with peach tree accounting and the learners equally develop skills in preparing cash flow statement.

d) Microsoft Access exposes the learners to the basics in data base creation of table's option. The trainees acquire skills in production of works like students, banks, and organization's data base. Reports of various forms are designed using Microsoft access.

Umezulike and Ile (2008) stated that to train our accounting education graduates to be viable, identifying opportunities around them and as well as use I.T. skills to liberate themselves from the mandate of perpetual hardship and poverty, there is need for adjustments in some educational courses and the integration of vocational and more IT courses into the accounting education curriculum of instruction. This is based on the fact that accounting education programme of most universities and colleges failed to

inculcate the knowledge of these IT skills. It is pertinent that these skills are inculcated to the students for programme relevance. A programme can only be relevant when it serves the societal needs.

2.10 **Empirical Studies**

The following researchers' works are reviewed in order to serve as a basis for this present work.

Gallo and Johnson (2008) were interested in determining what factors influence a student's ability to apply basic Mathematics knowledge in applied settings. They did so by administering a two part Mathematics examination to 696 students enrolled in various economics courses ranging from principles to upper level applied courses. This first part of the examination contained a set of 15 multiple choice questions designed to test basic Mathematics skills that students should have mastered in high school or in a college algebra class. In the second part of the examination, students were given a series of three problems containing practical uses of basic Mathematics knowledge. The scores on the two parts allowed the researchers to directly correlate a student's basic Mathematics aptitude with their ability to solve simple applications of Mathematics.

The results indicated that students who took advanced Mathematics courses performed significantly better on the test, while the effect was negative for students who had only taken algebra. It is important to mention that there was a positive correlation between the performance on test one and the Mathematics courses students took which could be reducing the positive impact of Mathematics courses on student performance. Therefore, a credit in Mathematics is justified in this case and it is equally expected of students in Federal Colleges of Education to do well in Financial Accounting.

This study established the need for high level performance in Mathematics before the knowledge can be appropriately put to use in applied cases such as in Financial Accounting. The population of the researchers was adequate with the instrument employed but failed to give the sample size of the study. However, this work has benefitted from the literature review of the study.

Yunker, Yunker and Krull (2009) conducted a study on "The Influence of Mathematics Ability on Performance in Principles of Accounting". The study sought to determine the effect of Mathematics skill on academic success in accounting in two ways. First, their intention is to statistically estimate the *incremental* effect of Mathematics ability on performance in principles of accounting, holding constant other important determinants. Mathematics ability is obviously correlated with general intellectual ability.

The methodology of this research was empirical. At the beginning of the semester, students were given Mathematics pre-test. The test items covered certain areas especially relevant to accounting. After the end of the semester, each student's performance on the Mathematics pre-test (overall and in each area) was matched with his/her overall performance in the principles of accounting course. Regression analysis of the data indicates that: (1) the positive effect of Mathematics skills on accounting performance is strongly significant; (2) controlling for the student's general ability and other key factors bearing on accounting performance, the measured incremental effect of Mathematics skill on performance is quite small; (3) in numerical terms, the measured incremental effect of the different branches of Mathematics on accounting performance is very similar.

The Mathematics pre-test instrument was administered unannounced on the first day of class in all sections of Principles of Accounting I and II at a regional Midwestern public

university at the beginning of the fall semester, 2005. Virtually all students enrolled in the Principles sequence took the test, for which 25 minutes was allowed. Within two weeks of taking the pre-test, each student respondent received a personalized feedback report containing a list of the questions together with the respective correct answers and percentages of respondents answering correctly.

The researcher estimated the incremental effect of Mathematics ability on student performance in Principles of Accounts by means of regressing student performance and the overall effect of Mathematics ability is estimated, and also the effect of Mathematics ability in specific areas of Mathematics such as proportions and percentages. It is found that while each one of the Mathematics score variables is highly significant according to the standard t-statistic test, the overall explanatory power of the regression equation, as measured by its R-squared, is not increased very much in a numerical sense by the addition of any one of them to a regression equation that already includes as an explanatory variable Grade Point Average.

Here, the researcher covered all necessary basic Mathematics operation which is related to Accounting and it was established that there was a high correlation between the two subjects.

The sample size of the work was not stated even the number of population was not mentioned too. It was revealed that Mathematics was highly correlated with other academic works. However, the methodology of the work was empirical which the present study has adopted too.

Williams (2009) conducted a research work on "Analysis of the Relationship of Mathematics Ability and Success in Accounting 1 and 2 at Sheboygan South High

School in South Africa". This study aimed at examining the relationship between college Mathematics courses and success in a college intermediate accounting course. However, little research has been undertaken to analyze the relationship between a high school algebra course and a high school introductory accounting course. This research work attempted to determine if there was a relationship between Mathematics ability in high school algebra and success in a high school introductory accounting course. Student proficiency levels were examined through a state standardized testing model to determine the relationship between state Mathematics test scores/proficiency levels and final grades in the introductory accounting course. Seventy-five students were considered for the population and sample.

Results revealed that students who had received a grade of "C" or better in calculus did better than other students in an introductory level accounting course. However, the study concluded that success in algebra and on a Mathematics pretest did not significantly increase the performance in an introductory accounting class. The population of the work was too small for the nature of the work. Although, the present work has benefitted from literature review of this study in order to establish whether truly a credit in Mathematics does not really influence the students' performance in Financial Accounting in Federal Colleges of Education in Nigeria. Also, the work used academic profiles which the present work has adopted.

Minga (2010) conducted a research work on "Demographic Factors, Accounting Grades and Mathematics Skills: Evidence from a South African University". This research attempted to examine among others whether in spite of the same lecturer, tutor and other similar environments (Like course material, assignment and work environment) demographic factors like colour and gender explain the performance at a second year

Accounting course. Survey design method was adopted for the study, with the population of two hundred and seventy-three (273) students in which all of them were served with the questionnaire. A total of two hundred and six (206) copies of the questionnaires were completed and returned. Data were gathered from two scores. First from the University's records office and secondly from a questionnaire designed for the purpose of this research. All the respondents were taking second year level and above (accounting) courses.

The data were analysed in stages. The preliminary stage was computation of descriptive statistics and correlation co-efficient to test whether the data were sensitive to gender and colour issues. Secondly, the opinions of students in the various years, about the importance they attached to certain preparatory level courses were summarized. The rankings were further tested to check whether there was a consensus among the respondents. Thirdly, correlation and regression analysis were conducted to see whether certain high school and first year courses do explain grades obtained in accounting II, Accounting III and Management Accounting courses.

The findings of the study revealed among others that there was relationship between certain Mathematics and Communication Skills and success in University level Accounting courses, and that average matriculation scores and aptitude test results have been found to be associated with grades obtained in elementary and intermediate level Accounting courses. Among the recommendations made by the researcher were that Universities should set admission criteria for admitting students for accounting education, the researcher added that if students were selected with quantitative backgrounds they will perform better in the class.

The research design, sample size and instrument adopted were adequate. However, the students profile and statistical instrument adopted have been benefitted to the current study. The work equally added to the literature review of this current research work.

In a related study, Jubril (2011) conducted a research work on Relationship Between Entry Grades in Mathematics and Students Performance in Financial Accounting in Federal Colleges of Education in Nigeria across three zones. The study aimed to investigate the relationship between students' entry grades in Mathematics and their ability of solving problems in Financial Accounting within a stipulated time.

A correlation design method was adopted for the study, with the population of 655 students. A total of 270 students were sampled by using random sampling technique. Data were gathered from two sources. First from the Colleges' records office in Mathematics (O'level Mathematics results) and secondly from Accounting Diagnostic Test which was administered to the students in three phases. All the respondents were taking from NCE 3 level in Accounting option.

The data were analysed in stages. Descriptive statistics of frequency counts and percentage (%) were used for computing personal data of respondents. Secondly, frequency, percentage scores, mean score, range were used for answering research questions. The linear regression was used to test the extent of the relationship between entry grades in Mathematics and students performance.

The findings of the study showed that there was significant relationship between students entry grades in Mathematics and their ability of solving problems in Financial Accounting within a stipulated time in Federal Colleges of Education in Nigeria. Furthermore, he findings of the study showed that there was relationship between

Mathematics and Financial Accounting in Federal Colleges of Education in Nigeria. Among the recommendations made was that orientation programmes should be mounted to enlighten the secondary school students on the need to develop interest in Mathematics. The instruments, research design and sample size adopted were very good which the current study is going to benefit from it.

Although this study added to literature review of this study, but it has only replicated the conclusion of other works cited earlier establishing a correlation between knowledge of Mathematics and Financial Accounting skills. However, the present study seeks to ascertain whether Business Mathematics offered in NCE 1 has any significant effect on students' performance in Financial Accounting that is offered subsequently in NCE 2. To this effect, the current study is targeted at NCE 1 and 2 where Business Mathematics and Financial Accounting are actually offered.

2.11 **Summary of Literature Review**

In summary, the knowledge of Mathematics is very important in the success of the students in accounting and other field of studies. It is indispensable to Business Education especially accounting students. Mathematics is part of the core subjects that is being taught within the educational setting.

In the first sub-focus discussed the Theoretical framework which made of Maslow theory i.e. theory of Hierarchy of Needs. The basic assumption of this theory is that every need must be met before someone can reach to the peak which is self actualization. The next topic traced the History of Accounting in Nigeria from seventeenth century to the present time and also observed some recognized accounting bodies. Subsequently, the concept of Accounting was discussed with meaning of Accounting Education. The importance of Financial Accounting was also discussed, such as it prevents fraud, it provides

information to decision makers and it keeps records. The concept of Mathematics Education was discussed, this identified Mathematics as a language and as a knowledge tool. The relationship of Accounting and Mathematics was also discussed with some scholars identified the relationship to be that there are strong parallels between accounting and two important areas of Mathematics the elementary algebra and the calculus. Factors influencing Accounting performance was also taken into consideration to be Mathematics proficiency, gender, Study Habits, Skills and Attitudes (SHSA) factors, these deal with motivation, attendance and note-taking. The report from TIMSS revealed that level of parental education, literacy resources such as books and study aids, a study desk or table showed higher achievement than those from less advantaged background. Group learning activities improve analytical thinking too. The effect of attitude in Accounting Education determines their performances in a subject. It is revealed that a positive attitude to a subject leads to more effort being devoted to it. Four phases of problem-solving were also identified to be understanding the problem, selecting a strategy, carrying out the plan, and looking back. Modern Accounting skills required by Accounting Education students were also identified.

Lastly, five related works were reviewed under empirical studies that have to do with the present work. While some reviewed studies established a correlation between Mathematics knowledge and knowledge required in Financial Accounting, some have more or less established a disconnect. It is, however, worthy to note that virtually all the works had concentrated on students supposed entry behaviour in Mathematics without ascertaining the authenticity of such claimed bahaviour as expressed in the students' entry certificate requirement such as the O'level certificate. More so, none has been able to actually ascertain continuity and relevance of this claimed Mathematics background. The foregoing are the gaps noted which this study sought to close by considering

Business Mathematics at the NCE 1 level as a pre-requisite knowledge to Financial Accounting in NCE II.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

This study deals with the effect of Business Mathematics grades on students performance in Financial Accounting in Federal Colleges of Education, North-Central Geo-political zone, Nigeria. This chapter outlines the method and procedure used in carrying out the study as follows:

3.1 Research Design

3.2 Population for the study

3.3 Sample Size and Sampling Procedure

3.4 Instrument for Data Collection

3.4.1 Validity of Research instrument

3.4.2 Reliability of the Instrument

3.5 Procedure for Data Collection

3.6 Methods for Data Analysis

3.1 Research Design

The research design adopted for this study was ex-post facto research design. This design was employed to determine the effect of performance in Business Mathematics on students' performance in Financial Accounting from existing data in three Federal Colleges of Education in North-Central Geo-political zone, Nigeria. Ex post facto research design is ideal for this work because students' profile records was used which could not be manipulated by the researcher. This is line with Simon and Goes (2013) who stated that ex post facto design is ideal for conducting social research when it is not possible or acceptable for the researcher to manipulate the characteristics of human participants. It is a substitute for true experimental research or quasi experimental research and can be used to test hypothesis about cause and effect.

3.2 **Population for the study**

The population of this study was made up of all the NCE 2 students' profile in Business Education Department in all the three Federal Colleges of Education in the North-Central Geo-political zone, Nigeria for the 2011–2012 session. The population of the study was 445 students made up of both males and females as shown in table 3.1.

Table 3.1: *Population of the study*

Names of Colleges	*No. of Male Students*	*No. of Female students*	*Total*
FCE Pankshin	53	91	144
FCE Okene	84	125	209
FCE Kontagora	42	50	92
	175	270	445

Sources: Schools records 2011/2012

3.3 **Sample Size and Sampling Procedure**

Krece and Morgan (1970) (see Appendix ii) recommended a sample size of at least two hundred and fifty-four should be considered for a population of seven hundred and fifty which is about 34%. However, for a wider coverage and generalization of the findings the researcher used four hundred and forty-three (443) respondents made up of NCE 2 Business Education students from the population of four hundred and forty-five (445) students from three Federal Colleges of Education in North-Central Geo-political zone, Nigeria represented the sample. The sample size consists of all the students who wrote both subjects.

This method was used to avoid any element of bias in the choice of the sample population for the study.

3.4 **Instrument for Data Collection**

The measuring instrument that was used in this study were the NCE 1 Business Mathematics and Financial Accounting NCE 2 records from the departments of Business Education in three Federal Colleges of Education in North-Central Geo-political zone, Nigeria for 2010-2011 and 2011/2012 sessions.

To facilitate this research, the researcher rated students' NCE 1 Business Mathematics grades and Financial Accounting NCE 2 grades first and second semesters respectively as follows:

Table 3.2: **Rating scale of Business Mathematics (NCE I) and Financial Accounting (NCE II) grades:**

S/NO.	*NCE Grades in Mathematics and Financial Accounting*	*Points*	*Letter Grades*
1	70 – 100	5	A
2	60 – 64	4	B
3	50 – 59	3	C
4	45 – 49	2	D
5	40 – 44	1	E
6	0 – 39	0	F

Source: NCE grade points

3.4.1 **Validity of Research Instrument**

Based on the nature of this research, the researcher did not deem it necessary to validate the research instruments that have to do with the schools records because it had been approved by Academic Board of each college.

3.4.2 **Reliability of the Instrument**

The reliability of the instrument was not carried out because it was an approved result from the colleges. Thus, the instrument was considered reliable for the purpose of this study.

3.5 **Procedure for Data Collection**

With a letter of introduction from the Head of Department of Vocational and Technical Education, Ahmadu Bello University Zaria, Kaduna State, the following steps were taken:

a) Prior arrangements were made with the Management of each of the Colleges involved by submitting a formal request for the release of the records involved along with the letter of introduction at the Registrar's offices.
b) Approval of the researcher's requests were therefore granted in communications to the Examinations and Records units of the colleges directing official releases of records of results of affected students to the researcher.
c) The researcher got the students profiles from the selected institutions within five weeks on submission of requests.
d) All the students were considered except those that were absent in Business Mathematics.

All data used in this study were gathered with the highest level of confidentiality. Only the researcher had access to the raw data.

3.6 **Procedure for Data Analysis**

Secondary data on performance in Business Mathematics and Financial Accounting were collected on ordinal scale, that is A, B, C, D, E and F with percentage scores (see Table 3.2). The highest grade was A while the lowest grade was F. These grades were coded into their numerical equivalents i.e. 5 (70-100), 4 (60-69), 3 (50-59), 2 (45-49), 1(40-44) and (0 – 39) F respectively from A to F. All the data were analysed in stages, descriptive statistics of frequency counts and middle point was used for Business Mathematics and Financial Accounting grades data of respondents. Each student scores of first and second semesters in both subjects were summed up and divided by 2 in order to find the average score (see appendices iii – vi). Also, frequency, percentage scores, mean scores, range were used for answering research questions in order to compare the two subjects means and level of percentages of passing or failing. Instrument used for null hypotheses was t-statistics test. t–test was used for testing null hypotheses one to five since it was a test of effect. Nworgu, (1991) affirms this that t-test proves to be one of the most effective methods of comparing two group means. All the null hypotheses were tested at 0.05 level of significance. The data was analyzed using SPSS Statistics version 17.0 where P-value approach, short for probability. Instead of comparing t-scores as in classical approach, the researcher compared probabilities. Paired sample t-test was used to test null hypotheses 1 to 3 while independent t-test was employed for null hypotheses 4 and 5 to test for gender difference in the mean scores of the students in department of Business Education in Federal Colleges of Education, North Central Geo-political zone, Nigeria.

Decision rule: If the mean grade of Business Mathematics is equal or greater than that of Financial Accounting, it was concluded that Business Mathematics has positive effect on

Financial Accounting; on the other it has negative effect. That is, it is related and not related respectively.

On the basis of making scientific decision, (0.05) was used as the level of significance. In testing the Ho, the null hypothesis is being rejected when the p-value is less than the level of significance (0.05) and retained when greater than the level of significance.

CHAPTER FOUR

PRESENTATION AND ANALYSIS OF DATA

In this chapter, the researcher presents an analysis of the data collected from the field of study. The results are analysed under the following headings:

4.1 Demographic data

4.2 Answering the research questions

4.3 Hypotheses testing

4.4 Discussion of major findings

Section A

4.1 *Demographic Data*

This section dealt with responses to students profile from the three Federal Colleges of Education north-central geo-political zone, Nigeria as presented in tables 4.1– 4.2.

Demographic Data

This section dealt with responses to students profile from the three Federal Colleges of Education north central zone of Nigeria as presented in Tables 4.1 – 4.2.

Table 4.1 **Distribution of students by gender**

Sex	**Frequency**	**Percentage (%)**
Male	175	39.3
Female	270	60.7
Total	**445**	**100.0**

Source: Field Study, 2013

Table 4.1 reveals that 175 students representing 39.3% were male while 270 students representing 60.7% were female in both Business Mathematics and Financial Accounting. It shows that female students were more than male students.

Table 4.2 Distribution of students by colleges

Colleges name	Frequency	Percentage (%)
Federal College of Education, Pankshin, Plateau State	144	32.4
Federal College of Education, Okene, Kogi State	209	46.9
Federal College of Education, Kontagora	92	20.7
Total	**445**	**100.0**

Source: Field Study, 2013

Details in Table 4.2 shows that 144 respondents representing 32.4% were students of Federal College of Education, Pankshin, Plateau State while 209 respondents representing 46.9% were students of Federal College of Education, Okene Kogi State. Others were 92 respondents representing 20.7% students of Federal College of Education, Kotangora, Niger State. Based on this, Federal College of Education Okene in Kogi State had the highest population among the three colleges.

Section B

Answering the research questions

This section showed responses to the five research questions generated for the study. Details of the responses from students profile that constitute the respondents of the study from three Federal Colleges of Education in North central States of Nigeria can be seen in appendices iii -vii. The summaries are presented in Tables 4.3 – 4.7.

Research Question 1: *To what extent does the attainment of merit grade and above in Business Mathematics have effect on students' performance in Financial Accounting in the department of Business Education in Colleges of Education in the north central zone of Nigeria?*

This research question attempted to determine the effect of merit grade and above in Business Mathematics on performances of students in Financial Accounting in Federal Colleges of Education North Central States, Nigeria. Summary of the responses to research question is shown in Table 4.3

Table 4.3: Frequencies, percentages and means of students' performances in Business Mathematics and Financial Accounting at merit grade and above

Scores/grades	Frequencies		Percentages		Means	
	Bus. Maths	Fin Acc	Business Maths(%)	Financial Acc(%)	Business Maths	Fin Acc
70- 100	9	22	4.8	11.9		
60 -69	43	36	23.2	19.4		
50 – 59	133	52	72.0	28.1	57.54	52.69
45 – 49	-	26	-	14.1		
40 – 44	-	23	-	12.4		
0 – 39	-	26	-	14.1		
Total	**185**	**185**	**100**	**100**		

Source: Field study, 2013

Table 4.3 shows that 9 respondents representing 4.8% had 70 – 100 scores in Business Mathematics while 22 respondents representing 11.9% had 70 – 100 scores in Financial Accounting, 43 respondents representing 23.2 % had 60 – 69 scores in Business Mathematics while 36 respondents representing 19.4% had 60 – 99 scores in Financial Accounting, 133 respondents representing 72% had 50 – 59 scores in Business Mathematics while 52 respondents representing 28.1% had 50 – 59 scores in Financial Accounting, 46 respondents representing 14.1% had 45 – 49 in Financial Accounting, 23 respondents representing 12.4% had 40 – 44 in Financial Accounting other 26 respondents representing 14.1% had 0 – 39 in Financial Accounting. The mean scores in Business Mathematics and Financial Accounting stood at 57.54 and 52.69 respectively. It was concluded that merit grade and above in Business Mathematics have positive effect on students' performance in Financial Accounting since the mean of Business Mathematics was greater than Financial Accounting.

Research Question 2: *To what extent does the attainment of pass grades in Business Mathematics have effect on students performances in Financial Accounting offered in the department of Business Education?*

This research question attempted to determine the effects of pass grades in Business Mathematics on performances of students in Financial Accounting in Federal Colleges of

Education North-Central Geo-political zone, Nigeria. Summary of the responses to research question is shown in table 4.4

Table 4.4: Frequencies, percentages and means of students' performances in Business Mathematics and Financial Accounting at pass grades

Scores/grades	Frequencies		Percentages		Means	
	Bus. Mathematics	Financial Acc	Business Mathematics(%)	Financial Acc(%)	Business Mathematics	Fin Acc
70 – 100		-				
60 - 69	-	6	-	4.2		
50 – 59	-	24	-	16.9		
45 - 49	56	24	39.7	16.9	43.80	41.94
40 – 44	86	34	60.3	24.0		
0 – 37	-	54	-	38.0		
Total	**142**	**142**	**100**	**100**		

Source: field study, 2013

Table 4.4 shows that 6 respondents representing 4.2% had 60 -69 scores in Financial Accounting while none in this category in Business Mathematics, 24 respondents representing 16.9% had 50 – 59 scores in Financial Accounting while none in this category in Business Mathematics, 56 respondents representing 39.7% had 45 – 49 in Business Mathematics while 24 respondents representing 16.9% had 45 – 49 in Financial Accounting, 86 respondents representing 60.3% had 40 – 44 in Business Mathematics while 34 respondents representing 24% had 40 – 44 in Financial Accounting. Also, Business Mathematics had 43.80 mean score while Financial Accounting had 41.94. Therefore, pass grades in Business Mathematics was considered to have positive effect on the students' performance in Financial Accounting in Federal Colleges of Education in North Central States of Nigeria with mean scores of 43.80 and 41.94 respectively.

Research Question 3: *To what extent does the attainment of fail grade in Business Mathematics have effect on students' performance in Financial Accounting in the department of Business Education in Colleges of Education in the north-central geo-political zone of Nigeria?*

This research question attempted to determine the effect of students' fail grade in Business Mathematics on their performance in Financial Accounting in Federal Colleges

of Education North Central Geo-political zone, Nigeria. Summary of the responses to research question is shown in Table 4.5

Table 4.5: Frequencies, percentages and means of students' performances in Business Mathematics and Financial Accounting at fail grade

Scores/grades	Frequencies		Percentages		Means	
	Bus. Maths	Fin Acc	Business Maths(%)	Financial Acc(%)	Business Maths	Fin Acc
70- 100	-	2	-	1.5		
60 -69	-	4	-	2.9		
50 – 59	-	12	-	8.8	32.06	39.21
45 – 49	-	17	-	12.5		
40 – 44	-	39	-	28.7		
0 – 39	136	62	100	45.6		
Total	**136**	**136**	**100**	**100**		

Source: Field study, 2013

Table 4.5 shows that136 students representing 100% failed Business mathematics with their scores ranging from 0-39 as against 2 respondents representing 1.5% with scores ranging from70-100 in Financial Accounting. 4 respondents representing 2.9% had 60 – 69 scores in Financial Accounting, 12 respondents representing 8.8% had 50 – 59, 17 respondents representing 12.5% had 45 – 49 in Financial Accounting, 39 respondents representing 28.7% had 40 – 44 and 62 students representing 45.6% also failed Financial Accounting with their scores ranging 0-39. The mean score of fail grade in Business mathematics stood at 32.06 while that of Financial Accounting was 39.21. By this result, fail grade in Business Mathematics was considered as having negative effect on performance in Financial Accounting as the mean scores of the two are on fail grade rating.

Research Question 4: *To what extent does attainment of merit grade and above in Business Mathematics by male students have effect on their performances in Financial Accounting offered in the department of Business Education over female students?*

This research question attempted to determine the effects of merit grade and above in Business Mathematics by male students and their performances in Financial Accounting

over females in Federal Colleges of Education, North-Central Geo-political zone, Nigeria. Summary of the responses to research question is shown in table 4.6

Table 4.6 Frequencies, Percentages and Means of Male and female students' performances in Business Mathematics and Financial Accounting at merit grade and above

Scores/ grades	Frequencies				Percentages				Means			
	Male		Female		Business Maths		Financial Acc		Business Maths		Fin Acc	
	Bus Maths	Fin Acc	Bus Maths	Fin Acc	M	F	M	F	M	F	M	F
70 – 100	5	8	4	14	8.0	3.3	13.0	11.4				
60 - 69	11	10	32	26	17.4	26.2	15.8	21.0				
50 – 59	47	17	86	35	74.6	70.5	27.0	29.0	57.17	57.73	51.80	52.30
45 - 49	-	9	-	17	-	-	14.2	14.0				
40 – 44	-	10	-	13	-	-	15.8	10.6				
0 – 39	-	9	-	17	-	-	14.2	14.0				
Total	**63**	**63**	**122**	**122**	**100**		**100**	**100**				

Source: Field Study, 2013

Table 4.6 shows that in Business Mathematics male students had 5 respondents representing 8% (70 -100) scores while female had 4 respondents representing 3.3%. For the same subject, 11 respondents representing 17.4% had 60 – 69 scores while female had 32 respondents representing 26.2%. In addition 47 respondents representing 74.6% had (50 – 59) scores as against female who had 86 respondents representing 70.5%. Also in Financial Accounting male had 8 respondents representing 13% while female had 14 respondents representing 11.4%. For the same subject 10 male respondents representing 15.8% had 60-69 scores as against female who had 26 respondents representing 21%. 17 respondents representing 27% had 50-59 scores while female had 35 respondents representing 29%. Furthermore, male had 9 respondents representing 14.2% in 45 – 49 scores while female had 17 respondents representing 14% in 45 – 49. For the same subject 10 respondents representing 15.8% had 40 - 44 scores while female respondents had 13 representing 10.6% and finally, 9 respondents representing 14.2% had 0 – 39 while female respondents had 17 representing 14%.

On the overall, Business Mathematics mean scores, male had 57.17 and female 57.73 while in Financial Accounting the results were 52.1 and 53.0 for male and female means score respectively. In view of this, it could be seen that both male and female students are performing at the same rates in Business Mathematics and Financial Accounting, therefore, it has positive effect on their performances.

Research Question 5: *To what extent does attainment of pass grades in Business Mathematics by female students have effect on their performances in Financial Accounting offered in Federal Colleges of Education, North-Central Geo-political zone, Nigeria over male students?*

This research question attempted to determine the effects of pass grades in Business Mathematics by female students and their performances in Financial Accounting over males in Federal Colleges of Education in North-Central Geo-political zone, Nigeria. Summary of the responses to research question is shown in table 4.7.

Table 4.7: Frequencies, Percentages and Means of Male and female students' performances in Business Mathematics and Financial Accounting at pass grades.

Scores/grades	Frequencies				Percentages				Means			
	Male		Female		Business Mathematics		Financial Acc		Business Maths		Fin Acc	
	Bus Maths	Fin Acc	Bus Maths	Fin Acc	M	F	M	F	M	F	M	F
70 – 100 (5)	-	-	-	-	-	-		-				
60 - 69 (4)	-	2	-	4		-	5.0	3.7				
50 – 59 (3)	-	15	-	9	-	-	10.0	27.8				
45 - 49 (2)	22	10	34	14	40.7	38.6	15.9	18.5	43.7	44.3	43.8	40.4
40 – 44 (1)	32	11	54	23	59.3	61.4	26.1	20.4				
0 – 39 (0)	-	16	-	38	-	-	43.0	29.6				
Total	54	54	88	88	100	100	100	100				

Source: field study 2013

Table 4.7 shows that in Business Mathematics male had 22 respondents representing 40.7% (45 - 49) scores as against female with 34 respondents representing 38.6%. For the same subject 32 respondents representing 59.3% while female had 54 respondents representing 61.4% (40 – 44) scores. Likewise, in Financial Accounting male had 2 respondents representing 3.7% while female had 4 respondents representing 5% (60 – 69) scores. For the same subject 15 male respondents representing 27.8% had 50-59 scores while female had 9 respondents representing 10%. Furthermore, 10 male respondents representing 15.9% had 45 - 49 scores while female had 14 respondents representing 18.5%. For the same subject male had 11 respondents representing 20.4% for 40 – 44 scores as against female who had 23 respondents representing 26.1% for 40 – 44 scores. Finally, 16 respondents representing 29.6% had 0 – 39 scores while female had 38 respondents representing 43%.

The overall Business Mathematics and Financial Accounting mean scores for male and female students were 43.7 and 44.3 respectively while Financial Accounting had 43.8 and 40.4 for male and female respectively. This shows that mean scores of both male

and female students were greater than Financial Accounting, therefore, it has positive effect on their performances in Financial Accounting.

Section C

Test the research hypotheses

This section showed the summary of the test of the five research hypotheses formulated for the study. Details of the responses from students' profile that constitute the respondents for the study from three Federal Colleges of Education in North-Central Geo-political zone, Nigeria are contained in the appendices viii – xi while the summaries are as presented in Tables 4.8 – 4.12.

4.8: **Hypothesis one**

Merit grade and above in Business Mathematics have no significant effect on performance of students in Financial Accounting in the department of Business Education in Federal Colleges of Education, North-Central Geo-political zone, Nigeria.

This research hypothesis attempted to determine effect of merit grade and above in business mathematics on the performance of students in Financial Accounting in the Federal Colleges of Education in the North-Central Geo-political zone, Nigeria. To analyse this, paired sample t-test was used to test this hypothesis 1. The summary is as presented in Table 4.8.

Table 4.8 Paired Samples t-test on the effect of students' performances in Business Mathematics and Financial Accounting at merit grade and above

Variables	N	Mean	SD	t-cal	t-crit	df	P-value
Business Mathematics/ML	165	57.52	6.83				
				7.57	1.96	164	0.001
Performance in Financial Accounting	165	52.11	13.08				

Source: Field Study, 2013

From Table 4.8, the mean of Business Mathematics was 57.52 and the standard deviation stands at 6.83 as against the mean of 52.11 and standard deviation of 13.08 for students'

performance in Financial Accounting. The t-calculated was 7.58 and the t-critical stands at 1.96. This is also seen in probability value of 0.001 less than the alpha level of 0.05 (0.001 < 0.05). This means that the null hypothesis that states that merit grade and above in Business Mathematics have no significant effect on performances of students in Financial Accounting in the department of Business Education in Federal Colleges of Education, North Central States of Nigeria is therefore rejected. This implied that merit grade and above in Business Mathematics have significant effect on performances of the students in Financial Accounting.

4.9: **Hypothesis two**

Pass grades in Business Mathematics have no significant effect on the performance of students in Financial Accounting offered in the department of Business Education in Federal Colleges of Education, North Central Geo-political zone, Nigeria.

This research hypothesis attempted to determine the effect of pass grades in Business Mathematics on performances of students in Financial Accounting in Federal Colleges of Education North-Central geo-political zone, Nigeria. The summary is as presented in Table 4.9

Table 4.9 Paired Samples t-test on the significant effect of students' performances in Business Mathematics and Financial Accounting at pass grades

Variables	N	Mean	SD	t-cal	t-crit	Df	P-value
Business Mathematics/PL	142	43.81	3.06				
				3.67	1.96	141	0.037
Performance in Financial Accounting	142	41.92	10.30				

Source: Field Study, 2013

Table 4.9 reveals that the mean of Business Mathematics was 43.81 and the standard deviation stood at 3.06 as against the mean of 41.92 and standard deviation of 10.30 for students' performance in Financial Accounting. The t-calculated is 3.67 and the t-critical stood at 1.96. This is also seen in probability value of 0.037 less than the alpha

level of 0.05 (0.037 < 0.05). This means that the null hypothesis that states that pass grades in Business Mathematics have no significant effect on performances of students in Financial Accounting offered in the department of Business Education in Federal Colleges of Education, North-Central Geo-political zone, Nigeria is therefore rejected. The result of paired sample t-test above clearly indicates that there is a significant effect in the mean score of students obtained in Business Mathematics at pass level and their general performances in Financial Accounting. This implied that pass grades in Business Mathematics have significant effect on performances of students in Financial Accounting.

4.10: **Hypothesis Three**

Fail grade in Business Mathematics have no significant effect on the performances of students in Financial Accounting in the department of Business Education in Federal Colleges of Education, North-Central Geo-political zone, Nigeria.

This research hypothesis attempted to determine the significant effect of fail grade in Business Mathematics and students performances in Financial Accounting in Federal Colleges of Education North-Central Geo-political zone, Nigeria. To analyse this, paired sample t-test was used to test this hypothesis 3. The summary is as presented in Table 4.10.

Table 4.10 Paired Samples t-test on the effect of students' performances in Business Mathematics and Financial Accounting at fail grade

Variables	N	Mean	SD	t-cal	t-crit	df	P-value
Business Mathematics/FL	136	32.06	4.70				
				7.03	1.96	135	0.000
Performance in Financial Accounting	136	39.21	11.52				

Source: Field Study, 2013

From Table 4.10, the mean of Business Mathematics was 32.06 and the standard deviation stood at 4.70 as against the mean of 39.21 and standard deviation of 11.52 for students' performance in Financial Accounting. The t-calculated was 7.03 and the t-

critical stood at 1.96. This is also seen in the observed probability value of 0.000 less than the fixed alpha level of 0.05 (0.000< 0.05). This means that the null hypothesis that states that fail grades in Business Mathematics have no significant effect on the performances of students in Financial Accounting in the department of Business Education in Federal Colleges of Education, North Central Geo-political zone, Nigeria was therefore rejected. This implied that fail grades in Business Mathematics have significant effect on the performance of the students in Financial Accounting because majority of those that failed in Business Mathematics also failed in Financial Accounting. The mean difference was 7.15 which showed that the difference is statistically significant to reject the hypothesis.

4.11: **Hypothesis four**

Merit grade and above by male students in Business Mathematics have no significant effect on their performance in Financial Accounting offered in the department of Business Education in Federal Colleges of Education, North Central Geo-political zone Nigeria over female students.

This research hypothesis attempted to determine whether the merit grade and above by male students in Business Mathematics have effect on their performances in Financial Accounting over female students in Federal Colleges of Education North-Central geo-political zone,, Nigeria. The summary is as presented in Table 4.11.

Table 4.11: Independent Samples t-test on significant effect of Male students' performances in Business Mathematics and Financial Accounting over female students at merit grades

Variables	Sex	N	Mean	SD	t-cal	t-crit	Df	P-value
Business	Male	63	56.80	7.18				
Mathematics/ML	Female	96	57.90	6.54				
					0.55	1.96	316	0.819
Performance in	Male	63	51.80	13.10				
Financial Accounting	Female	96	52.30	13.30				

Source: Field Study, 2013

Table 4.11 shows that male student had Mean and standard deviation of 56.80 and 7.18 respectively as against mean of 57.90 and standard deviation of 6.54 for female students in Business Mathematics. The table also shows that male student had Mean and standard deviation of 51.80 and 13.10 respectively as against mean of 52.30 and standard deviation of 13.30 for female students in Financial Accounting. The calculated t-test of 0.55 is less than the critical value of 1.96, this could also be seen when the p-value of 0.819 comparing male and female students who have merit grade and above in Business Mathematics and their performances in Financial Accounting appeared to be higher than the level of significance (0.05) (0.819>0.05). Therefore, the null hypothesis that credit grades by male students in Business Mathematics have no significant effect on performances in Financial Accounting offered in the department of Business Education in Federal Colleges of Education, North-Central Geo-political zone, Nigeria over female students is retained. This indicates that both students who have merit grade and above in Business Mathematics performed better in Financial Accounting in the department of Business Education in Federal Colleges of Education North-Central Geo-political zone, Nigeria irrespective of gender.

4.12: **Hypothesis five**

Pass grades by female students in Business Mathematics have no significant effect on their performances in Financial Accounting offered in the department of Business Education in Federal Colleges of Education, North-Central Geo-political zone, Nigeria over male students.

This research hypothesis attempted to determine whether the pass grades by female students in Business Mathematics have effect on their performances in Financial Accounting over male students in Federal Colleges of Education North-Central Geo-political zone, Nigeria. The summary is as presented in Table 4.3.5.

Table 4.12 Independent Samples t-test on significant effect of female students' performances in Business Mathematics and Financial Accounting over female students at pass grades

Variables	Sex	N	Mean	SD	t-cal	t-crit	Df	P-value
Business Mathematics/CL	Male	54	43.70	2.99				
	Female	88	43.90	3.14				
					2.16	1.96	283	0.032
Performance in Financial Accounting	Male	54	44.30	9.64				
	Female	88	40.50	10.50				

Source: Field Study, 2013

Table 4.12 shows that male student had Mean and standard deviation of 43.70 and 2.99 respectively as against mean of 43.90 and standard deviation of 3.14 for female students in Business Mathematics. The table also shows that male student had Mean and standard deviation of 44.30 and 9.64 respectively as against mean of 40.50 and standard deviation of 10.50 for female students in Financial Accounting. The calculated t-test of 2.16 is greater than the critical value of 1.96. This is supported by observed p-value (0.032) less than the fixed p-value (0.05), therefore the null hypothesis that pass grades by female students in Business Mathematics have no significant effect on their performances in Financial Accounting offered in the department of Business Education in Federal Colleges of Education, North-Central Geo-political zone Nigeria over male students is rejected. The researcher, therefore, concludes that male students perform averagely better

than their female counterparts in Financial Accounting in Federal Colleges of Education, North-Central Geo-political zone, Nigeria.

Discussion of Major Findings

Based on the research questions and hypotheses analyzed, the following are the major findings as stated and discussed.

1) Those students with merit grades and above in Business Mathematics performed equally good in Financial Accounting with mean scores of 57.53 and 52.69 respectively which is positive. This has revealed that Business Mathematics has positive effect on students performance in Financial Accounting with p-value of 0.001<0.05.
2) Students' who had pass grades in Business Mathematics also performed averagely in Financial Accounting in Federal Colleges of Education in North-Central Geo-political zone, Nigeria with mean scores of 43.80 and 41.94 respectively which is positive. This reveals that Business Mathematics has positive effect on students performance in Financial Accounting with p-value of 0.037 <0.05.
3) Students who failed Business Mathematics performed poorly in Financial Accounting in the three Federal Colleges of Education in North-Central Geo-political zone, Nigeria with mean scores of 32.05 and 36.33 respectively which is negative. This reveals that poor performances in Business Mathematics also have negative effect on students performances in Financial Accounting with p-value of 0.000<0.05.
4) At merit grades and above in Business Mathematics, gender was not significant in students' performances in Financial Accounting with mean scores of 57.17, 57.73 for male and female in Business Mathematics and 51.80, 52.30 in Financial

Accounting for both male and female which is positive. It shows a p-value of 0.819>0.05.

5) At pass grades, it was revealed that male students performed averagely better in Financial Accounting than female students' which means that male students' performance was merely averagely good in Financial Accounting with mean difference of 3.8 and p-value of 0.032 < 0.05 which is statistically significant.

On the whole, research questions one, two and three and hypotheses one, two and three ascertain the extent to which attainment of merit/pass/fail grades in Business Mathematics by students have significant effects on performances in Financial Accounting in the department of Business Education in Federal Colleges of Education North Central States of Nigeria. It was revealed that merit or pass grades in Business Mathematics have positive significant effect on performance in Financial Accounting in Federal Colleges of Education North Central States of Nigeria. In like manner, fail grade equally have significant negative effect on performance in Financial Accounting in Federal Colleges of Education North Central States of Nigeria.

Gist (1996) supports this finding that mathematics/algebra/calculus performance of students relate to success in introductory accounting classes. The study reveals that students who had received a grade of "C" or better in calculus did better than other students in an introductory level accounting course. Likewise, Williams (2009) affirms this finding by supporting the existence of a relationship between ability in high school algebra course and the success in high school introductory accounting course. To him, there is a relationship between the students' performance in Mathematics and Financial Accounting at secondary schools.

This is contrary to Burdick and Schwartz (1982) who did not consider mathematics and algebra as significant explanatory variables for accounting students' outperformance.

Research question four and hypothesis four were tested to find out to what extent does attainment of merit grades and above in Business Mathematics by male students have effect on their performances in Financial Accounting offered in the department of Business Education over female students.

The result showed that both male and female students performed equally. This finding has confirmed the views of Kirk and Spector (2006) who found that student age, gender, the length of time between taking principles and cost accounting are insignificant. Other related studies on the same area include Suleiman and Mohezar (2006) study on Master of Business Administration students. They utilized just correlation analysis. Work experience, gender, age, and ethnicity were concluded as not significant in academic performance. Also, Buckless, Lipe, and Ravenscroft. (1991) found that when controlling for SAT scores, gender effects largely disappeared.

Research question five and hypothesis five were tested to find out to what extent does attainment of pass grades in Business Mathematics by female students have effect on their performances in Financial Accounting offered in the department of Business Education over male students. It was revealed that male students performed better in Financial Accounting more than female students' which means that male students' performance was merely averagely good in Financial Accounting. This finding fairly relates with Doran, Bouillon and Smith (1991) who found that on average, males are found to have significantly higher examination scores than females in Accounting Principles I, but not in Accounting Principles II.

This finding throws a new twist to the measure of performance of the male and the female students. While there was a measure of equity in performance at the credit level, the male performed better at the pass level. The reason behind this may be resilience in the male folks to break even in the face of undaunting challenges while the females may give up much more easily when the going gets tough. In essence, the reason behind this twist may be that of attitude and not aptitude.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

This study investigated the effects of Business Mathematics grades on students' performance in Financial Accounting in Federal Colleges of Education North-Central Geo-political zone, Nigeria. In order to achieve the objective of the study, five specific objectives were raised which included, to ascertain the extent to which attainment of merit grade and above, passes, or fail grade and gender in Business Mathematics by students have effects on their performance in Financial Accounting in Federal Colleges of Education, North-Central Geo-political zone, Nigeria.

In line with these objectives, five research questions were raised to guide the study and also five hypotheses at 0.05 level of significance. An Ex post facto research design was employed for the study. A total population of four hundred and forty-five (445) was used for the study. Four hundred and forty-three students were used as sample who wrote Business Mathematics and Financial Accounting. Students profile was adopted as an instrument for the study. The data collected were presented in tables and research questions were answered. The null hypotheses were tested using t- statistics test. On the basis of making scientific decision, (0.05) was used as the level of significance.

The following were the major findings of the study:

1) Good performances in business mathematics enhanced students' performance in financial accounting.
2) There was no gender discrepancy among the students between Business Mathematics and Financial accounting.

5.2 **Conclusion**

Based on the findings of this study, it was concluded that performances in Business Mathematics either at pass, merit or fail grades have significant effects on Financial Accounting. Also, this effects are considered largely none gender discriminatory especially on the consideration of the effect at merit grade level and above. Since the study has revealed that those students that are not performing well in Business Mathematics will equally not do well in Financial Accounting, it can be concluded that there will be increased pressure of change of options from Accounting option to others. This can lead to overall poor performance of students and possible increasing drop-out rate. It can also lead to poor enrolment of students in Accounting option which will result into insufficiency in the number of Accounting teachers in the society.

5.3 **Recommendations**

Based on the findings and conclusion of the study, the following recommendations are made:

1) To avoid mass failure in Financial Accounting, students must pass Business Mathematics at NCE 1 before proceeding to NCE 2 Financial Accounting. This implies that a pass in Business Mathematics in NCE I should be made a prerequisite for students' enrolment into Financial Accounting course in NCE II.
2) Business Mathematics should be introduced at secondary school level for commercial students in order to prepare them for task ahead in the department of Business Education. This could be incorporated into the curriculum of secondary school as it is done in Further Mathematics to prepare science oriented students.

3) Candidate opting to read Business Education in Colleges of Education should be required to write Business Mathematics as against general Mathematics as presently the case. This may further guarantee content relevance.

5.4 Limitation of the study

The following was the limitation encountered by the researcher.

1) Inability to obtain the students profile records in good time as a result of the colleges being uncomfortable in exposing their results caused a delay for the researcher. Although, this was minimized through a letter of introduction to the concerned institutions.

5.5 Suggestions for further studies

The researcher suggests that further study could be considered in the following ways:

1) Factors associated with students' performance in Financial Accounting in Federal and states Colleges of Education in Nigeria.
2) The effect of parental background on students' performance in Financial Accounting in Colleges of Education in Nigeria.
3) Obstacles to Accounting: The English Language and environmental factors in Colleges of Education in Nigeria.
4) Attitudes and Motivation of male and female students to the study of accounting in colleges of education.

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APPENDIX III

Merit and above grades in Business Mathematics and students performance in Financial Accounting

S/No.	*Bus Maths (NCE I)*	*Financial Accounting (NCE II)*
1.	57	41
2.	57	68
3.	64	70
4.	69	45
5.	52	42
6.	54	55
7.	61	72
8.	55	70
9.	55	74
10.	55	40
11.	62	41
12.	60	60
13.	56	47
14.	64	56
15.	56	62
16.	59	62
17.	51	58
18.	55	48
19.	55	53
20.	50	61
21.	56	66
22.	55	37
23.	60	66
24.	56	57
25.	59	53
26.	50	56
27.	51	46
28.	57	48
29.	53	52
30.	59	64
31.	67	67
32.	55	51
33.	50	45
34.	54	45
35.	59	66
36.	65	45
37.	50	57
38.	58	58
39.	59	65

40.	52	36
41.	50	45
42.	50	45
43.	65	46
44.	55	53
45.	51	53
46.	66	57
47.	57	80
48.	55	55
49.	54	40
50.	56	31
51.	75	72
52.	56	51
53.	55	52
54.	55	34
55.	54	50
56.	52	37
57.	51	47
58.	52	53
59.	53	51
60.	53	40
61.	58	68
62.	64	43
63.	52	27
64.	50	53
65.	61	43
66.	51	59
67.	53	67
68.	50	56
69.	53	58
70.	62	46
71.	51	47
72.	53	52
73.	57	25
74.	50	42
75.	56	42
76.	61	65
77.	55	53
78.	62	65
79.	52	46
80.	56	30
81.	60	49
82.	54	32
83.	57	55
84.	57	45
85.	59	40

86.	52	41
87.	59	75
88.	60	70
89.	57	70
90.	52	55
91.	62	61
92.	50	33
93.	64	26
94.	77	49
95.	60	76
96.	77	77
97.	58	50
98.	55	46
99.	57	65
100.	66	24
101.	62	35
102.	56	51
103.	59	43
104.	57	30
105.	63	40
106.	50	32
107.	92	32
108.	52	42
109.	58	31
110.	54	53
111.	50	40
112.	52	37
113.	63	56
114.	52	31
115.	53	62
116.	53	51
117.	51	61
118.	77	32
119.	69	32
120.	59	46
121.	81	65
122.	67	45
123.	65	52
124.	55	25
125.	63	82
126.	57	53
127.	51	47
128.	74	46
129.	55	40
130.	66	74
131.	52	59

132.	50	50
133.	57	80
134.	55	75
135.	55	67
136.	50	59
137.	60	68
138.	54	68
139.	53	73
140.	51	50
141.	70	64
142.	54	73
143.	53	62
144.	54	64
145.	55	38
146.	63	72
147.	64	53
148.	56	50
149.	56	61
150.	61	44
151.	53	54
152.	53	54
153.	56	53
154.	67	61
155.	51	38
156.	65	44
157.	53	43
158.	74	71
159.	62	54
160.	51	51
161.	62	58
162.	58	49
163.	60	49
164.	50	36
165.	54	68

APPENDIX IV

Passes grade in Business Mathematics and students performance in Financial Accounting

S/No	*Business Maths (NCE I)*	*Financial Accounting (NCE II)*
1.	49	40
2.	40	43
3.	41	40
4.	44	58
5.	40	45
6.	40	52
7.	45	53
8.	46	43
9.	43	50
10.	40	45
11.	46	41
12.	47	45
13.	49	36
14.	40	46
15.	48	52
16.	43	40
17.	47	34
18.	43	42
19.	48	48
20.	44	56
21.	47	40
22.	49	47

23.	42	37
24.	45	36
25.	41	39
26.	43	41
27.	46	30
28.	40	43
29.	48	50
30.	41	42
31.	45	40
32.	42	41
33.	40	36
34.	41	37
35.	49	51
36.	46	55
37.	46	23
38.	44	27
39.	43	36
40.	40	49
41.	42	41
42.	41	41
43.	46	33
44.	40	37
45.	42	37
46.	44	37
47.	41	30
48.	43	43
49.	43	38

50.	44	37
51.	46	38
52.	46	31
53.	41	27
54.	47	60
55.	42	31
56.	40	42
57.	49	39
58.	49	30
59.	42	38
60.	45	39
61.	36	39
62.	40	44
63.	47	42
64.	49	43
65.	42	61
66.	42	42
67.	48	46
68.	41	65
69.	40	42
70.	45	50
71.	49	47
72.	41	47
73.	41	53
74.	42	49
75.	40	48
76.	42	58

77.	49	67
78.	46	54
79.	44	69
80.	46	45
81.	40	53
82.	42	42
83.	48	46
84.	47	42
85.	42	32
86.	41	41
87.	43	57
88.	42	34
89.	49	39
90.	45	43
91.	46	58
92.	49	41
93.	40	47
94.	41	42
95.	42	22
96.	44	32
97.	41	9
98.	40	17
99.	41	29
100.	44	32
101.	46	32
102.	41	59
103.	45	40

104.	49	42
105.	41	49
106.	43	47
107.	44	25
108.	47	18
109.	49	19
110.	42	39
111.	41	40
112.	47	54
113.	44	29
114.	41	24
115.	41	40
116.	46	47
117.	48	24
118.	48	52
119.	43	46
120.	47	66
121.	47	45
122.	45	33
123.	42	55
124.	40	37
125.	40	55
126.	40	53
127.	44	36
128.	44	34
129.	49	57
130.	44	37

131.	41	36
132.	46	39
133.	47	26
134.	43	47
135.	43	52
136.	41	37
137.	44	46
138.	49	39
139.	40	47
140.	46	34
141.	40	48

APPENDIX V

Failed grades in Business Mathematics and students performance in Financial Accounting

Serial No	*Bus. Maths NCE 1*	*Financial Accounting NCE 2*
1.	26	73
2.	23	58
3.	39	42
4.	28	63
5.	36	46
6.	31	25
7.	37	35
8.	38	48
9.	34	43
10.	27	23
11.	26	30
12.	31	34
13.	33	33
14.	39	53
15.	31	35
16.	36	42
17.	32	41
18.	19	23
19.	30	20
20.	26	28
21.	21	22
22.	26	47
23.	28	43
24.	38	34
25.	30	43
26.	34	40
27.	25	26
28.	33	48
29.	39	47
30.	29	34
31.	27	27
32.	26	54
33.	34	40
34.	29	35
35.	33	23
36.	28	45
37.	30	20
38.	32	24

39.	32	11
40.	28	50
41.	28	26
42.	19	27
43.	28	42
44.	35	35
45.	37	13
46.	37	43
47.	38	32
48.	34	63
49.	27	65
50.	31	84
51.	31	48
52.	35	40
53.	37	35
54.	25	62
55.	27	53
56.	36	50
57.	33	47
58.	32	41
59.	33	21
60.	34	40
61.	23	40
62.	34	35
63.	38	41
64.	36	44
65.	31	28
66.	34	25
67.	18	30
68.	38	55
69.	35	58
70.	30	50
71.	27	47
72.	34	50
73.	27	41
74.	36	45
75.	27	36
76.	33	23
77.	31	46
78.	33	12
79.	35	37
80.	36	34
81.	33	40
82.	28	22
83.	38	48
84.	30	13

85.	32	27
86.	29	15
87.	36	43
88.	38	43
89.	34	46
90.	39	52
91.	38	45
92.	33	42
93.	36	39
94.	28	38
95.	26	40
96.	37	47
97.	35	39
98.	27	44
99.	37	48
100.	34	43
101.	34	37
102.	30	40
103.	26	35
104.	33	41
105.	30	43
106.	38	52
107.	30	38
108.	39	36
109.	30	39
110.	26	37
111.	35	42
112.	34	37
113.	31	33
114.	39	49
115.	33	34
116.	33	41
117.	33	31
118.	27	36
119.	35	42
120.	31	44
121.	33	38
122.	35	43
123.	34	37
124.	35	40
125.	39	30
126.	35	43
127.	36	35
128.	32	34
129.	36	39
130.	39	41

131.	34	42
132.	25	32
133.	36	39
134.	36	40
135.	38	44
136.	25	42

APPENDIX VI

Male students performance in Business Mathematics and in Financial Accounting at merit grade and above over female students

S/No	*Sex*	*Business Maths (NCE I)*	*Financial Acc (NCE II)*
1.	1	57	41
2.	1	57	68
3.	1	64	70
4.	2	69	45
5.	1	52	42
6.	1	54	55
7.	1	61	72
8.	1	55	70
9.	2	55	74
10.	2	55	40
11.	1	62	41
12.	2	60	60
13.	1	56	47
14.	1	64	56
15.	1	56	62
16.	1	59	62
17.	2	51	58
18.	1	55	48
19.	1	55	53
20.	2	50	61
21.	2	56	66

22.	1	55	37
23.	1	60	66
24.	1	56	57
25.	1	59	53
26.	1	50	56
27.	2	51	46
28.	1	57	48
29.	2	53	52
30.	1	59	64
31.	1	67	67
32.	1	55	51
33.	1	50	45
34.	1	54	45
35.	1	59	66
36.	1	65	45
37.	1	50	57
38.	1	58	58
39.	2	59	65
40.	2	52	36
41.	1	50	45
42.	1	50	45
43.	1	65	46
44.	2	55	53
45.	2	51	53
46.	2	66	57
47.	1	57	80
48.	1	55	55

49.	1	54	40
50.	2	56	31
51.	2	75	72
52.	2	56	51
53.	2	55	52
54.	2	55	34
55.	2	54	50
56.	1	52	37
57.	2	51	47
58.	1	52	53
59.	1	53	51
60.	1	53	40
61.	1	58	68
62.	1	64	43
63.	2	52	27
64.	1	50	53
65.	1	61	43
66.	2	51	59
67.	2	53	67
68.	2	50	56
69.	1	53	58
70.	2	62	46
71.	1	51	47
72.	1	53	52
73.	2	57	25
74.	1	50	42
75.	1	56	42

76.	1	61	65
77.	2	55	53
78.	2	62	65
79.	2	52	46
80.	1	56	30
81.	2	60	49
82.	2	54	32
83.	2	57	55
84.	2	57	45
85.	2	59	40
86.	1	52	41
87.	2	59	75
88.	2	60	70
89.	2	57	70
90.	1	52	55
91.	2	62	61
92.	1	50	33
93.	2	64	26
94.	1	77	49
95.	2	60	76
96.	1	77	77
97.	1	58	50
98.	1	55	46
99.	1	57	65
100.	2	66	24
101.	2	62	35
102.	1	56	51

103.	2	59	43
104.	2	57	30
105.	2	63	40
106.	1	50	32
107.	2	92	32
108.	2	52	42
109.	2	58	31
110.	2	54	53
111.	1	50	40
112.	2	52	37
113.	1	63	56
114.	1	52	31
115.	2	53	62
116.	2	53	51
117.	2	51	61
118.	2	77	32
119.	1	69	32
120.	1	59	46
121.	1	81	65
122.	2	67	45
123.	2	65	52
124.	1	55	25
125.	1	63	82
126.	1	57	53
127.	2	51	47
128.	1	74	46
129.	1	55	40

130.	2	66	74
131.	1	52	59
132.	1	50	50
133.	2	57	80
134.	1	55	75
135.	2	55	67
136.	2	50	59
137.	2	60	68
138.	2	54	68
139.	1	53	73
140.	2	51	50
141.	2	70	64
142.	2	54	73
143.	1	53	62
144.	1	54	64
145.	1	55	38
146.	1	63	72
147.	2	64	53
148.	2	56	50
149.	1	56	61
150.	2	61	44
151.	2	53	54
152.	2	53	54
153.	1	56	53
154.	2	67	61
155.	2	51	38
156.	2	65	44

157.	2	53	43
158.	1	74	71
159.	1	62	54

APPENDIX VII

Female students performance in Business Mathematics and in Financial Accounting at pass grades over male students

S/No	*Sex*	*Business Maths (NCE I)*	*FINANCIAL ACC. (NCE II)*
1.	1	49	40
2.	1	40	43
3.	1	41	40
4.	1	44	58
5.	2	40	45
6.	1	40	52
7.	1	45	53
8.	2	46	43
9.	2	43	50
10.	2	40	45
11.	2	46	41
12.	2	47	45
13.	2	49	36
14.	1	40	46
15.	2	48	52
16.	1	43	40
17.	1	47	34
18.	2	43	42
19.	1	48	48
20.	2	44	56
21.	2	47	40
22.	2	49	47
23.	2	42	37
24.	2	45	36
25.	2	41	39
26.	2	43	41
27.	2	46	30
28.	2	40	43
29.	1	48	50
30.	2	41	42
31.	2	45	40
32.	2	42	41
33.	1	40	36
34.	2	41	37
35.	2	49	51
36.	2	46	55
37.	2	46	23
38.	2	44	27
39.	2	43	36
40.	2	40	49
41.	2	42	41

42.	1	41	41
43.	1	46	33
44.	2	40	37
45.	2	42	37
46.	1	44	37
47.	2	41	30
48.	1	43	43
49.	1	43	38
50.	2	44	37
51.	2	46	38
52.	1	46	31
53.	1	41	27
54.	1	47	60
55.	2	42	31
56.	2	40	42
57.	1	49	39
58.	2	49	30
59.	1	42	38
60.	2	45	39
61.	2	36	39
62.	2	40	44
63.	2	47	42
64.	2	49	43
65.	1	42	61
66.	2	42	42
67.	1	48	46
68.	2	41	65
69.	2	40	42
70.	1	45	50
71.	2	49	47
72.	2	41	47
73.	1	41	53
74.	1	42	49
75.	1	40	48
76.	1	42	58
77.	2	49	67
78.	1	46	54
79.	2	44	69
80.	1	46	45
81.	2	40	53
82.	1	42	42
83.	2	48	46
84.	1	47	42
85.	1	42	32
86.	1	41	41
87.	1	43	57
88.	2	42	34
89.	2	49	39
90.	1	45	43
91.	1	46	58

92.	2	49	41
93.	1	40	47
94.	2	41	42
95.	2	42	22
96.	2	44	32
97.	2	41	9
98.	2	40	17
99.	1	41	29
100.	2	44	32
101.	2	46	32
102.	1	41	59
103.	2	45	40
104.	1	49	42
105.	2	41	49
106.	2	43	47
107.	2	44	25
108.	1	47	18
109.	2	49	19
110.	1	42	39
111.	2	41	40
112.	2	47	54
113.	2	44	29
114.	2	41	24
115.	2	41	40
116.	1	46	47
117.	1	48	24
118.	1	48	52
119.	2	43	46
120.	2	47	66
121.	1	47	45
122.	2	45	33
123.	1	42	55
124.	1	40	37
125.	1	40	55
126.	2	40	53
127.	2	44	36
128.	2	44	34
129.	2	49	57
130.	2	44	37
131.	2	41	36
132.	2	46	39
133.	2	47	26
134.	2	43	47
135.	1	43	52
136.	1	41	37
137.	2	44	46
138.	2	49	39
139.	2	40	47
140.	2	46	34
141.	1	40	48

APPENDIX VIII

Paired sample T-Test and correlations for Hypothesis one

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Merit in Bus. Mathematics	57.5	165	6.832	0.532
	Performance in F. Accounting	52.1	165	13.08	1.018

Paired Samples Correlations				
		N	Correlation	Sig.
Pair 1	Merit in Bus. Mathematics & Performance in Financial Accounting	165	0.106	0.175

APPENDIX IX

Paired sample T-Test and correlations for Hypothesis two

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pass in Bus. Mathematics	43.81	142	3.06	0.257
	Performance in F. Accounting	41.92	142	10.3	0.867

Paired Samples Correlations				
		N	Correlation	Sig.
Pair 1	Pass in Bus. Mathematics & Performance in F. Accounting	142	0.022	0.79

APPENDIX X

Independent samples T-Test for Hypothesis three

Group Statistics					
	Sex	*N*	*Mean*	*Std. Deviation*	*Std. Error Mean*
Merit in Bus. Mathematics	Male	63	56.8	7.18	0.91
	Female	96	57.9	6.54	0.67
Performance in Financial Accounting	Male	63	51.8	13.1	1.65
	Female	96	52.3	13.3	1.35

APPENDIX XI

Independent samples T-Test for Hypothesis four

Group Statistics					
	Sex	N	Mean	Std. Deviation	Std. Error Mean
Pass in Bus. Mathematics	Male	54	43.7	2.99	0.41
	Female	88	43.9	3.14	0.33
Performance in F. Accounting	Male	54	44.3	9.64	1.31
	Female	88	40.5	10.5	1.12