

UNIVERSITY OF CAPE COAST

THE INFLUENCE OF MATHEMATICS ABILITY ON STUDENTS'  
ACADEMIC PERFORMANCE IN FINANCIAL ACCOUNTING

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UNIVERSITY OF CAPE COAST

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ACADEMIC PERFORMANCE IN FINANCIAL ACCOUNTING

BY

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## DECLARATION

### **Candidate's Declaration**

*I hereby declare that this thesis is the result of my own original research and that no part of it has been presented for another degree in this university or elsewhere.*

Candidate's Signature:..... Date:.....

Name: Cynthia Osei Boateng

### **Supervisors' Declaration**

*We hereby declare that the preparation and presentation of this thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.*

Principal Supervisor's Signature:..... Date:.....

Name: Prof. Mrs. Rosemond Boohene

Co-supervisor's Signature..... Date:.....

Name: Dr. Ekua Tekyiwa Amua-Sekyi.

## ABSTRACT

The purpose of the study was to find out whether mathematics ability influences Senior High School students' academic performance in Financial Accounting in the Central Region of Ghana. Descriptive survey design was employed by using quantitative and qualitative methods in obtaining data. Stratified and simple random sampling techniques were used to select a sample of 370 Financial Accounting students and 13 Financial Accounting teachers respectively. In-depth interviews, focus group discussions, questionnaires, achievement tests and two terms' Financial Accounting scores of students were employed to analyse and solicit respondents' views on how mathematics ability influenced students' academic performance in Financial Accounting.

The results have shown that a positive perception of mathematics and Financial Accounting subsequently leads to better performance in Financial Accounting. Also, teachers' qualifications, area of specialisation, years' of experience and mathematics background correlated positively and significantly with students' mathematics ability whereas teachers' gender and perception showed no significant relationship with mathematics ability. Again, gender influenced the academic performance of students in mathematics and Financial Accounting with males outperforming females. It was, therefore, recommended that Financial Accounting teachers should teach students reading Financial Accounting relevant mathematics topics to enable them understand the mathematics concepts found in Financial Accounting.

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## **DEDICATION**

To my family, especially Enoch and Adwoa Apori Ansah.

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## **CHAPTER ONE**

### **INTRODUCTION**

#### **Background to the Study**

Financial Accounting as a discipline has a long history in the world. The ingenuity of double entry bookkeeping (formal Financial Accounting) can be characterised as the work of an Italian Franciscan friar, Luca Pacioli in the 14<sup>th</sup> century. According to the Committee on Terminology of the American Institute of Certified Public Accountants [AICPA] (1966), Financial Accounting is the process of identifying, measuring and communicating economic information to permit informed judgements and decisions by its users.

According to Yunker, Yunker and Krull (2009), Financial Accounting is concerned with accurate numerical measurement of precisely defined operational concepts. It follows that practitioners of Financial Accounting should be comfortable with mathematics in general and numbers in particular. Yunker et al. (2009) resonated that most Financial Accounting teachers readily acknowledge that mathematical ability or arithmetical skills are important for students to understand Financial Accounting systems and financial statement analysis which has a significant impact on student performance in Financial Accounting courses. Weis and Tinius (1991) acknowledged that, Luca Pacioli discussed Financial Accounting in his mathematics book *Summa de Arithmetica, Geometria,*

*Proportioni et Proportionalita* (hereafter, *Summa*). *Summa's* English title would be *Collected Knowledge of Arithmetic, Geometry, Proportions and Proportionality*. Before *Summa* was published, Luca Pacioli had been teaching mathematics courses in several universities for more than 20 years. Sangster, Stoner and McCarthy (2007) mentioned that there were ten Chapters in the *Summa*: Chapter one to seven about Arithmetic, Chapter eight about Algebra, Chapter nine about Business, including, *Particularis de Computis et Scripturis* translated into *Details of Financial Accounting and Recording*, and Chapter ten about Geometry and Trigonometry. The section of *Particularis de Computis et Scripturis* appears to be included for the sake of completeness to recognize the importance of arithmetic principles in the application of bookkeeping (Rabinowitz, 2009).

Several other researchers (Ellerman, 1985; Yamey, 1994; Rabinowitz, 2009) highlighted that Financial Accounting literature agreed that the double entry system is an application of mathematics. They indicated that the double entry system had existed hundreds of years before it was published in *Summa*. Double entry system is one of few principles that stayed unchanged for more than 500 years (Hatfield, 1924; Littleton, 1926; Rabinowitz, 2009).

The use of debits and credits in the double entry system is also an application of mathematics. This study argues that the use of debits and credits in the double entry system is mainly because there is no negative numbers in the financial unit. Financial Accounting uses a monetary unit principle to measure the economic activities (Littleton, 1926). Most of modern Financial Accounting

textbooks define debits meaning the left side, and credits meaning the right side (Anthony, Hawkins & Merchant, 2007; Williams, Haka & Bettner, 2007; Weygandt, Kieso & Kimmel, 2008). The definition indicates that the use of debits and credits is identical with algebra that has left and right sides.

Peters and Emery (1978) believed that mathematicians did not use negative numbers when Pacioli published the *Summa*. On the contrary, Scorgie (1989) demonstrated that the negative numbers were known before the publication of the *Summa*. Mathematically, moving negative numbers (suppose minus 5) from the left side of algebra to the right side will change the numbers into positive ones (plus 5). Thus, the use of debits and credits in Financial Accounting conveys that financial information is purely an application of mathematics. Mathematics is used in most aspects of daily life. Many of the top jobs such as business consultants, company directors and a host of others require a solid understanding of basic mathematics, and in some cases require a quite detailed knowledge of mathematics. It also plays important role in business, like business mathematics by commercial enterprises to record and manage business operations. Mathematics is a pre-requisite of access to educational advancement in Financial Accounting. A good performance in mathematics will facilitate students' learning in Financial Accounting.

In Ghana, Financial Accounting education dates back to the days of colonial governance and missionary schools. It was significantly introduced at the Government Boys College (now Mfantshipim) in Cape Coast initially, as bookkeeping to be studied together with shorthand and typewriting as the



commercial subjects' curriculum under the colonial administration of Sir Frederick Gordon Guggisberg. After independence, they were still part of the school curriculum. Commercial subjects were written during the Middle School Leaving Certificate Examination (M.S.L.C.E.). The commercial education curriculum was transmuted to include Financial Accounting as a subject. Financial Accounting was offered in the Secondary Schools from Form One up to Form Five as an elective subject for students who wrote the School Certificate and General Certificate of Education Ordinary Level (SC/GCE 'O' Level).

At the sixth form, Financial Accounting was one of the subjects offered for the General Certificate of Education Advanced Level (GCE 'A' level) examination. The introduction of the 1987 educational reform at the secondary level led to General Certificate of Education (GCE), Ordinary ('O') level and Advanced ('A') level replaced by the Senior High School. This resulted in Curriculum Research and Development Division (CRDD) of the Ghana Education Service adapting Financial Accounting as an elective for business students at the senior secondary schools (now senior high schools). Currently the subject is studied along with subjects such as Business Management, Elective Mathematics, French and Economics. Financial Accounting is studied at the Polytechnic level for students pursuing Diploma in Business Studies (DBS) and Higher National Diploma (HND). Also, at the university level Business, Social Sciences and some Physical Sciences (Mathematics and Agriculture) students study Financial Accounting.

Having a relationship with the philosophy of education of Ghana, Financial Accounting is expected to provide students with the requisite knowledge, occupational skills and attitudes for national development. In achieving this broad goal, the Ministry of Education, Science and Sports Financial Accounting syllabus for Ghanaian senior high schools (2011) is designed to help students:

1. Acquire the knowledge of basic Financial Accounting principles and their application in modern business.
2. Acquire skills for using Financial Accounting as a tool for planning, organizing, controlling and financial decision making processes.
3. Prepare them for initial entry into Financial Accounting careers and develop sound foundation for further studies
4. Acquire skills for analysing and interpreting financial reports and statements for the purpose of making useful management decisions.
5. Develop moral and ethical values essential for accountability in financial matters of both private and public sector organizations.
6. Develop an appreciation for neatness, orderliness, thoroughness and accuracy in financial record keeping.
7. Acquire positive attitudes required of patriotic citizens in matters such as regular payment of tax, customs obligations due to individual organizations and to the state, and avoidance of the embezzlement, misapplication or misappropriation of public funds.

(Ministry of Education [MoE], 2008)

In recent times, senior high school students, understanding of some mathematics concepts related to Financial Accounting has not been motivating. This is evident in the West African Examination Council (WAEC) Chief Examiners' reports (2006-2009) on the practical aspect (Financial Accounting Paper 2) which stated that:

1. most students had difficulty in arithmetic, word problems, computation of ratios and percentages which affected the figures to be used in the preparation of the financial statements.
2. many candidates found it difficult relating ratios in the balance sheet to the trading and profit and loss account items which made most of the figures in the preparation of the financial statements wrong.
3. candidates wrongly computed the interest on capitals and partners' share in the profits which made them lose marks.

An individual's perception about a subject is believed to have a tremendous effect on his or her performance in the subject. According to Wetzel, Potter and O'Toole (1982) and Charkins, O'Toole and Wetzel (1985), there is a positive relationship between students' perception and performance, in that a student's perception influences his or her attitude towards a subject and therefore affects his or her performance. A positive perception affects performance positively while the opposite is true. It may therefore be assumed that, since there seems to be a relationship in students' performance in Mathematics and Financial Accounting, one's perception about Mathematics could have an influence on the person's performance in Financial Accounting. The aim of this study therefore, is

to find out the impact of mathematics ability on students' academic performance in Financial Accounting.

### **Statement of the Problem**

The determinants of students' performance in Financial Accounting, has received considerable attention in literature and continues to be a challenging theme. Empirical studies in developed and some developing countries on factors which influence students' performance in Financial Accounting have pointed to issues such as class attendance, study efforts, teaching styles of teachers, learning styles of students, academic environment among others. However, one factor which could also influence students' performance which has not been given much attention in Ghana is the mathematics ability of the student. A study of WAEC statistics on performance of Financial Accounting students in Mathematics and Financial Accounting in the Assin South District and Cape Coast Municipality from 2006-2009 gave evidence that mathematics ability may contribute to influencing students' performance in Financial Accounting as shown in Table 1 and 2.

From Table 1, Financial Accounting students' performance in Mathematics in Assin South from 2006-2009 was very poor. This was indicated by 23.6%, 9.1%, 11.0% and 9.9% pass from 2006-2009. On the other hand, their performance in Financial Accounting was also poor. This was indicated by 39.5%, 39.9%, 38.6%, 41.6% rates from 2006 to 2009.

**Table 1: Assin South Accounting Students' Performance in Mathematics and Financial Accounting (2006-2009)**

Year	Mathematics		Financial Accounting	
	Pass	Fail	Pass	Fail
2006	23.6% (61)	76.4% (197)	39.5% (102)	60.5% (156)
2007	9.1% (24)	90.9% (240)	39.9% (105)	60.1 (158)
2008	11.0% (34)	89.0% (274)	38.6% (119)	61.4% (189)
2009	9.9% (37)	90.2% (338)	41.6% (154)	58.4% (216)

WAEC: 2006-2009

**Table 2: Cape Coast Financial Accounting Students' Performance in Mathematics and Financial Accounting (2006- 2009)**

Year	Mathematics		Financial Accounting	
	Pass	Fail	Pass	Fail
2006	68.8% (490)	31.2% (222)	81.4% (576)	18.6% (132)
2007	65.8% (508)	34.2% (264)	77.9% (601)	22.1% (171)
2008	71.9% (463)	28.1% (181)	86.0% (553)	14.0% (90)
2009	67.5% (565)	32.5% (272)	82.6% (690)	17.4% (145)

WAEC: 2006-2009

From Table 2, the performance of Financial Accounting students in Financial Accounting in Cape Coast metropolis was good. This was indicated by 81.4%, 77.9%, 86.0% and 82.6% pass. On the other hand, their performance in mathematics was also good. This was indicated by 68.8%, 65.8%, 71.9%, 67.5% pass.

From Tables 1 and 2, it can be deduced that as Financial Accounting students performed poorly in Mathematics, they likewise did not perform well in Financial Accounting in Assin South district. However, Financial Accounting students in the Cape Coast Metropolis performed better in Mathematics and also performed better in Financial Accounting.

Considering these statistics on Financial Accounting, it is not clear whether this trend in performance can be attributed to the mathematics ability of the students. The study was conducted to find out, if mathematics ability, really has an influence on Financial Accounting students' academic performance in the Central region of Ghana. Furthermore, it is very important that the relationships between factors such as students' perceptions, teachers' characteristics as well as students' gender are adequately investigated and documented.

### **Purpose of the Study**

The purpose of the study was to find out whether mathematics ability influences Financial Accounting students' academic performance in the Central region of Ghana. The study specifically sought to:

1. Investigate the effect of mathematics ability on Financial Accounting students' academic performance.
2. Examine the relationship that exists between students' perception of mathematics and their academic performance in Financial Accounting.
3. Identify the relationship that exists between students' perception of Financial Accounting, and their academic performance in Financial Accounting.

4. Establish the relationship which exists amongst Financial Accounting teachers' characteristics (gender, academic and professional qualification, area of specialisation, years of experience, mathematics background and perception) and the mathematics ability of Financial Accounting students.
5. Assess whether there exists any differences between male and female Financial Accounting students' academic performance in Mathematics.
6. Find out whether there exists any differences between male and female students' academic performance in Financial Accounting.

### **Research Questions**

The following research questions and hypotheses were drawn to guide the study.

1. What is the effect of mathematics ability on Financial Accounting students' academic performance in Financial Accounting?
2. What relationship exists between students' perception of Mathematics and their academic performance in Financial Accounting?
3. What relationship exists between students' perception of Financial Accounting and their academic performance in Financial Accounting?
4. What relationship exists between Financial Accounting teachers' characteristics (gender, academic and professional qualification, area of specialisation, years of experience, mathematics background and perception) and the mathematics ability of Financial Accounting students?

## **Hypotheses**

Ho: 1. There is no significant difference in the academic performance of male and female Financial Accounting students in Mathematics.

Ho: 2. There is no significant difference in the academic performance of male and female Financial Accounting students in Financial Accounting.

## **Significance of the Study**

Firstly, the findings of the study would add to existing literature and will provide information for further research. Secondly, the results would be useful to heads of schools and other school authorities in making admission decisions concerning the criteria for selecting students to pursue the financial accounting programme. In addition, guidance and counselling coordinators as well as teachers could use such pieces of information to guide students in choosing careers and programmes of study. The findings would also alert teachers on the various aspects of mathematics which are needed to help students in their success in Financial Accounting. Ultimately, scholarship officers and financial aid officers would be able to use this information in selecting students who qualify for scholarships and financial aid.

## **Delimitation of the Study**

Financial Accounting studied in senior high schools has two parts; the theory and practical aspect. English and mathematics proficiency are both needed to be able to prepare financial statements. According to Wong and Chia (1995) when a student has a higher proficiency in English and Mathematics, performance in Financial Accounting is likely to be higher. In determining Financial



Accounting students' performance, the study did not consider the theoretical written aspect of Financial Accounting which relate to their English ability.

### **Limitations of the Study**

The study would have been more representative if all the Financial Accounting students in the sampled schools in the Central Region had participated in the study. However, at the time of data collection, there was a limit to use only second year Financial Accounting students as a result of the preparation for the WASSCE examination by the third and fourth year students.

Since the questionnaire required them to rate their professionalism, teachers could fake unwarranted skills. Students' responses could be influenced by fear, hatred, love and other emotional issues about their thoughts and perceptions. The effect of these could significantly affect the authenticity of the findings.

### **Organisation of the Rest of the Study**

Chapter Two was devoted to the review of related literature which covered the theoretical and conceptual framework of the study as well as empirical studies on the questions and hypotheses formulated. Chapter Three pointed out the methodology which included the research design, population, sample and sampling technique, research instruments, validity and reliability of the instrument, data collection procedure and data analysis procedure. The fourth chapter presented and discussed the results which were obtained from analysing the data. The final chapter, Chapter Five, was based on the summary, conclusions and recommendations as well as areas suggested for further research.

## **CHAPTER TWO**

### **REVIEW OF RELATED LITERATURE**

This chapter reviews previous works by other researchers which are related to the study. The review first presents on the theoretical framework based on the nature of Financial Accounting and Mathematics. Other topics reviewed include the concept of performance; perception; teacher characteristics; and gender. The empirical review was to allow comparing the findings of this study with other related studies to either confirm or reject conclusions drawn by earlier researchers.

#### **Nature of Financial Accounting**

Historically, double entry Financial Accounting achieved its prominence with Friar Luca Pacioli, in one of the sections of his book *Summa de Arithmetica, Geometria, Proportioni et Proportionalita*, in which he described the double entry as “the method of Venice”. Double entry is a formulation of “where- got, where- give”, a two dimensional system that permits classification within one set of classes (Arthur as cited in Riahi- Belkaoui, 2005). Mattessich (1964) asserts that a transaction or flow has basically two dimensions: an aspect and a counter- aspect. He opines that, economic events corresponds to a two dimensional classification of value within a set of classes. A categorical double entry Financial Accounting is aimed at maintaining the fundamental Financial Accounting equation (Assets=

Capital + Liabilities). Contrary to categorical double entry, the duality in causal double entry has a much deeper root. In causal double entry, an increment (debit) is matched with a decrement (credit). Duality does not stem from the selection of two classifications out of many, but from our perception of change in the resource set as being addition and subtraction.

It is generally considered that Financial Accounting is a measurement, that is, the assignment of numerical values to objects, events and attributes in such a way as to ensure easy aggregation or disaggregation of the data. There are various types of measures which are possible in Financial Accounting which may be direct or indirect. Direct measures are actual measures of an object or its attributes. Indirect measures are derived indirectly by an algebraic transformation of a set of numbers that represent direct measures of some objects or attributes. These objects are intrinsic of an indirect measure. The unit cost of production that is derived by dividing the total production cost by the volume of production is an example. Most measures used in Financial Accounting are indirect measures resulting from some transformation. The degree of transformation provides the distinction between what is perceived as a direct or an indirect measure, and defines the source of measurement of error. Thus, a measurement error would occur either in the original primary quantification or the transformation process.

Every measurement is made on a scale. Scales can be described in general terms as nominal, ordinal, interval or ratio. A nominal scale assists in the determination of equality, like numbering of students. It is a simple classification of labelling system like the case of a chart of accounts. The numbers reflect the

object themselves, rather than their properties. An ordinal scale assists in the determination of the lesser or greater, like grades of workers in an institution. It is an order of preference system. One problem with ordinal scale is that the differences or intervals between the numbers are not necessarily equal. An interval scale assists in the determination of the equality of intervals or difference like temperature and time. It assigns equal values to intervals between assigned numbers. A ratio scale assists in the determination of the equality of ratios with the addition feature of the existence of a unique origin, a natural zero point, where the distance from it for at least one object is known.

Financial Accounting relies on each of the scales of measurement. The nominal scale although basic to the Financial Accounting process is neither the only nor the most important scale pertaining to our discipline. The evaluation process- the core of theoretical accountancy- utilizes the ratio scale; statement analysts primarily work with ordinal scales; and certain aspects of cost Financial Accounting can be considered as applying the interval scale.

### **The Nature of Mathematics**

Mathematics (from Greek μάθημα *máthēma*, "knowledge, study, and learning") is the abstract study of topics encompassing quantity, structure, space, change and other properties. Mathematics involves seeking out patterns and formulating conjectures. Mathematicians resolve the truth or falsity of conjectures by mathematical proof. The research required to solve mathematical problems can take years or even centuries of sustained inquiry. Since the pioneering work of Giuseppe Peano (1858–1932), David Hilbert (1862–1943), and others on

axiomatic systems in the late 19th century, it has become customary to view mathematical research as establishing truth by rigorous deduction from appropriately chosen axioms and definitions. When those mathematical structures are good models of real phenomena, then mathematical reasoning can provide insight or predictions about nature. Through the use of abstraction and logical reasoning, mathematics developed from counting, calculation, measurement, and the systematic study of the shapes and motions of physical objects. Practical mathematics has been a human activity for as far back as written records exist (Wikipedia, 2013).

### **The Concept of Mathematics Ability**

According to Borovik and Gardiner (2006) mathematics ability in their developed form, appears highly specific but are in fact quintessentially human, and are widely spread at large in all social classes of students. Mathematics is a personality-building activity, it shapes the way the learner thinks and sees the world. Everyone has the ability to learn mathematics, although some children learn and make connections more quickly than others. Everyone has some mathematical ability, but some children have potential far beyond what most people are prepared to believe. Borovik and Gardiner (2006) assert that mathematical abilities in a child are often dormant and remain unnoticed both by the child and his or her teachers. This potential can be lost forever if it is not discovered and supported at the appropriate time. It may even be undermined by inappropriate experience. Mathematics depends on systematic, cumulative learning, and each new skill needs to be built on a solid foundation laid at earlier

stages. It requires a high level of motivation and emotional involvement on the part of the learner. Understanding is of course vital; but it is also essential for the learner to experience real difficulties: boredom and lack of challenge present far greater dangers when seeking to nurture mathematical talent.

### **Individual Differences in Mathematical Ability**

Morton and Frith (1995) suggested three different (but not mutually exclusive) research domains that provide evidence of potential sources of individual differences in mathematical ability: genetics, cognition and behaviour.

#### **Genetics**

Butterworth (2005) proposes that we are born with a number module which categorizes the world in terms of numerosities. This innate mathematical ability is considered to be, at least in part, genetically determined. It is becoming increasingly recognised that our genetic inheritance influences our lifespan in terms of our predisposition to certain abilities, both physical and mental. Dehaene (2001) proposes that we have a non-verbal ability to spatially represent magnitude similar to a mental number line. Located bilaterally in the parietotemporal areas of the brain, the number line is believed to be an evolutionary developed ability which helps us to represent things in terms of relative in magnitude. It is proposed that this innate ability to represent magnitude provides the foundation on which our culturally derived system of numbers and mathematical operations is built. This is a bold statement and we are left to consider whether individual differences in mathematical ability are the result of nature (i.e., genes) or nurture (e.g., teaching). It is worth noting that Dehaene places more weight on nurture,

concluding that the impact of education is probably much greater than any initial difference in number sense.

### **Cognitive**

The study of mathematical cognition attempts to answer the fundamental questions of structure and process in mathematical processing: how is numerical and mathematical knowledge represented in the brain, and how do we solve mathematical problems? Adams (2007) posits that cognitive psychologists approach these kinds of questions by trying to understand the functional architecture of the brain. By modelling observed human performance (e.g., doing mathematics), models of mathematical cognition including computer simulations have advanced our understanding of our mathematical brain.

Adams (2007) goes on to assert that this is because in order to successfully model human performance, one needs to first fully understand the processes children and adults go through in order to solve mathematical problems. Siegler's Distribution of Associations model was the first model to implement the development of children's strategy choice in mathematical problem solving. The model posits that correct and incorrect answers are restored in an interconnected network of number facts in long-term memory. Through a dynamic process, answers generated by a child when solving a problem (e.g.,  $3 + 4 = ?$ ) influence their future response to that problem exceeds a present level. For example, the child will become more efficient at using the counting algorithm and will begin to compute the correct answer more times than the incorrect answers, thus building its associative strength. The correct answer (7) associated with the problem ( $3 +$

4) will display a “peakedness” amongst the possible solutions. When this “peakedness” exceeds a threshold, (the confidence criterion) the child will retrieve rather than compute the answer. The model also provides a mechanism to account for strategy selection. Backup strategies such as counting will be used when the answer generated fails to reach the confidence criterion and the search length parameter (number of retrieval attempts) exceeds a pre-set level. Siegler (1999) argues that this process is automatic and not the result of a conscious choice.

### **Behavioural**

There are two sources of behavioural variations that interact with cognitive factors that may explain individual differences in mathematical ability. These are cognitive style and maths anxiety. An individual’s cognitive style describes his or her choice of approach in structuring and characterising information (Riding, 2002). Cognitive style has two dimensions: holistic analytic (whether people view the whole or see things in parts) and verbal-imagery (whether people prefer to represent information verbally or as pictures and images). Riding contends that people’s cognitive styles differ along these dimensions in various combinations that is, analytic-verbalisers or holistic - imagers. An important consequence of having a particular style profile is the effect it has on the individual’s working memory. Analytic and verbal styled students are more resource demanding than holistic and imagery styled students. Holistic imagery styled students are less receptive in exceeding their capacity of their working memory. A research by Riding (2002) report that in terms of overall



academic achievement, holistic imagery styled students appear to be the least to perform better, especially in courses such as Science, Music, Mathematics which require detailed analysis.

Mathematics has long been associated with increased levels of anxiety, both in students suffering from general anxiety to those who have a subject-specific problem (Ntow, 2009). Ashcraft and Kirk (2001) studied people during problem solving to evaluate how mathematics anxiety had an impact on mathematical ability. They carried out a study with college students who cited low, moderate, or high levels of mathematics anxiety on a questionnaire. The results revealed that high mathematics anxiety was associated with decreased working memory capacity and such individuals showed a substantial regression in problem-solving performance. They had less working memory space to effectively deal with mathematics because their anxiety was using working memory space that could be used to solve mathematical problems. Furthermore, Ashcraft and Kirk (2001) found that students with a high level of mathematics anxiety enrolled in fewer mathematics courses, received lower mathematics grades, and scored worse on working-memory tests involving numbers.

### **Various aspects of Mathematics related to Financial Accounting**

Arithmetic or arithmetics which is derived from the Greek word ἀριθμός, arithmos “number” is the oldest and most elementary branch of mathematics, used very popularly, for tasks ranging from simple day-to-day counting to advanced science and business calculations. It involves the study of quantity, especially as the result of operations that combine numbers. In common usage, it refers to the

simpler properties when using the traditional operations of addition, subtraction, multiplication and division with smaller values of numbers.

### **Addition**

Addition is a mathematical operation that represents the total amount of objects together in a collection. It is signified by the plus sign (+). It is the basic operation of arithmetic. In its simplest form, addition combines two numbers, the addends or terms, into a single number, the sum of the numbers. Adding more than two numbers can be viewed as repeated addition; this procedure is known as summation and includes ways to add infinitely many numbers in an infinite series; repeated addition of the number one is the most basic form of counting. Example: if there are three red balls and two blue balls, if we want to know how many balls there are altogether, it is 3 red balls+2 blue balls= 5balls. So in Financial Accounting, Selling Price (1000p) = Cost Price (800p) + Profit (200p).

### **Subtraction**

Subtraction is the opposite of addition. It is signified by the minus sign (-) Subtraction finds the difference between two numbers, the minuend minus the subtrahend. The minuend is the number from which another number is to be deducted. The subtrahend is the number to be deducted. If the minuend is larger than the subtrahend, the difference is positive; if the minuend is smaller than the subtrahend, the difference is negative; if they are equal, the difference is zero. For example, if there are five eggs and two eggs are taken away. If we want to know how many eggs are left, then it is 5eggs- 2eggs = 3eggs. Hence, in the discipline

of Financial Accounting, Profit (200p) = Selling Price (1000p) – Cost Price (800p).

### **Multiplication**

Multiplication is the second basic operation of arithmetic. It is signified by  $\times$  or  $*$ . Multiplication also combines two numbers into a single number, the product. The two original numbers are called the multiplier and the multiplicand, sometimes both simply called factors. Multiplication is best viewed as a scaling operation. If the numbers are imagined as lying in a line, multiplication by a number, say  $x$ , greater than 1 is the same as stretching everything away from 0 uniformly, in such a way that the number 1 itself is stretched to where  $x$  was. Similarly, multiplying by a number less than 1 can be imagined as squeezing towards 0. (Again, in such a way that 1 goes to the multiplicand.). For example: find the product of 2 and 4.  $2 \times 4 = 8$ . Also in Financial Accounting, if a profit of 200p is doubled, then Profit =  $200p \times 2 = 400p$ .

### **Division**

Division is essentially the opposite of multiplication. It involves splitting into equal parts or groups. It is signified by  $\div$  or  $/$ . Division finds the quotient of two numbers, the dividend divided by the divisor. Any dividend divided by zero is undefined. For positive numbers, if the dividend is larger than the divisor, the quotient is greater than one; otherwise it is less than one (a similar rule applies for negative numbers). The quotient multiplied by the divisor always yields the dividend. Example, there are twelve chocolates and three friends want to share them. How many will each person get?  $12 \div 3 = 4$ . Thus from the point of Financial

Accounting, if the profit of  $400p$  is shared between 4 partners, then  $400p/4 = 100p$  each.

### **Percentages and Proportions**

Percentages and Proportions are two different ways of expressing relative frequency and probability. When used this way, the highest value a proportion can have is 1. This means that everyone is in a particular group. For instance, if all the people in your sample were males, the proportion of people in your sample who are males would be 1. If this were the case, if you selected one person from your sample, that person would be guaranteed to be male. To calculate a proportion, take the number of people belonging to the category you're interested in (e.g., the number of males in your sample) and divide by the total number of people in your sample. Percentages express exactly the same idea as proportions. However, percentages can vary between 0 and 100. 100% is exactly the same as a proportion of 1. To calculate a percentage, calculate a proportion and multiply by 100. To calculate a proportion from a percent, divide by 100.

### **Algebraic Expressions**

Algebraic notation describes how algebra is written. It follows certain rules and conventions, and has its own terminology. For example: the expression,  $5x^2 - 4xy + c$ .  $5x^2$  and  $4xy$  are called terms,  $x$  and  $y$  are called variables,  $^2$  is called power or exponent, 3 and 2 are called coefficients,  $+$  and  $-$  are called operators and  $c$  is called constant. A coefficient is a numerical value which multiplies a variable (the operator is omitted). A term is an addend or a summand, a group of coefficients, variables, constants and exponents that may be separated from the

other terms by the plus and minus operators. Letters represent variables and constants. By convention, letters at the beginning of the alphabet (e.g. a, b, c) are typically used to represent constants, and those toward the end of the alphabet (e.g. x and y) are used to represent variables. Algebraic operations work in the same way arithmetic operations such as addition, subtraction, multiplication, division and exponentiation and are applied to variables and terms.

### **Concept of Academic Performance**

The concept of academic achievement has been viewed by people in different ways. Academic achievement is defined by Crow and Crow (1969) as the extent to which a learner is profiting from instructions in a given area of learning, that is, academic achievement is reflected by the extent to which skill and knowledge has been imparted to him or her. They also confirm that academic achievement also denotes the knowledge attained and skill developed in the school subject, usually designated by test scores. According to the Cambridge Reporter (2003), academic performance is mostly defined in terms of examination performance. It is the main indicator that a set of actions, tasks or plans that have been carried out, has been accomplished. It tells the extent to which a student, teacher or educational institution has achieved successes or failures.

Hammil (as cited in Younn, 2009) describes achievement as the skill a person has mastered as a result of direct instruction. The skills, according to Hammil may be teacher-taught, parent-taught, or self-taught, but they exist in individuals who have had specific training. He further declared that skills like reading, writing, computer-use, alphabetical knowledge or typing are not innate

rather they are learnt before they are achieved. He concluded that achievement tests in schools are administered to find out how much a student knows about a particular content or subject taught and can be attained as a result of instruction.

Santrock (2006) also defines academic performance as what students have learnt or what skills the student has learnt and this is usually measured through assessments like standardised tests, performance assessments and portfolio assessments. Teachers' observations made up the bulk of the assessment, but today, summation or numerical method of determining how well a student is performing is a fairly recent invention.

It can be concluded from the definitions above that, academic performance is the direct outcome of education and our societies view academic performance as a key criterion to judge a person's total potentialities and capacities. Hence, academic performance occupies a very important place in education as well as in the learning process. Gagne (as cited in Karimi, 2008) points out that there are five main categories of learning outcomes. These are verbal information, intellectual skills, cognitive strategies, attitudes and motor skills. All these outcomes are of importance to the learning process and different learning tasks would require the demonstration of the various learning outcomes which contribute to academic performance. It can also be inferred that performance in Financial Accounting can be determined by the scores a student gets when he or she is tested on the Financial Accounting he or she has been taught.

## **Theory of Performance**

Elger (2002) promulgated Theory of Performance (ToP) which is useful in traditional learning contexts such as the classrooms and workshops as well as non- traditional learning contexts such as academic advising, self-development, departments, academic committees, professional research groups, and colleges. He asserted that performance is a “journey not a destination” and the location in the journey is labelled level of performance of which each level characterises the effectiveness or quality of performance. A person performing at one level may be performing either better or lower than another person at a different level. Performing at a higher level produces results that can be classified into categories:

**Quality increases** - results or products are more effective in meeting or exceeding the expectations of stakeholders.

**Cost decreases** - amount of effort or financial resources to produce a result goes down; amount of waste goes down

**Capability increases** - ability to tackle more challenging performances or projects increases

**Capacity increases** - ability to generate more throughput increases

**Knowledge increases** - depth and breadth of knowledge increases

**Skills increase** – abilities to set goals persist, maintain a positive outlook, etc. increase in breadth of application and in effectiveness

**Identity and motivation increases** - individuals develop more sense of who they are as professionals; organizations develop their essence.

Elger (2002) indicated three factors that influence performance improvement. These include a performer's mind-set, immersion and reflective practice. Performer's mind-set includes actions that engage positive emotions. Examples include setting challenging goals, allowing failure as a natural part of attaining high performance, and providing conditions in which the performer feels an appropriate degree of safety.

Immersion in a physical, social, and intellectual environment can elevate performance and stimulate personal as well as professional development. Elements include social interactions, disciplinary knowledge, active learning, emotions (both positive and negative), and spiritual alignment. Reflective practice involves actions that help people pay attention to and learn from experiences. Examples include observing the present level of performance, noting accomplishments, analysing strengths and areas for improvements, analysing and developing identity, and improving levels of knowledge. The section on assessment offers a variety of strategies for cultivating reflective practice.

## **Components of Performance**

### **Level of Identity**

As individuals mature in a discipline, they take on the shared identity of the professional community, while elevating their own uniqueness. As an organization matures, it develops its mission, its way of doing business, and its uniqueness. This is associated with maturation in a discipline, culture or life and when there is internalisation in a person or organization, thus, the individual or organization takes on the shared identity.



### **Level of Skills**

Skills describe specific actions that are used by individuals, groups, or organizations in multiple types of performances. This involves describing an action which is relevant in a broad range of performance contexts. This includes making assumptions, persisting, being humble, setting goals and observing.

### **Level of Knowledge**

Knowledge involves facts, information, concepts, theories, or principles acquired by a person or group through experience or education and training. This is derived from human experiences which can be communicated or recognized.

### **Context of Performance**

This component includes variables associated with the situation in which the individual or organization performs. This relates to circumstances associated with the performance and this applies to multiple performances or activities within the context which is not a personal factor. The performance of an academic department is coupled with the organizational effectiveness of the host college or the learning of a student is coupled with the organization of a class.

### **Personal Factors**

This component includes variables associated with the personal situation of an individual. This involves the life situation of an individual. When a teacher is ill, his activities and duties to carry out as expected of him will be affected.

A student's performance in academic work is affected by the quality of his or her classroom environment.

## **Fixed Factors**

This component includes variables unique to an individual that cannot be altered. It involves strictly individuals and groups. Example, An individual's performance in playing basketball is affected by height. Genetic factors also influence performance.

## **Concept of Perception**

Like most concepts, perception has been defined in a variety of ways since its first usage. From the layman's perspective, according to the Chambers Dictionary, perception is defined as an act of being aware of "one's environment through physical sensation, which denotes an individual's ability to understand". Perception is our sensory experience of the world around us and involves both the recognition of environmental stimuli and actions in response to these stimuli. Through the perceptual process, we gain information about properties and elements of the environment that are critical to our survival. Perception not only creates our experience of the world around us; it allows us to act within our environment.

Fieldman (as cited in Oppong, 2009) explains that perception is the sorting out, analysis, interpretation and integration of stimuli from the sensory organs. In this direction, it can be accepted as the process through which people receive and interpret sensory stimuli into forms that are understandable. Perception includes the five senses; touch, sight, taste, smell and taste. It also includes what is known as proprioception, a set of senses involving the ability to detect changes in body positions and movements. It also involves the cognitive processes required to

process information. Perception formation according to Bierhoff (as cited in Ferreira & Santoso, 2006) is the strong influence exerted by information gained at earlier stages in building an individual's perception of something. The first information received not only impacts on the knowledge organization of the human mind, but also influences the processing of new information.

Further to this, Bierhoff notes that where subsequent information is regarded as biased, preceding information benefits from greater validity, as the primacy effects fosters precise perception because the expectations based on the first information are comparatively valid, whereas subsequent contradictory evidence lacks validity. As a result of past beliefs, information received at later stages by a person is only interpreted in the context of an existing mind-set. In other words, the assimilation of the later information will occur in the light of pre-established beliefs and expectations. Because the information received at an early stage shapes the impressions directly, this information plays a key role in influencing the information received at a later stage (Bierhoff, 1989) and how it is treated.

Belief perseverance theory also maintains that individuals derive their expectations based on the first information received and that this affects the way they build impressions at later stages (Lord, Ross & Lepper, 1979; Bierhoff, 1989). Gibson and Spelke (1983) have identified five stages through which perceptions develop. In the first place, they indicate that, as human beings grow, their perception becomes more selective and more purposeful. Secondly, people become increasingly aware of the meaning of their perceptions. The next stage

according to Gibson and Spelke (1983) is when perception becomes more selective as people detect increasingly subtle aspects of stimuli. The fourth stage is where people become more efficient in picking up critical information from stimuli.

The final stage is when people become proficient at generalizing perceived meaning from one situation to another. The perceptual development appears continuously as individuals go through these stages. It is important to point out that such perception influences one's attitude of doing anything. Therefore, the perception of teachers and students will have a great impact on the academic performance of students in Financial Accounting. The extent to which a child perceives his or her own abilities is a good predictor of his or her task engagement and performance. For example, children who perceive that they are good at mathematics are more likely to persist when they face challenges because they are confident in their abilities (Pintrich & Schrauben, 1992). Rindfleisch (2007) asserts that, in academics, perception refers to how smart one believes that he or she is in a particular subject. She further explains that, students develop performance expectations based on those abilities from their perceptions. How or to what students attribute their failure or success is also influenced by their perceived ability.

In general, there are two types of attributions associated with failure and success: lack or success of ability and lack or success of effort. Children with high perceived ability are more likely to attribute their success to high ability, while children with low perceived ability are likely to attribute their success to luck

(Marsh, 1986) and vice versa. Children with high perceived ability are more likely to attribute their failures to lack of effort or to an external factor, while children with low perceived ability are more likely to attribute their failure to internal factors like ability (Marsh, 1986).

### **Teacher Characteristics**

The quality of education depends on the teachers as reflected in the performance of their duties. Over time pupils' academic performance in both internal and external examinations had been used to determine excellence in teachers and teaching (Ajao as cited in Akiri & Ugborugbo, 2009). Teachers have been shown to have an important influence on students' academic achievement and they also play a crucial role in educational attainments because the teacher is ultimately responsible for translating policy into action and principles based on practice during interaction with the students (Afe as cited in Akiri & Ugborugbo, 2009). Teaching, learning and academic performance of students depends on the effectiveness of teachers.

According to Liyew (2008), the teacher is the powerful person in the classroom to make learning happen and ensure better academic achievement for students. Teachers are expected to play their roles in order to satisfy the needs and objectives of students. They need to create positive learning environments. All students must feel that they are positively and equally valued and accepted, and that their efforts to learn are recognized. This is the more reason why teachers have responsibilities more than imparting knowledge. Teaching includes helping learners to learn by themselves, to develop skills and attitudes, and to express

ideas, feelings, opinions and experiences. To be effective in teaching, teachers must be competent and ready to devote their time, energy, and knowledge to help children learn and achieve the best. They need to have adequate knowledge in the subject they teach and the necessary skills to communicate the knowledge. Ball, Hill and Bass (2005) contend that to be a good facilitator of any subject, one should have a sound content based knowledge.

Stinnett (as cited in Kochhar, 2004) emphasizes that the effectiveness of a teacher can be enhanced with good leadership and appropriate instructional resources and methods. However, the most effective plans of administrators and the best selection of instructional devices and methods are of little avail if the teacher is ignorant, unskilled and indifferent. Financial Accounting teachers' characteristics (gender, teacher qualification (academic and professional), years of experience, mathematics background, subject/ area of specialisation and perception) is one of the key factors which determine students' achievement in Financial Accounting and indeed schools in Ghana, including senior high schools in the Central region.

### **Gender of the Teacher**

Umoh, (as cited in Udousoro, 2011) contends that every culture holds males superior to their female counterparts and this is evident and confirmed even in most societies. Males have been perceived naturally as powerful and prestigious thereby having higher and superior status than women. Gender is a major factor that influences career choice and subject interest of teachers. For instance, Home Economics, Nursing, Secretary-ship and other feminine related

careers have been traditionally regarded as aspects of the school curriculum reserved for females. Most of these subjects are taught by females in schools. Mathematics, Carpentry, Metal work, Financial Accounting and other Science related subjects are mostly pursued and taught by males. Based on this, males choose male stereotyped occupations and females choose female stereotyped occupations. Thus, at school males are more likely to take difficult subject areas and challenging problem-solving situations while female on the other hand prefer simple subjects and often shy away from difficult tasks and problem-solving. This illustrates the high level of gender stereotypes of teachers in education.

### **Teacher Qualification (Professional and Academic)**

Teacher qualification measures the educational attainment of the teacher. That is the highest qualification or level obtained by the teachers in any subject. The qualifications obtained by a teacher can be categorised namely Certificate, Diploma, Bachelor's, Master's or Doctoral degrees. Academic qualification in this study refers to teachers who have qualifications or certificates in any subject. Professional academic qualification in this study refers to teachers who have qualifications or certificates in formal education.

In Ghana, there are two types of teachers with qualification who teach Financial Accounting in the Senior High Schools. One type consists of teachers with Certificate or Bachelor's or Master's degree in education with a subject specialisation and the other type consists of teachers with subject specialisation but no qualification in education. Smith, Stanley and Shores (as cited in Ansong, 2009) posits that teachers need to have adequate training in educational methods

uniquely appropriate to the field of knowledge being taught. The Financial Accounting teacher, for instance, should be the one who knows Financial Accounting and will know how to teach it by applying the relevant mathematical concepts so that students will learn, remember and achieve the facts and understandings comprising the goal of instruction. Additionally, he must have knowledge about the levels of knowledge in his or her subject; that is, the ability to explain for students to understand the logic of the subject and perform creditably when assessed. Every teacher is expected to possess pedagogical content knowledge which is an amalgam of common elements such as knowledge of subject matter, knowledge of students and possible misconceptions, knowledge of curricula, knowledge of general pedagogy. It is based on the belief that teaching as a profession has a knowledge base for teaching. Teachers must blend the content and pedagogy of Financial Accounting into an understanding of how particular topics, problems or issues are organised, represented and adapted to the diverse interests and abilities of learners which is then presented to them as instruction.

### **Years' of Experience**

The length or number of years a teacher stays in the classroom to teach can be measured as his or her years' of experience. The years' of experience for each teacher may differ. There is a popular saying 'practice makes perfect'. This saying is supported by most researchers of teacher education. Rosenholtz (as cited in Younn, 2009) affirms that while inexperienced teachers (those with less than three years of experience) are typically less effective than more senior teachers,



the benefits of experience appears to level off after about five years especially in senior high school settings. As a beginning teacher teaches the same subject over a certain period of time, he or she may begin to gain ideas of teaching that would make him or her become an effective teacher. In some instances the veteran teachers may continue to gain more experience. Sometimes the benefits of experience may interact with educational opportunities. For instance, veteran or more experienced teachers in settings that lay emphasis on continual learning and collaboration continue to grow and improve their own performances to have an impact on students' performance.

#### **Area/ Subject Specialisation of the Teacher**

Knowledge of subject matter involves teachers' understanding of the central concepts and structures of the discipline taught with enough flexibility to create learning experiences that make the content meaningful for learners. According to Gess-Newsome and Lederman (1999), teachers with a good depth of subject matter knowledge have strong knowledge base which enables them to be empowered as well as the sense of sharing expertise with learners in the classroom.

#### **Perception of the Teacher**

A teacher's perception is concerned with his or her individual way of thinking, acting and behaving which to some extent can be used to predict the academic performance of the learner. Smith (2002) in his observation theory demonstrated that perception is acquired by using one or more of the five senses to acquire information about objects or persons in the surrounding

environment. What teachers like or dislike, appreciate and feel about a subject, learning or studies of their students could have a significant effect on the academic performance of their students. In this vein, a positive or negative perception of a teacher may be related to the performance of students.

### **Concept of Gender**

Gender is a cultural construct that distinguishes the roles, behaviour, mental and emotional characteristics between females and males developed in a society. Umoh (as cited in Udousoro, 2011) defines gender as psychological term used in describing behaviours and attributes expected of individuals on the basis of being born as either male or female. According to Okeke (2003), the study of gender is not just mere identification of male and female sexes. Scholars have gone further to identify responsibilities assigned to opposite sexes and to analyse the conditions under which those responsibilities are assigned.

Furthermore, Okeke (2003) specifically notes that the study of gender means the analysis of the relationship of men and women including the division of labour, access to resources and other factors which are determined by society as opposed to being determined by sex. It further involves the study of the socio-cultural environment under which responsibilities are assigned and the relationships emanating from it. Thus, gender equally projects the properties that distinguish and classify organisms on the basis of their reproductive and cultural expectant roles. It relates to the cultural and psychological attributes of men and women through their socio-economic contributions, expectations and limitations. Thus the concept of gender does not support or suggest the dominance of male

over female or vice versa in academics and other human resource development areas but it stresses equality and equity in enhancing effective and efficient recognition, development and utilization of competences and endowed capabilities of both sexes.

Gender education, according to Kano (2004), refers to instructional sensitization practices devoid of cultural bias and prejudice and as a process, it employs equity in the specification of subject matter, methodology, strategy and evaluation as regards the students irrespective of their sex. Gender education advocates equity in the provision of learning opportunities, content, strategies and textbook pictorial illustrations. Gender education is free from sex stereotyping, sex inequalities, sex discrimination and sex-role differentiation. It is a pivot through which the curriculum planners and implementers revolve for maximum success in the school since it endorses a more comprehensive and challenging gender sensitive curriculum. Therefore the nation should show concern and develop interest on how the two sexes will develop academic competences which will later be transferred to professional competences for effective and efficiency manpower development in our society.

### **Related Studies on Academic Performance**

#### **The Effect of Mathematics Ability on Students' Academic Performance in**

#### **Financial Accounting**

One of the goals of secondary education is to prepare students for the intricacies of every day decision-making. Students will face many situations which are complex with limited solutions. Through classroom experiences,

critical thinking is built to tackle such situations. Mathematics is an important element of such development because solving mathematical problems helps students with transitional ability, the ability to take what they know and apply that to what they do not know in order to perform better academically (Hoag & Benedict, 2010). Mathematics education researchers find that college preparatory mathematics leads to higher test scores in high school students' subsequent academic careers (Ganoran & Hannigan, 2000).

The conclusion is that mathematics maturity and understanding helps students become overall learners hence an impressive academic performance (Focardi & Fabozzi, 2010). The relationship between mathematics and academic performance in Financial Accounting courses has also been investigated by Financial Accounting educators for several years; there has been sufficient evidence with regards to the type of mathematics and sequence of mathematics and Financial Accounting courses.

Collier and McGowan (1989) provided an anecdotal evidence of empirical examination of the relationship between mathematics skills and course grades in Intermediate Financial Accounting. They assumed that, students with better Financial Accounting performance might have a better understanding of numbers and digits. Results of the research suggest a significantly positive relationship between mathematics skills and student's performance in the Intermediate Financial Accounting. Based on the findings, Collier and McGowan (1989) believed that a minimum perception of Mathematics (arithmetic and algebra) was

required but not sufficient for being successful in an academic programme of Financial Accounting.

Tho (1994) conducted a study in the University of Malaya, on Introductory Financial Accounting course. He proved that students' grades in high school Financial Accounting, Mathematics and Economics are important predictors of performance. A study was conducted by Wong and Chia (1995) on the interaction between proficiency in both Mathematics and English on students' performance in the first year level financial Financial Accounting course in Hong Kong University of Science and Technology. The findings on a multiple regression showed that a higher degree of proficiency in Mathematics was associated with a higher level of performance in Financial Accounting course for students who were more competent in English. Similarly, Mitchell (1988) also assumed that possession of a greater numerical ability influences Financial Accounting performance. Hence, a higher degree of proficiency in Mathematics of a student will have a significant effect on his or her performance in introductory Financial Accounting courses. The findings of Eskew and Faley (as cited in Wong & Chia, 1995) concluded that students with more university study hours in Mathematics and Statistics perform better in Financial Accounting than others.

In a study conducted by Gist, Goedde and Ward (1996) in America on the influence of mathematical skills and other factors on black students' performance in Principles of Financial Accounting, the authors tried to conduct a more comprehensive research on linking the cognitive skills and minority students'

performance in Financial Accounting courses. Their model consisted of variables which are related to students' mathematic skills, college grade point average, college admission test score, and gender. The findings showed that college Grade Point Average (GPA) was the most important factor which influenced the performance of black students in Principles of Financial Accounting, followed by Scholastic Aptitude Test (SAT) and performance in calculus. They also found out that B or better performance in calculus class was critically related to successful performance in Financial Accounting. Based on the results, it was concluded that consideration of the measures (college GPA, SAT and performance in calculus) could possibly lead to efficient allocation of limited Financial Accounting resources encouraging students who rank high on these measures to take or continue taking Financial Accounting courses.

Yee Lee (1999), proved that students who had passed Financial Accounting in one of the public examinations all outperformed students with no prior Financial Accounting qualification in Financial Accounting I, but not in Financial Accounting II. It was concluded that numerical ability (mathematics) was one of the factors which mainly determined students' performance.

Pritchard, Potter and Saccuci (2004), investigated the relationship between students' computational skills and basic algebra abilities and their performance in Principles of Finance. They found out that basic algebra and computational skills was the most statistically significant explanatory variable of students' performance in Finance which is a business related course to Financial Accounting. Therefore, students who have weak algebra skills are at a

considerable disadvantage. Those who have solid algebra skills enjoy a real advantage.

Yunker, Yunker and Krull (2009), conducted a study on the influence of mathematics ability on Financial Accounting students' performance. Yunker et al. (2009) managed a 24 question pre-test of Mathematics, which was divided into different sections with each involving certain questions. They tested the effects of different areas in Mathematics; Arithmetic, Proportions and Percentages and Algebra on Financial Accounting skills as well as the overall effect of it on the undergraduate Financial Mathematics score variables had a significant impact, the overall effect of mathematic skills and the explanatory power of the regression equation did not grow, as a new Mathematics score was added to the equation. They judged this finding and indicated that Mathematics did play an important role in undergraduate Financial Accounting students' better performance, but it was not the only effective variable. There are some other influential variables, which can affect the academic performance of Financial Accounting students. Nevertheless, the pre-test itself can be utilized to conveniently identify at-risk students in Principles of Financial Accounting courses, especially those with low arithmetical and percentages and proportions skills.

Al-Twajjry (2010) conducted a study in Saudi Arabia on students' academic performance in undergraduate Managerial Accounting courses. The findings confirmed that Mathematics skills had a significant impact on Management Accounting course.

Fedoryshyn, O' Brien, Hintz and Bosner (2010) examined whether a student's arithmetic reasoning ability has an effect on their performance in the first Principles of Financial Accounting course. The study involved a 50 question arithmetical skills test which was administered to 247 students who enrolled in Principles of Financial Accounting course at three regional colleges and universities. The results showed significant correlation between arithmetic reasoning skills and performance in Principles Financial Accounting course. The findings may have an impact on the prerequisites considered appropriate for Principles of Financial Accounting course.

Gholamreza Zandi and Bagheri (2012) examined the relationship between Mathematics excellency and efficiency of Financial Accounting students in four universities in the province of Shiraz province, with four hundred and sixty seven (467) fresh Financial Accounting students as sample size. The authors designed a questionnaire with 26 Mathematics questions and the results of the multiple regression analysis revealed that Mathematics skills positively and strongly had an impact on academic performance of students in Principles of Financial Accounting. Clearly, Mathematics skills are influential over the Financial Accounting discipline outperformance, i.e., the higher, the Mathematics knowledge, the better the Financial Accounting performance.

### **Students' Perception of Mathematics**

Mathematics has played and continues to play a crucial role in the advancement of real life situations. In this course of advancement, the importance of Mathematics is highly evident in its applicability in almost school subjects



including Financial Accounting. The perception of students about Mathematics is a significant factor which affects students' performance. Empirical evidence has concluded that students have a positive perception of Mathematics.

Taylor (2004) in a study of 745 students in four high schools in Southern California on their perception towards Mathematics using the Test of Mathematics Related Attitude (TOMRA) reported that students' perception towards Mathematics was positive. This was because students indicated that they enjoyed studying Mathematics and were also motivated by their instructors.

Eshun (as cited in Ntow, 2009) in a study of attitude of secondary school students involving 1419 students from 12 secondary schools in the Central and Western Regions of Ghana reported that students' attitude towards Mathematics was positive because of the usefulness of Mathematics, their confidence in learning Mathematics, success in Mathematics, effective motivation, no Mathematics anxiety, Mathematics was not male dominated, their understanding and enjoyment of Mathematics.

The investigations of Kislenko, Grevholm and Lepik (2005) about students' beliefs and attitudes towards Mathematics in Norway and Estonia revealed a negative perception of students about Mathematics. 85% of the respondents perceived Mathematics to be difficult and concluded that the students understood that it was their responsibility to learn Mathematics and acknowledged Mathematics to be a subject which increases in difficulty as they progressed through the grades. Eshun (as cited in Ntow, 2009) stated that most people believe that among all school subjects, Mathematics is the most feared subject. He goes

further to state that if asked to sum up their view of Mathematics at school many people would describe it in terms of one, if not all, of the three D's- dull, difficult and dislike.

Streitlien, Wiik and Brekke (2001) conducted a study in Norway on the beliefs and attitudes of Mathematics students which also showed a negative perception of mathematics. They pointed out that students perceived Mathematics to be boring and abstract. They attributed the possible reason could be an effect of a decreasing general motivation for schooling by students. Also some students believed that it was important to know how to solve practical problems than knowing how to deal with numbers or make calculations.

In a paper presented by Forgasz (2001) in America on the topic, "Mathematics as a gendered domain in Australia", he disclosed that majority of the respondents in his survey had a positive perception of mathematics. He construed that students' perceived mathematics as a gender neutral domain subject and their teachers perceived them to likely succeed. In a similar symposium presented by Kloosterman, Tassell and Ponniah, (2001) in America, they also concluded that Mathematics was a gender neutral domain subject. CRDD (2007) emphasised in the Mathematics curriculum for the Senior High Schools in Ghana that core Mathematics aims to develop students' basic quantitative skills. Thus, Mathematics helps students to appreciate the usefulness of Mathematics in other school subjects and in other vocations such as Commerce or Financial Accounting.

The results of most of the literature above, shows that learners have a positive perception of Mathematics. The findings concur with the studies by Taylor (2004) and Eshun (as cited in Ntow, 2009). It is therefore hypothesized that Financial Accounting students will also have a positive perception of the Mathematics subject since both Financial Accounting and Mathematics subjects have certain similar characteristics. It can be unveiled that Financial Accounting students have a positive perception of Mathematics.

### **Students' Perception of Mathematics and their Academic Performance in Financial Accounting**

Many studies have examined students' perception about Mathematics and their academic performance in Financial Accounting. Schreiber (2000) in his study on advanced academic achievement pronounced that those who had positive attitudes toward Mathematics had a better performance in the Mathematics subject and other related Mathematics subjects. An extensive review of the findings of the Trends in Mathematics and Science Study (TIMSS) data was carried out by Kiamanesh and Kheirieh (2001) on in- and out-of-school variables such as self-concept, attitudes towards Mathematics, home background as well as motivation and students' subsequent academic performance. It was concluded that there was a positive correlation between students' attitude about Mathematics and their academic achievement in Mathematics. In a related work by Papanastasiou (2002) on school, effects of attitudes and beliefs on Mathematics achievement, it was concluded that there was a positive relationship between students' attitude of Mathematics and their academic performance of Mathematics.

A survey by Ifamuyiwa (2004) on the relationship between students' achievement in and attitude towards secondary school Mathematics submitted that despite the different perspectives from which researchers have conceived attitude, the common line of agreement was that the achievement of goals and objectives can be influenced or affected by attitude, and that a positive attitude was more likely to engender achievement of a goal or objective (performance)

In contrast with these findings, Cain-Caston's study (1993) showed that for the third grade students there was no significant relationship between students' attitude toward Mathematics and students' achievement in the subject.

### **Students' Perception of Financial Accounting**

Financial Accounting is a mandatory course for most business students which is designed to equip learners with a vocational skills. However, to be able to develop these skills, a positive perception is required. Empirical evidence in this study provides us with the perception of students about Financial Accounting.

In a survey conducted by Hunt, Falgiani and Interieri (2004) on the nature and origins of students' perception of accountants, respondents perceived that for a person to enjoy Financial Accounting there was the need for one to be good with numbers because Financial Accounting is full of mathematics. Collier and McGowan (1989) in their investigation also indicated that students needed to understand number concepts in order to do well in Financial Accounting and that background knowledge in arithmetic and algebra were necessary conditions for good performance in Financial Accounting subjects.

A study by Cohen and Hanno (1993) used the theory of planned behaviour to predict and explain the choice of Financial Accounting as a major. Their results indicated that students perceived Financial Accounting to be too number-oriented. Intended Financial Accounting majors were also found to place more emphasis than intended non-Financial Accounting majors on high performance in the introductory courses in their selection of a major in their study.

Warsono, Darmawan and Ridha (2009) proved that the use of mathematics rationality simplifies the explanation of why the elements of expenses and assets should receive the same treatment in relation to credits and debits. They also demonstrated that the rules of debits and credits are totally based on mathematical logics and that learning Financial Accounting should be based on a mathematical platform. It was also in their study that a perspective of mathematics can be employed to solve crucial issues in Financial Accounting principles.

Rao and Higgins (as cited in Malgwi, 2006) used a case study method on a financial statement analysis project to ascertain the usefulness of financial Financial Accounting in the society from the user's perspective. It was divulged from the study that 97% of users perceived the Financial Accounting course as serving a useful function in society.

Gracia and Jenkins (2003) conducted a study on exploring student failure on an undergraduate Financial Accounting programme of study. In some of the interviews conducted, most of the Financial Accounting students indicated that they enjoyed and liked Financial Accounting. Geiger and Ogilby (2000) investigated students' perception and their effect on their decision to major in

Financial Accounting. The results revealed that because students involved in the study are motivated to study Financial Accounting, they have a positive perception of Financial Accounting this also makes them consider Financial Accounting as interesting and useful. In a related study, Malgwi (2006) reported that students perceived Financial Accounting positively because they were highly motivated to study Financial Accounting such that they recognised the first Financial Accounting course as interesting and they had confidence in their ability to handle the course and its relevance.

Yu (2011) conducted a study on how study habits, skills and attitudes affect students' performance in introductory college Financial Accounting in the Philippines. He identified motivation as important in explaining students' performance in Financial Accounting. Wooten (as cited in Yu, 2011) asserts that motivation influences effort which in turn significantly influences Financial Accounting performance.

Riordan, St. Pierre, and Matoney (as cited in Geiger & Ogilby, 2000) examined whether the introductory course appeared to attract or retain quality students (as measured by GPA). They found that the mean GPA of intended Financial Accounting majors was higher than that of non-Financial Accounting students before the introductory course, and that students transferring into Financial Accounting after the course had higher GPAs than those transferring out.

The results of the above authenticates that students have a positive perception of Financial Accounting. This is because they consider it to be

interesting, useful, important, and place a higher value on the subject. Students' academic performance in such a subject can be assumed will be positively affected if the learners have a positive perception.

### **Students' Perception of Financial Accounting and their Academic Performance in Financial Accounting**

A research was done by Anuka (2002) on the effects of double entry Financial Accounting on students' achievement using senior secondary school students. It was concluded that the attitudes of students had a positive correlation with their achievement in Financial Accounting. Adetayo (2010) investigated the relationship between study habits, attitude (perception) and academic achievement in Financial Accounting using four hundred students randomly selected from two classes in eight secondary schools in Ijebu-North area of Ogun State in Nigeria. The findings of the study revealed that there was a significant positive correlation between students' perception of Financial Accounting and their academic achievement in Financial Accounting.

Semukono, Orobia and Arinaitwe (2013) examined learning environment, students' attitude and performance in quantitative courses amongst undergraduate business students, using Makerere University Business School in Uganda. The data were collected from 346 third year students using a face-to-face (administered) questionnaire survey. The findings indicated that students' attitude was positively associated with performance in quantitative, courses such as financial management and Financial Accounting students' attitude towards quantitative courses causes more variations in performance.

## **Effect of Teacher Characteristics on Students' Academic Performance**

### **Gender of the Teacher**

The sex of the teacher can be explained to have a relationship with the academic performance of students. Students see their teachers as role models. There is a related literature on the association of teacher gender on students' academic performance. Akiri and Ugborugbo (2008) examined how the gender of a teacher influences his or her productivity in secondary schools. The conclusion from the study was that there was no significant association between the gender of the teacher and the academic achievement of students.

Kimani, Kara and Njagi (2013) also in a related study investigated the relationship between selected teachers' demographic characteristics and classroom instructional practices and students' academic achievement in selected secondary schools in Kenya. One hundred and fifty three teachers selected randomly from eighteen schools in three districts in the County participated in the study. The study found that teachers' gender was not significantly related to academic achievement of students. Okoro, Ekanem and Udoh (2012) in his study presented a divergent view. In his work, he involved 60 primary pupils and their class teachers from three schools in Uyo metropolis in Nigeria to investigate the effect of teacher's gender on students' academic achievement. It was established that there was a significant relationship between the gender of the teacher and students' academic achievement in mathematics.



## **Professional and Academic Qualification of the Teacher**

The availability of competent teachers is direct and central in the reconstruction of academic performance. It is a fact that the academic and professional qualification of a teacher has an effective impact on the academic performance of students. There is sufficient empirical evidence that suggests that a teacher's academic and professional qualification can have an impact on the academic performance of students.

Greenwald, Hedges, and Laine (1996) conducted a meta-analysis of studies that examined the relationship between school resources and students achievement; they found that there was a significant and positive relationship between teachers' qualification measured as having a master's degree or not having a master's degree and students' achievement. Goldhaber and Brewer (1996) evaluated the effect of teacher degree level on educational performance. They indicated that an advanced degree that was specific in the subject taught was associated with higher students' achievement. Betts, Zau, and Rice (2003) in assessing the determinants of students' academic achievement found that teachers' highest degree correlates positively with students' achievement. Rice (2003) also in his study on understanding the effectiveness of the quality of the teacher found that when teachers have an advanced degree in their teaching subjects it will have a positive impact on the students' achievements.

Bressoux, Kramarz and Prost (2008) organised a research on teacher training, class size and students' outcomes. They compared the effect of certified and uncertified teachers' training on third grade pupils' achievement in

Mathematics in France. They found out that training of the teacher substantially improves students' scores in mathematics. It was concluded that training improves teachers' effectiveness in raising their students' achievement in Mathematics. In Israel, Zuzovsky (2009) conducted a study by re-examining the TIMMS (Trends in Mathematics and Science Study) Data for 2003 on the components of teacher qualification. It was found out that there was a positive relationship between teachers' qualification and students' performance in Mathematics and Science.

On the contrary, Wenglinsky (2000) delved into the association between the practices of the classroom teacher and the academic performance of students and Greenberg, Rhodes, Ye and Stancavage (2004) worked on teacher preparation and eighth grade students' performance in Mathematics. They both concluded that postgraduate qualifications at master's or higher level were not significantly related to students' achievement. Despite the contrary findings, it is likely that teachers' qualifications play a significant role in determining students' achievement in Mathematics.

### **Years' of experience of the Teacher**

A number of studies found teachers' years' of experience to positively correlate with students' achievement. Greenwald, Hedges, and Laine (1996) in their meta-analysis of data from 60 studies found that teachers' years' of teaching experience positively correlates with students' achievement. Hawkins, Stancavage, and Dossey, (1998) and Rosenholtz (as cited in Darling-Hammond (2000) found teaching experience to be related to students' achievement but that

the relationship may not be linear; students of teachers who had fewer than five years' of experience had lower levels of Mathematics achievement but there were no difference in Mathematics achievement among students whose teachers had more than five years' of experience. The implication of that is that the benefit of experience levels off after five years. The curvilinear effect according to Darling-Hammond (2000) could be because older teachers do not continue to grow and learn and may grow tired of their jobs.

Betts, Zau and Rice (2003) found that teachers' experience significantly correlates with students' achievement in Mathematics. A report by the Centre for Public Education (2005) stated that research has been consistent in finding positive correlations between teaching experience and higher students' achievement. Teachers with more than five years teaching experience are found to be the most effective while inexperience is shown to have strong negative effect on students' performance. In a related finding, Rivkin, Hanushek, and Kain (2005) showed that students of experienced teachers achieved better than students of new teachers (those with one to three years of experience).

Contrary to these findings, a few studies like Hanushek (1997) reported in the studies that he reviewed that only 9% of the studies found a significant positive relationship between the experience of the teacher and students' performance. Furthermore, 71% of the studies did not find results to support a relationship between teachers experience and students' achievement. Martin, Mullis, Gregory, Hoyle and Shen (2000) and Wenglinsky (2002) also found that the number of years in teaching is not associated with students' achievement.

These contrary findings could be due to the presence of well- prepared beginning teachers who were highly effective.

### **Area of specialisation of the teacher**

Work by other researchers and institutions also support that subject-content specialisation influence students' learning outcomes. Education for All (EFA, 2002) affirm in their report that “the quality of teaching significantly affects student achievement, particularly in terms of teaching methods, subject-specific expertise, motivation and attitude”(p. 24).

Ball (as cited in Ansong, 2011) hypothesized that without a deep understanding of subject matter content, teachers would be unable to generate accurate explanations or representations on the fly in response to student questions. To her, subject matter knowledge is critical in good teaching and better achievement of their learners and teachers can be identified only by learners' ability to understand and perform well. Wilson and Floden (2003) found that students of Mathematics teachers with Mathematics or Mathematics Education degrees demonstrate higher academic achievement in subjects related to Mathematics. However, they also indicated that there might be a limit at which more Mathematics knowledge does not help the teacher.

Goldhaber and Brewer (1996) found that specialisation in one's teaching subject is the most reliable predictor of students' achievement in Mathematics and Science. A review of a study of high school students' performance in Mathematics and Science by Darling-Hammond (2000) found that one having a

major in his/her teaching subject was the most reliable predictor of students' achievement scores in Mathematics and Science.

However, a few other researchers reported inconsistent relationships between teachers' subject majors and students' achievement. For example, Ingvarson, Beavis, Bishop, Peck and Elsworth (2004) reported that a number of studies on the relationship between teachers' subject majors and student's achievement in Mathematics reported complex and inconsistent results.

### **Mathematics knowledge of the teacher**

Harbison and Hanushek (1992) on appraising the performance of poor students in Brazil construed that mathematics knowledge of teachers had a link with the academic performance of poor students. A multi-level analysis of longitudinal evidence in Belize was carried out by Mullens, Murnane and Willett (1996) to find out the contribution of training of teachers and their subject matter knowledge to their teaching effectiveness in Belize. As part of their conclusions, they found out that the mathematics knowledge of the teacher is significantly related to the academic achievement of his students. Also, Rowan, Chiang and Miller (1997) used research on employees' performance to study the effects of teachers on students' achievement also added that the mathematical ability of the teacher was positively correlated with the performance.

Hill, Rowan and Ball (in press) explored whether and how teachers' mathematical knowledge for teaching contributes to gains in students' mathematics achievement. They used linear mixed model methodology in which 1190 first graders and 1773 third graders' mathematical achievement gains over a

year were nested within 334 first grade teachers and 365 third grade teachers, who in turn were nested within 115 schools. They found teachers' mathematical knowledge was significantly related to student achievement gains in both first and third grades. Similarly, Floden and Meniketti (2006) assessed the results of eleven quality studies and declared that most studies stated that there was a positive association between teachers study of Mathematics and students' achievement though the results were not wholly coherent. Poe and Stickler (2008) also indicated that teachers with mathematics knowledge contribute to higher achievements of students in Mathematics as compared to their fellow teachers who were less knowledgeable in Mathematics.

### **Teachers' Perceptions**

A study by Gallister (2003) on students' and teachers' perception of Financial Accounting revealed that teachers had a positive perception of Financial Accounting and also provided insights that Financial Accounting had a similar orientation as mathematics. Kapoor (2004) also investigated the perception of secondary school teachers concerning Management Financial Accounting in India and concluded that secondary school teachers have a substantial concern for the subject.

Malthus and Fowler (2009) ascertained the perceptions of New Zealand high school and tertiary students regarding Financial Accounting and accountants, as well as the perceptions of high school Financial Accounting educators and career advisers who potentially influence these students. It was found out that Financial Accounting teachers had a positive perception of Financial Accounting.

## **Teachers' Perception and the Mathematics Ability of Financial Accounting Students**

Bakado (2000) studied the association between teachers' characteristics and the academic performance of secondary school students in the Central region of Ghana. It was concluded that there was no association between teachers' perception and the academic performance of secondary school in mathematics. On the contrary, Renz (2012) found out from his research on "evaluation of teachers' perception and the achievement of students" that there was a significant relationship between teachers' attitude towards Financial Accounting and mathematics achievement of the students.

## **Effect of Students' Gender on Students' Academic Performance in Mathematics**

The relationship between gender and performance in Mathematics has received considerable attention in the educational domain and research documents show discrepancies among male and female performance in Mathematics. In particular the last few decades has seen an increase in research on issues related to males' and females' access, performance and achievement, and participation in mathematics (Gallaher & Kaufmann, 2005). There are findings which complement significant or no differences in mathematics achievement between males and females. Literature which reported significant differences also provide evidence whether males outperform females or vice versa.

Manger (1996) investigated the relationship between gender and Mathematical achievement with Norwegian third grade students using an

achievement test covering numeracy problems, fraction problems, geometry problems and word problems. It came to light from the study that boys performed better than females in Mathematics because they had higher total test scores than girls. It was concluded that males had good Mathematical skills than females.

In a study by Alao and Adeleke (2000) on preference and factors influencing phobia for Mathematics among secondary school students in Nigeria, it was found out that most females feared Mathematics which consequently resulted in their low performance than males in Mathematical activities. A study by Blithe, Forbes, Clark and Robinson (as cited in Adeleke, 2007) on gender differences in the Mathematics performance of secondary students in New Zealand reports a consistent difference in mean performance in favour of males. It can be measured that males perform better in Mathematics than females.

Fan and Chen (as cited in Huang ,2010) analysed the data from the National Education Longitudinal Study of 1988, which collected data on approximately 24,500 students who were in the 8th grade in 1988, and then had the first follow- up of 1990 (Grade 10), the second follow- up of 1992 (Grade 12) by U.S. department of Education. The results showed that there were no differences between sexes when total- group means were compared. However, noteworthy sex differences favouring males emerged when the high end Mathematics scores were examined. These differences became larger from the 8th grade to the 12th grade, and became more prominent at more extreme score ranges. From his findings, based on his research on gender difference in cognitive abilities, Halpern (2000) also reported that there were significant gender



differences in Mathematical or quantitative ability with males outperforming females in tests of quantitative ability.

Otchey (2000) conducted a study on the attitudes of teachers and students toward Mathematics and their effects on junior secondary school students' achievements. The study was also to determine whether significant differences exist between Mathematics achievement of male and female students. It was found out that there was a significant difference in Mathematics achievement between male and female students with females performing better than males in Mathematics.

Chambers and Schreiber (2004) studied girls' academic achievement and varying extra-curricular activities. They compared males to females to find out whether there was a difference between males and females in a Mathematics achievement test. Their results showed that girls performed better than males in Mathematics achievement test.

Farooq, Chaudhry, Shafiq and Berhanu (2011) conducted a study on different factors that were affecting quality of students' academic performance at the secondary school level in Pakistan. The results showed that student's gender strongly affects their academic performance, with girls performing better in the subjects of Mathematics, and English as well as cumulatively. They concluded that girls usually showed more efforts which led them to obtain better grades in schools. The first Assessment of Performance Unit (APU) survey (1980) reported that there was a significant difference between gender and academic performance of students in Mathematics. It was disclosed that boys perform better than girls in

written test on descriptive geometry, ratio and percentages, mensuration and practical test. It was concluded that boys perform better in Mathematical skills than girls.

Fennema and Carpenter (1981) evaluated the 1978 Mathematics test of the USA National Assessment of Education Programme (NAEP)(1980) The test was administered to 9, 13 and 17 year-old pupils to assess their mathematical abilities of knowledge, skill, understanding and application. They concluded that there was a significant difference between performance of males and females in Mathematics. They found out that with the high scores on skills at 9 and 13 years, boys did significantly better than girls in all cases. They also found that the higher the cognitive level the greater the difference between the sexes.

Bassey, Joshua and Asim (2008) carried out a study on gender and Mathematics Achievement in secondary schools in Calabar, Cross Rivers State. The study revealed that there is a significant difference between the Mathematics achievement of the rural male and female students. Arslan, Çanlı and Sabo (2012) appraised the effect of attitude, achievement and gender on Mathematics Education with a sample of 270 males 283 females in a middle school. They also determined whether any differences existed between male and female students' performance in Mathematics. It was revealed that significant differences exist in terms of gender and their academic performance in Mathematics with females outperforming males.

The influence of some selected factors on the academic performance of students at Kotebe College of Teacher education in Ethiopia was examined by

Regassa (1999). He used chi square to check whether gender was significantly related to academic performance. Students' academic performance was categorised into three groups (below satisfactory, satisfactory and above satisfactory). It was concluded from the study that there was no significant difference between male and female students for the three groups.

Sprigler and Alsup (2003) analysed gender and the mathematical reasoning of students in an elementary school. They indicated that there was no difference between the gender and mathematics reasoning ability of students. Ding, Song and Richardson (2007) also supported that there was a significant difference between male and female students in Mathematics. Asuai and Adeleye (2013) carried out a study on the impact of peer assessment on Performance in Mathematics among 115 males and 97 females from four senior secondary schools in Delta State, Nigeria. It was proved from the study that there was a significant difference between gender and academic performance in Mathematics.

### **Effect of Students' Gender on Students' Academic Performance in Financial Accounting**

Bouillon and Doran (1992) compared the performance of female and male students at Iowa State University in Financial Accounting Principles I and II using multiple regression techniques to assess the incremental explanatory effects of gender. They investigated and found out that male students significantly outperformed female students in Financial Accounting Principles I. Moreover, the performance of the two groups was not found to be significantly different in Financial Accounting Principles II. By controlling some variables they also

showed that the performance of male students is slightly better than that of female students in Financial Accounting Principles II.

In an investigation by Koh and Koh (1999) on the determinants of performance in an Accountancy degree programme, they accounted that there was a significant difference between male and female students' performance in Financial Accounting with males outperforming. Mutchler, Turner and Williams (1987) conducted an analysis over an 18 year-period and found that female Financial Accounting students outperformed their male counterparts. Tyson's (1989) key finding was also that female Accountancy students tend to receive higher grades in upper division Financial Accounting courses than males in the first two years in studying the course. Tho (1994) confirms this; when he concluded from his study that socio-demographic variables of gender does not contribute significantly to performance variability, and also female students perform better than males in Financial Accounting.

Udoukpong, Emah and Umoren (2011) examined the differences in the academic performance of junior secondary school students on Business Studies. A sample of 138 males and 152 females were surveyed from which a conclusion was drawn that there was a significant difference in the academic performance of male and female students in Business studies. The female students had a higher academic performance mean score in Business Studies than the male counterparts (59.59 vs. 52.93). It was concluded that females outperformed males.

Trine and Schellenger (1999) investigated determinants that influenced upper level finance course performance. They found a significant difference for

gender and academic performance in finance. Kirk and Spector (2006) examined the impact of gender on students' academic achievement in Cost Financial Accounting. It was revealed that gender as a demographic factor was not significantly related with students' success in Cost Financial Accounting. It can be concluded that there is a significant difference between gender and the academic performance in Financial Accounting. Suleiman and Mohezar (2006) conducted a study with Master of Business Administration students to identify key predictors of students' success'. They utilized just correlation analysis. It was established that there was a significant difference in the academic performance of male and female students in Financial Accounting.

Abdullah (2005) used a sample of 126 male and 111 female students to examine the main determinants of student performance in the Principles of Financial Management course. He found that gender has a significant impact on performance in Financial Management which indicates the difference in performance between male and female students. He found that the performance of the male student depends upon the Financial Accounting courses while the female student depends upon Economic courses.

In the United Arab Emirates, Al-Tamimi and Al-Shayeb (2002) used a sample of 256 students to investigate the factors affecting student performance in the fundamentals of financial management. They resolved that, gender was one of the most significant variables. They also found that significant gender differences exist, with males outperforming females.

Gammie, Jones and Robertson- Millar (2003) conducted a study with a sample of the data of 79 graduates from the Robert Gordon University in Scotland to find out factors that determined a student's degree classification in the final year by developing a statistical model using logistic regression which was to predict whether a student will achieve a second class upper or not degree in his or her final year. It was revealed from the study as part of the variables explored that there was no significant difference between gender and academic performance in Financial Accounting.

In a research by Turner, Holmes and Wiggins (1997) on the factors which determine students' grades in intermediate Financial Accounting, it was hypothesised that there was no significant difference between male and female academic performance in Financial Accounting. It was proved that there was no significant difference between male and female students academic performance in intermediate Financial Accounting.

Ekanem (2008) used a total of 600 junior secondary students (300 males and 300 females) to investigate the characteristics and academic performance of students in Business Studies in junior secondary schools in Akwa Ibom State, Nigeria. The finding of the study indicated that the mean score for the males was 25.07 as against the female mean score of 25.87. The calculated t-test value showed no significant difference between the two mean scores. It was concluded from the results which was obtained that there was no significant difference between male and female students' performance in Business studies.

Okafor and Egbon (2011) assessed a developing country setting of academic performance of male and female Financial Accounting undergraduate students in Nigeria. It was hypothesized in this study that no differences exist between male and female performance in undergraduate Financial Accounting courses. The finding of this study revealed that there was no significant difference between academic performance of male and female Financial Accounting students in undergraduate Financial Accounting courses.

### **Summary of Literature Review**

The review revealed that Mathematics ability is one of the most paramount factors that influence the academic performance of Financial Accounting students. Mathematics ability can be said to subsist when a student is able to accurately, prove or estimate the association between numbers, shapes and quantities by using signs, symbols and proofs which includes arithmetic, algebra, calculus, etc.

Several previous studies (Tho, 1994; Gist, Goedde & Ward, 1996; Yee Lee 1999; Pritchard, Potter & Saccucci, 2004; Yunker, Yunker, & Krull, 2009; Al-Twajjry, 2010) had revealed that Mathematics had a positive effect on the academic performance of Financial Accounting students. However, the present study targets to really find out whether similarly, Mathematics influences the academic performance of senior high school Financial Accounting students in Ghana.

Furthermore, literature established varying views from different researchers about how students perceived Mathematics favourably and

unfavourably. (Schereiber, 2000; Kiamanesh & Kheirieh, 2001; Papanastasiou, 2002 as well as Ifamuyiwa, 2004). In the case of Financial Accounting, students had a positive perception of the subject which manifested in the works of some authors. (Adetayo, 2010; Semukono, Orobia & Arinaitwe, 2013). Most of the reasons they gave will be adopted in this study to explore if students have a positive or negative perception of Mathematics and Financial Accounting and the association this perception has with their academic performance in Financial Accounting.

The studies of Kimani, Kara and Njagi (2013) as well as Akiri and Ugborugbo (2008) reported no significant relationship between the sex and perception of the teacher and mathematics ability of Financial Accounting students. Some studies (Goldhaber & Brewer, 1996; Betts, Zau, & Rice, Floden & Meniketti (2006); Bakado, 2000) reported a positive relationship between some teachers' characteristics (qualification, area of specialisation, years' of experience and mathematics background) and the mathematics ability of Financial Accounting students. The review revealed that the characteristics of the Financial Accounting teacher in basic schools and tertiary institutions in other countries have a link with the academic performance of the students. The present study assesses the characteristics of teachers at the senior high level of Accounting Education in Ghana. It further fills a vacuum in Accounting Education research in the country.

Finally, literature brought to light that there was a significant difference between male and female Financial Accounting students' academic performance



in Mathematics and Financial Accounting. The search for literature revealed that many studies had been done in developed countries which had different characteristics and cultural background when compared with Ghana. In this respect the study is therefore necessary to find out what dominates in Ghana so as to help improve the academic performance of Financial Accounting in terms of gender.

In view of this the study will employ a descriptive survey (quantitative and qualitative techniques) to investigate in-depth understanding of the issues surrounding the influence of mathematics ability on the academic performance of Financial Accounting students.

## **CHAPTER THREE**

### **METHODOLOGY**

This chapter describes the method that was adopted to undertake the study. Specifically, it covered the research design, population, sample and sampling procedure, the instrument which was used in collecting data, pilot testing of the instrument, data collection procedure and how data gathered was analysed.

#### **Research Design**

The research employed descriptive survey design. The purpose of descriptive study is to observe, describe, and document aspects of a situation as it occurs naturally. Fraenkel and Wallen (2000) describe descriptive research as the collection of data in order to test hypothesis or answer research questions concerning the current status of the subjects of the study. Gay (1992) also describes the descriptive design as one which befits investigations concerning educational problems including assessment of attitudes, opinions, demographic information and conditions. It was against this background that the descriptive survey was chosen as the research design since the purpose of the study is to find out how mathematics ability influences students' academic performance in Financial Accounting.

Notwithstanding the benefits of using the descriptive survey design, it also has some weaknesses. It delves much into private matters of its respondents

which makes some unwilling to disclose the right information. Nonetheless, steps such as pilot-testing of questionnaires, assuring respondents of confidentiality and self-administering of questionnaires was taken to correct the weaknesses associated with the descriptive survey.

The method involved triangulating both qualitative and quantitative methods to collect data sequentially. (Creswell, 2008; Cohen, Manion & Morrison, 2008). In this study, interview guide, students' focus group discussions (qualitative methods) questionnaires and mathematics achievement test (quantitative) were used to collect data from the field. The use of mixed methods made it possible to get detailed, in-depth information in order to describe, interpret and make informed judgment concerning students' and teachers' perception of Mathematics and Financial Accounting. Advocates for the use of the mixed methods design include Neuman (2003) and Creswell (2003). Mertens (2003) stated that the mixed method helps in having a better understanding of the research problem by converging numeric trends from quantitative data and specific details from qualitative data. On the other hand, Neuman (2003) recommend the use of the mixed methods when he said that combining different approaches in a study is the best method to be adopted because it is better to look at a situation from several angles than to look at it from a single perspective.

### **Population**

At the time of the study, Central region had 55 senior high schools of which forty-nine (49) offered Financial Accounting. The list of schools offering Financial Accounting was obtained from the Regional Education Office, Cape

Coast. The target population for the study consisted of all Financial Accounting students and their Financial Accounting teachers in all the 49 senior high schools in the Central Region of Ghana in the 2012/2013 academic year. The target population comprised 17648 Financial Accounting students and 196 Financial Accounting teachers. These figures were obtained from the Central Regional Ghana Education Service office in Cape Coast.

The accessible population was made up of 370 second year Financial Accounting students and 13 Financial Accounting teachers. Only second year Financial Accounting students were used because just a term's scores of first year Financial Accounting students' performance in Financial Accounting were available since two terms performance in Financial Accounting was needed. Also, at the time of data collection, third and fourth year Financial Accounting students were busily preparing towards the oncoming West African Senior Secondary Certificate Examinations (WASSCE).

### **Sample and Sampling Procedure**

All the 49 senior high schools offering Financial Accounting in 2012/2013 academic year in Central Region were stratified into mixed and single sex schools. This sampling procedure was used to ensure that both mixed and single-sex schools were fairly represented in the study. It was also an attempt to build up a sample that was suitable enough to provide the information required to effectively answer the research questions. The stratification of the schools was based on data obtained from Central Regional Education Office on the

classification of schools based on programmes offered and on whether the school was mixed or single sex. A total of six schools were selected for the study.

All five senior high schools under the single sex categorisation were visited and based on the permission granted by heads of schools, availability and readiness of teachers and students, one male and one female, making a total of two single sex senior high schools were conveniently selected. The schools in the mixed stratum were then selected through the use of simple random sampling technique, thus lottery method. This technique ensured that each mixed school involved with students pursuing Financial Accounting had an equal and independent chance of being selected to participate in the study. Four senior high schools under the mixed categorisation were selected. From the two schools under the single sex school categorisation, there were exactly two classes that offered Financial Accounting; hence the two intact classes were used. Only one Financial Accounting class was selected in each of the four schools under the mixed schools categorisation. This was a result of limited time and cost implications. The schools that fell within the single sex category had an average class size of 42 students and the schools under the mixed category had an average class of 50 students.

In all, 370 Financial Accounting students from the mixed and single sex school categories participated in the study comprising 229 males and 141 females. The age of the students ranged from 10 to 25 years with a mean age of 17.1 and a standard deviation of 1.23 year. In the single sex school categorisation, there were 161 Financial Accounting students and 209 Financial Accounting students were in

the mixed school categorisation. Six students each from two of the sampled mixed school category were randomly selected for the focus group interviews.

All the 13 Financial Accounting teachers in the six sampled schools participated in the survey and were made up of 10 males and 3 females. All the teachers involved in the study were professionals with bachelor's degree. Eight teachers had advanced certification in mathematics. More than 80% of the teachers specialised in Financial Accounting and about 54% of the teachers had more than five years of experience in teaching business courses. Two teachers were conveniently selected from each school category for a one-on-one interview.

### **Instruments**

Instrument used for the study were Financial Accounting Students Questionnaire (ASQ); Financial Accounting Teachers Questionnaire (ATQ); Mathematics Achievement Test (MAT); Interview Protocol and Focus Group Interview Protocol. Financial Accounting Students' Academic Records, a Secondary data was also used for the study.

#### **Financial Accounting Students' Questionnaire**

The Financial Accounting Students Questionnaire consisted of both open ended and closed ended items which were designed and administered to students in the sampled schools. The ASQ had three sections and twenty three (23) items. Section 'A' sought data on the demographic characteristics of the students. Section B and C, were developed on a likert scale to sought students' views on factors of how the students perceived Mathematics and Financial Accounting respectively. To elicit students' perceptions of Mathematics and Financial

Accounting, the options to respond to the statements ranged from “Strongly Agree”, ”Agree”, ”Undecided”, ”Disagree” and “Strongly Disagree”.

### **Financial Accounting Teachers Questionnaire**

The ATQ had two sections and 12 open ended and closed ended items. Section ‘A’ asked teachers to provide information on their background. Section ‘B’ contained a list of reasons which sought to find out the opinions of the Financial Accounting teachers who taught the respondents in the participating schools. To each reason, teachers’ responses were to range from “strongly agree”, “agree”, “not sure”, “disagree” to “strongly disagree”.

### **Mathematics Achievement test**

The mathematics achievement test was adapted from Yunker, Yunker and Krull (2009) who devised an instrument for their research entitled “Assessment of Mathematics Skills for Students in Principles of Financial Accounting”. The instrument consisted of 24 multiple choice test items which sought to test the understanding of Financial Accounting students on various aspects of mathematics (arithmetic, percentages and proportions and algebra) related to Financial Accounting. The instrument was broken down as follows: 8 items involving arithmetic, 8 items involving ratios, percentages and proportions and 8 items involving algebra. Arithmetic items involve only numbers plus basic arithmetical operators for addition, subtraction, multiplication and division. Calculators were not used by students, so these items test the students’ ability to perform basic arithmetic operations without relying on calculation tools. Percentages and proportions items involve either arithmetical operations on

fractional numbers, or translation between proportional or percentage expression of numbers.

Algebra items involved algebraic solution for an unknown  $x$ . Word exposition items involved a high ratio of literal information to numeric information. The 9 word exposition items included 2 arithmetic items, 4 percentages and proportions items and 3 algebra items. The main reason for the choice of multiple choice questions was the problem of time constraint. Most of the school heads were not ready to give more than an hour to enable administration of the instrument. This made it difficult in including questions to test students' step by step problem solving skills.

### **Financial Accounting Scores of Students**

The Financial Accounting scores sought to obtain the academic performance of students in Financial Accounting which were collected from the records and ICT departments in consultation with the Financial Accounting teachers of the respective schools. Two terms scores were elicited (third term in year one and first term results in year two) which included the summation of respondents' class exercises, class tests, assignments and examination scores to give a total of 100. 10 marks were allotted to class exercises and assignments. This was done to ensure satisfactory scores of respondents were obtained by finding the average of the two terms' scores as well as actively involving the teachers since they knew the performance of the respondents better.



### **Interview Protocol**

An interview protocol made of semi-structured questions was developed by the researcher. This was to understand, clarify and obtain in depth information on some issues that emerged from the quantitative data". Responses from the interview were detailed explanations and similar to responses teachers gave on the ATQ indicating the reliability of the responses.

### **Focus Group Interview Protocol**

A focus group interview protocol made of semi structured questions was designed based on responses to reasons that emerged from the analysis of the students' quantitative data. Nineteen questions were formulated as a guide in the interview with the focus group.

### **Pilot-testing of Instruments**

Assistance was sought initially from colleague researchers and later supervisors to determine the face and content validity of the instruments. The questionnaires, focus group protocol and interview protocol were presented to them for their comments and suggestions. The suggestions they made were used to revise the initial items.

The questionnaires and mathematics achievement tests were later pilot-tested among second year Financial Accounting students and their teachers in two Senior High Schools in the Western Region. These schools were Fijai Senior High and Methodist Senior High Schools. These schools were chosen for the pilot testing because they had similar characteristics as the schools selected for the study in the Central Region. The responses were then coded and subjected to

complete item analysis to determine, among other things, the internal consistencies and validity of the instruments. The Cronbach alpha was used to test the reliability of the questionnaire and a reliability coefficient of 0.71 was realised. This meant that the instrument was reliable since Fraenkel and Wallen (2000) assert that “For research purposes, a useful rule of thumb is that reliability should be at .70 and preferably higher” (p.179). Notwithstanding this, few items which were found to be misleading were modified to facilitate easy reading and understanding. The pilot-test was conducted in February 2013.

### **Data Collection Procedure**

The actual fieldwork collection of the main data for the study took place in March 2013. The ATQ and ASQ were administered to students and teachers in the selected classes in the participating schools. In order to ensure a high return rate, and also to clarify the meaning of some items to students and teachers, the questionnaires were administered by the researcher. The schools used in the study were visited first to establish rapport with teachers and students before the actual date for the data collection. Before data collection, copies of an introductory letter from the head of the Department of Arts and Social Sciences Education (DASSE), University of Cape Coast, were presented to heads of senior high schools where the study was conducted (see appendix E). The purpose of this introductory letter was to solicit the cooperation between the researcher and teachers/students who served as respondents for the study.

In each school, students and teachers selected for the study were given the questionnaires to complete. Students completed their questionnaires first before

their Financial Accounting teachers were located to complete theirs. Teachers whose classes were involved in the study left the classrooms since their presence during the completion of the questionnaire could influence the students' responses to the items. Instructions on the questionnaires were read out to students and confidentiality of their responses was assured before they were allowed to read the items on their own.

Two focus group interviews were conducted and each interview session lasted 25 and 40 minutes respectively. The consent of the students were sought with regards to the use of audio tape to record the conversation during the focus group discussions. The number of participants in each group interviewed was six (three males and three females). Each member of the group was asked the same question. In order to give everyone a chance to be heard, everyone answered the same question before anyone else could add additional comments. In addition, to give everyone the opportunity to answer first, the position of lead interviewee was rotated.

Interview with teachers took approximately 30 minutes to 40 minutes. Arrangements were made at their convenience and majority of the interviews took place in the school's summer hut with their consent on the use of audio tape during the interview. The interview went on accordingly as stated in the guide, except on some situations which demanded that I probed further.

### **Data Analysis**

As Borg, Gall and Gall (1993) argued, the results of quantitative studies should be presented in numerical form, whereas the results of qualitative studies

should be presented either as verbal data (e.g., transcripts of interviews) or visual data (e.g., video recording of the events). Data collected from the questionnaire were edited, coded and analysed using SPSS version 16. Questions related to the demographic characteristics of the respondents were analysed by simple frequencies and percentages. The effect of mathematics ability on students' academic performance was analysed by means of simple regression. Students' perception about mathematics and Financial Accounting were analysed by the use of percentages, means and standard deviations. The items about students' perception of mathematics and Financial Accounting on the questionnaires were assigned values on a five-point Likert scale format (5-strongly agree, 4-agree, 3-undecided, 2-disagree, 1-strongly disagree). The mean of means was computed and chosen as the value to use in determining whether there was a positive or negative perception. The range adopted is as follows: Strongly Disagree (0.00 – 1.00); Disagree (1.01 – 2.00); Undecided (2.01 – 3.00); Agree (3.01 – 4.00) and Strongly Agree (4.01- 5.00). When the average of means is below 3.00, it tells that students agreed with the negative reasons, therefore a negative perception. When the average of means is between 2.01 to 3.00, it communicates that students are not sure of their perception. When the mean of means is above 3.01 but less than 5.00, it tells that students are in disagreement with the negative statements, therefore a positive perception.

Pearson product moment and correlational analysis was used to determine the relationship between students' mathematics perception and their academic performance in Financial Accounting, students perception of Financial

Accounting and academic performance in Financial Accounting as well as the association between teachers, characteristics (academic and professional qualification, area of specialization, years' of experience, mathematics background and perception) and the mathematics ability of the Financial Accounting students. Point biserial correlational analysis was used to find the relationship between the gender of the teacher and mathematics ability of the students. The independent t- test was used to determine whether there was a significant difference between the academic performance of male and female students in Financial Accounting and Mathematics.

Transcribed interviews from the students' focus group interviews and the one-on-one interviews with selected teachers were studied and issues relating to a particular research question were grouped under the research questions. These issues were quoted as narratives to support some of the discussions.

## **CHAPTER FOUR**

### **RESULTS AND DISCUSSION**

This chapter focuses on the presentation of data collected from the field as well as the analysis and interpretation of data with the view of answering the research questions and hypotheses. The findings of the study are also presented and discussed. The issues raised are:

1. Effect of Mathematics ability on Financial Accounting students' academic performance in Financial Accounting.
2. Relationship between students' perception of Mathematics and their academic performance in Financial Accounting.
3. Relationship between students' perception of Financial Accounting and their academic performance in Financial Accounting.
4. Influence of Financial Accounting teachers' characteristics (gender, academic and professional qualification, area of specialization, years' of experience, mathematics background and perception) and the mathematics ability of Financial Accounting students.
5. A test of differences in the academic performance of male and female Financial Accounting students in Mathematics.
6. A test of differences in the academic performance of male and female Financial Accounting students in Financial Accounting.

**The Effect of Mathematics Ability on Financial Accounting Students’  
Academic Performance in Financial Accounting**

Research question one sought to find out whether mathematics ability had an effect on students’ academic performance in Financial Accounting. The results in Table 3 indicate that the various aspects of mathematics ability have a positive effect on the academic performance of students in Financial Accounting.

**Table 3: Summary of the Effect of Students’ Mathematics Ability on their Performance in Financial Accounting**

	Coefficient	Std. Error	Beta	t-value	Sig
(Constant)	36.455	2.727		13.367	.000
Performance in Mathematics	1.372	.122	.505	11.215	.000

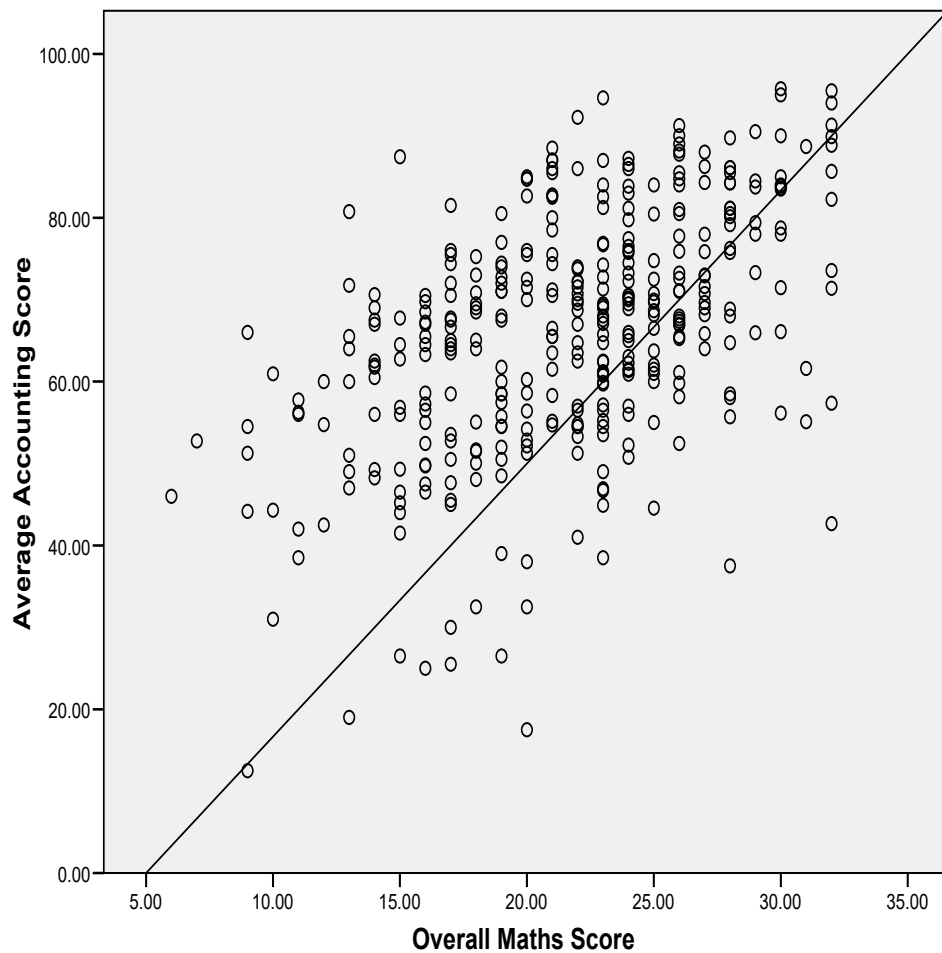
The estimated regression equation is given as  $y = 36.455 + 1.372x$

Where  $y$  = Students’ performance in Financial Accounting

$x$  = Mathematics ability of Financial Accounting students.

The t-values and significant values provided in Table 3 indicate that the estimated parameters are significant at the .05 alpha levels. The estimated regression line indicates that a student who performs well in Mathematics will have his/her score in Financial Accounting increase by 1.372. Thus performance in Mathematics can be used to predict a student’s performance in Financial Accounting and there will be no errors associated with such a prediction at the .05 alpha levels ( $.000 < .05$ ). The Beta value of .505 as diagrammatically represented in Figure 1 also indicates that performance in Mathematics has a significant positive impact on performance in Financial Accounting. This finding supports

the views of Financial Accounting education researchers (Tho, 1994; Gist, Goedde & Ward, 1996; Yee Lee 1999 ; Pritchard, Potter & Saccucci, 2004; Yunker, Yunker, and Krull, 2009; Al-Twaijry, 2010) who found mathematical and computational skills as the significant explanatory variable for Financial Accounting students' performance.



**Figure 1: The Influence of Mathematics Ability on Students' Academic Performance in Financial Accounting.**

It can be deduced from this positive effect of Mathematics ability on performance in Financial Accounting that Mathematics plays a significant role in



most calculations, preparation and interpretation of financial statements in Financial Accounting and therefore occupies an unequivocal position in most Financial Accounting analyses. This may clearly explain why students who perform well in Mathematics tend to do well in Financial Accounting. That is, students who are successful in mathematics are also successful in the Financial Accounting course. Also, Mathematics ability has a great influence on the Financial Accounting discipline performance. That is the higher the mathematics knowledge of the Financial Accounting student, the better the performance in Financial Accounting by the student.

#### **Relationship between the Specific Areas of Mathematics Needed in Financial Accounting and the Performance of Students in Financial Accounting**

The specific areas in Mathematics considered for the study were arithmetic, proportions and percentages, algebra and word exposition .The result presented in Table 4 shows the association between the specific areas of Mathematics needed in Financial Accounting and the academic performance of students in Financial Accounting.

**Table 4: Summary of the Relationship between the Various Aspects of Students' Mathematics Ability and their Performance in Financial Accounting**

		Maths Score	Maths Score	Maths Score	Maths Score
		Arithmetic	Proportions and Percentages	Algebra	Word Exposition
Average Financial Accounting Score	Pearson Correlation	.313(**)	.482(**)	.422(**)	.438(**)
	Sig. (2-tailed)	.000	.000	.000	.000
	N	370	370	370	370

Correlation is significant at the 0.01 level (2-tailed).

From Table 4, Pearson product moment correlation was used to find out whether there was a significant relationship between students' performance in the various mathematics areas needed in Financial Accounting and their academic performance in Financial Accounting. The results indicate that there is a weak significant positive relationship between students' performance in the various mathematics areas needed in Financial Accounting and their academic performance in Financial Accounting (Overall Mathematics  $r=0.505$ ; Proportions and percentages ( $r= 0.488$ ); Word exposition ( $r= 0.438$ ); Algebra ( $r = 0.422$ ); Arithmetic ( $r = 0.313$ ,  $p < 0.01$ ,  $N= 370$ , 2 tailed.). Although the relationship is significant, it is weak. This implies that students' mathematics ability in the various aspects of mathematics needed in Financial Accounting has a weak relationship with the academic performance of students in Financial Accounting. If students have high mathematics ability in the specific areas of mathematics, it does not necessarily mean that students' will have a higher performance in Financial Accounting. Thus, students' performance in the specific areas of Mathematics may be academically related to their academic performance in Financial Accounting.

**Table 5: Summary of Ranking of Significant Predictors of Students' Performance in Financial Accounting**

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.9239	5.165		5.661	.000
	Maths Score Algebra	1.650	.526	.199	3.137	.002
	Maths Score Arithmetic	1.873	.764	.125	2.452	.015
	Maths Score Proportions and Percentages	3.325	.675	.384	4.925	.000
	Maths Score Word Exposition	-.556	.683	-.074	-0.814	.416

Table 5 indicates that the four statistically significant predictors of the students' performance in Financial Accounting. Algebra ( $\beta = 1.65$ ,  $p < 0.5$ ), arithmetic ( $\beta = 1.87$ ,  $p < 0.5$ ), proportions and percentages ( $\beta = 3.33$ ,  $p < 0.5$ ) and word exposition ( $\beta = -0.56$ ,  $p < 0.5$ ) demonstrated significant effects on students' achievement in Financial Accounting. The coefficients in Table 5 indicate that the four regressors can be ranked in order to quantify their influence on the dependent variable by starting with proportions and percentages (0.33), arithmetic (0.19) algebra (0.17) and word exposition (- 0.055). In other words, in the context of the specific areas in mathematics, proportions and percentages accounted for 33% variation in students' achievement in Financial Accounting, while 19%, 17 % and 5.5% can be attributed to arithmetic, algebra and word exposition respectively. It can therefore be concluded that proportions and percentages are the highest mathematics concept which increase students' achievement in Financial Accounting. That is not to say that the other specific areas should be ignored as they also have effects on students' achievement in Financial Accounting.

### **Relationship between Students' Perception of Mathematics and their Academic Performance in Financial Accounting**

Research question two sought to examine students' perception of mathematics and the association it has with the academic performance of students in the Financial Accounting subject. To creditably answer this research question, students were asked nine statements on a Likert scale. The response options were: strongly agree, agree, undecided, disagree or strongly disagree (see Appendix A).

These statements focused on Financial Accounting students' perception towards mathematics. Students' responses are presented in Table 6.

**Table 6: Summary of students' responses on how they perceive Mathematics**

Perceptions	Mean	Sd
Mathematics is a difficult to study	3.8	1.22
I have always been afraid of mathematics	4.0	1.18
Only intelligent students can study mathematics	4.3	1.11
Mathematics is a subject for males	4.6	.83
I will never do well even if taught by the best teacher	4.7	.70
I do not enjoy studying mathematics	4.1	1.01
Mathematics is a boring subject	3.9	1.3
Mathematics is an irrelevant subject and not related to our lives	4.3	1.04
I am not highly motivated to study mathematics	3.6	1.4

SA- Strongly Agree, A-Agree, U-Undecided, D-Disagree, SD-Strongly Disagree

Mean ranges: Strongly Disagree (4.01 – 5.00); Disagree (3.01 – 4.00); Undecided (2.01 – 3.00); Agree (1.01 – 2.00) and Strongly Agree (0.00- 1.00).

Average of Means = 3.00.

Note: Any mean above mean ranges average 3.00 indicates that the students disagreed with the assertion made. Any mean ranges average below 3.00 indicates that students agreed with the assertion made.

It can be said from Table 6 that majority of the students with mean of 3.8 and standard deviation of 1.22 indicated that they did not perceive Mathematics as a difficult subject to study. I inquired from the students whether Mathematics was

a difficult subject to study. From the focus group discussion, the students were unanimous that it was not difficult to study. Three Financial Accounting students remarked:

**Financial Accounting Student 1:** *It is easy to study because maths deals with formulas, if you learn the formulas you are taught, there will be no problem.*

**Financial Accounting Student 2:** *Maths deals with steps which can be easily learnt to understand.*

**Financial Accounting Student 3:** *It requires practising and we are given exercises in class which makes it not difficult for me to understand*

The explanations and findings may be characterised that Financial Accounting students do not fear in their study of Mathematics because proper teaching methods or techniques are adopted by their teachers during instruction which gives them a better basis to understand and perform well in Mathematics. This finding deviates from the studies of Kislenko, Grevholm and Lepik (2005) and Eshun as cited in Ntow (2009) that most students perceive Mathematics as a difficult subject because they would have to work hard and solve many exercises to be good at Mathematics.

Also, some of the students ( $M = 3.9$ ,  $SD = 1.3$ ) pointed out that mathematics was not boring. From the interview, responses of students suggested are:

**Financial Accounting Student 1:** *Mathematics is about calculations. You cannot even doze when you are studying.*

**Financial Accounting Student 2:** *When we are being taught mathematics in class, there is competition in the class, different ideas and challenging answers are provided by different persons. You need to participate by working out the question given by the teacher to find out if your answer is correct.*

It can be attributed to this fact that as learners' progress in learning mathematics; they view the subject as interesting and exciting since they are motivated to study. This finding conflicts with the view of Streitlien, Wiik & Brekke (2001) who reported that students perceived mathematics as boring.

Based on students responses with a mean of 4.3 and standard deviation of 1.11 perceived that it was not only intelligent students who could study mathematics. Two students from different focus discussions revealed in the interactions that:

**Financial Accounting Students:** *Mathematics is around us and every activity of ours involves Mathematics, food vendors use mathematics to sell, in walking it is about Mathematics. It does not mean they need to be intelligent to study Mathematics to buy or sell or walk.*

Apart from these, students' responses with a mean score of 4.3 with standard deviation of 1.04 disagreed that Mathematics was irrelevant and not related to our lives. The students admitted that Mathematics is useful and relevant in different situations in life and are acknowledging that being good in Mathematics helps to learn other subjects such as Financial Accounting. The usefulness of Mathematics in everyday life is obvious in areas like measuring,



counting estimating the prices of goods when buying and selling and all spheres of business activities. This finding is in consonance with the study of Eshun (2000) and CRDD (2007) who confirmed the relevance and usefulness of Mathematics. The focus group interview further illuminated students' thoughts concerning the usefulness of Mathematics. This is what some Financial Accounting students had to say:

*It is part of everyday life. When we walk, the steps we take. Sellers need mathematics to sell. When we are cooking, we just don't pour in salt, we calculate an amount to know how much we should put in the food.*

The results further showed that with a mean of 4.6 and a standard deviation of 0.83 disagreed that mathematics was a subject for males. This shows that majority of the students perceive the study of mathematics as gender neutral as a few students responded that mathematics was a subject for males. Financial Accounting students in their perception in the interview indicated that:

*What men can do, women can also do it and even better. As an example, I am a female who is studying mathematics. Therefore Mathematics is not for males but for all. We all perform well when we are in class or write exams.*

The results may probably mean that students perceive that both male and female students consider Mathematics as interesting, important and suitable and both sexes can equally study and perform well in Mathematics. This finding is similar to the reportage of Forgasz (2001) that Australian students' perceived Mathematics as a gender neutral domain. Comparably, Kloosterman, Tassell and

Ponniah, (2001) also concluded in that American students perceived Mathematics as gender neutral.

From the results above in Table 6, it is clearly evident that the direction of the perception of Financial Accounting students about Mathematics is positive since all the means reported in Table 6 are above 3.00. The findings imply that students have a positive perception of Mathematics as they disagreed with a lot of the statements which were indicating negative perception of Mathematics. The findings is in line with the conclusions of Taylor (2004); Eshun as cited in Ntow (2009). These studies concluded that students have a positive perception of mathematics. It can be argued that the positive perception held by students towards Mathematics builds their self-confidence, motivates them to learn more, enjoy their studies and additionally perform exceptionally in Mathematics and other subjects which involve numerical measurements including Financial Accounting.

Since students have a positive perception of Mathematics, there is the need to find out the relationship between students' perception of Mathematics and their academic performance in Financial Accounting. Pearson correlation was used to find out whether there was a significant relationship between students' perception of mathematics and their academic performance in Financial Accounting. The results are presented in Table 7.

**Table 7: Summary of the Relationship between Students' Perception of Mathematics and their Academic Performance in Financial Accounting**

		Financial Accounting Test Score
Perception of	Correlation coefficient	.204
Mathematics	Sig. (2-tailed)	.000
	N	370

Correlation is significant at the .01 level (2-tailed)

From Table 7, the results indicate that there is a weak significant positive relationship between students' perception of Mathematics and their academic performance in Financial Accounting ( $r = 0.204$ ,  $p < 0.01$ ). This implies that students' positive perception of Mathematics has a weak relationship with the academic performance of students in Financial Accounting. Thus, students with a positive perception of Mathematics may not necessarily academically perform well in Financial Accounting as compared to students who have a negative perception of Mathematics. The implication of this is that students who have a positive perception of Mathematics are more likely to perform better in mathematics and other subjects related to Mathematics like Physics, Chemistry and Financial Accounting as compared to students who have a negative perception.

It may be rationalised that students who perceive Mathematics positively concentrate actively, with interest and are motivated to the learning of Mathematics as compared to students who perceive Mathematics negatively. Subsequently, they will achieve success and have superior abilities in Mathematics, and this could eventually have a positive effect on their academic

performance in Mathematics and other related subjects, Therefore, as already concluded in the study, high Mathematics ability transforms into high performance in all related mathematics subjects and vice versa. This result confirms the assertion of some authors (Schreiber, 2000; Kiamanesh & Kheirieh, 2001; Papanastasiou, 2002 as well as Ifamuyiwa, 2004) who found out that positive perception of mathematics influences Mathematics and other related Mathematics subjects performance positively. It refutes the findings of Cain-Caston (1993) who concluded there was no significant relationship between students' attitude toward Mathematics and students' achievement in the subject.

#### **Relationship between Students' Perception of Financial Accounting and their Academic Performance in Financial Accounting**

Students were asked to respond to ten statements on a likert scale on how they perceived Financial Accounting. The ten statements were based on reported reasons cited in the literature. Students' responses on their perception of Financial Accounting are presented in Table 8.

Mean ranges: Strongly Disagree (4.01 – 5.00); Disagree (3.01 – 4.00); Undecided (2.01 – 3.00); Agree (1.01 – 2.00) and Strongly Agree (0.00 – 1.00).

Average of Means = 3.00

Note: Any mean above mean ranges average 3.00 indicates that the students disagreed with the assertion made. Any mean ranges average below 3.00 indicates that students agreed with the assertion made.

**Table 8: Summary of students' responses on how they perceive Financial Accounting**

Perceptions	Mean	SD
Financial Accounting requires some knowledge in Mathematics to study or do calculations	4.16	1.1
Financial Accounting is a difficult subject to study	3.71	1.2
I am afraid of Financial Accounting	4.04	1.1
Only intelligent students can study Financial Accounting	4.17	1.13
Financial Accounting is a subject for males	4.58	.70
I will never do well in Financial Accounting even if I am taught by the best teacher	4.64	.75
I do not enjoy studying Financial Accounting	3.82	1.2
Financial Accounting is a boring subject	4.00	1.2
Financial Accounting is an irrelevant subject and not related to our lives	4.34	1.04
I am not motivated to study Financial Accounting	3.55	1.4

SA-Strongly Agree, A-Agree, U-Undecided, D-Disagree, SD-Strongly Disagree

From Table 8, it can be deduced that students (M= 4.16, SD= 1.1) disagreed that 'Financial Accounting did not require some knowledge in mathematics to study or do calculations.' Some Financial Accounting students commented that:

**Financial Accounting student 1:** *There are certain topics like ratios, percentages, fractions, subtraction and addition in mathematics which are also used in making calculations in Financial Accounting.*

**Financial Accounting student 2:** *Financial Accounting is full of mathematics.*

**Financial Accounting student 3:** *Financial Accounting deals with taxes, percentages and depreciation.*

These results reflect that understanding of percentages, large numbers and basic statistics are essential mathematics variables needed in Financial Accounting in order to be able to calculate taxes, compare payments methods, figure out loans as well prepare budgets and financial statements. This finding is consistent with the studies of several researches (Collier & McGowan, 1989; Cohen & Hanno, 1993; Hunt, Falgiani & Interieri 2004; Warsono, Darmawan & Ridha, 2009) who found out that for a person to enjoy studying Financial Accounting, there is the need to be mathematically inclined or be a number cruncher (be good with numbers).

Most of the students with a mean of 4.34 and a standard deviation of 1.04 also disagreed with the statement, "Financial Accounting is an irrelevant subject and not related to our lives". Two students lamented that:

**Financial Accounting student 1:** *Financial Accounting is about money, we are able to make budgets through Financial Accounting for market women and our parents.*

**Financial Accounting student 2:** *Financial Accounting provides us with jobs. It helps people to be accountants and managers.*

It can be argued from the findings that students studying Financial Accounting consider the subject as a vocation which they believe that in the future they can have careers to depend on. Financial Accounting is practical and

related to real life situations such that an individual can gain experience through what has been learnt. Students' affirmation that Financial Accounting is relevant and related to their lives endorses the study of Rao and Higgins (as cited in Malgwi 2006) that Financial Accounting is important and serves a useful function in societies from a user's perspective.

Financial Accounting students ( $M= 3.82$ ,  $SD= 1.2$ ) refuted the statement "that they did not enjoy studying Financial Accounting". This is what a student had to say:

*I have a good teacher who teaches Financial Accounting very well and motivates us to study Financial Accounting. This makes learning of Financial Accounting interesting and exciting.*

It can be inferred that students may be enjoying or like the studying of Financial Accounting because they have prior knowledge about Financial Accounting through practice or course studied or they are highly motivated by their friends, teachers or family members. This is in consonance with some of the interviews that Gracia and Jenkins (2002) conducted which most Financial Accounting students indicated that they enjoyed and liked studying Financial Accounting.

Students responded adversely that they were motivated to study Financial Accounting. This communicated that students feel motivated to study Financial Accounting as it reflected on the mean of 3.55 and a standard deviation of 1.4. Students during the focus interviews professed that:

*When people are going to the farm, walking in the scorching sun, it motivates me to study Financial Accounting so that in the future I do not go through the same.*

*When I see people who are dressed in suits and other nice outfits going to work, it motivates me to study Financial Accounting.*

*When I am awarded with prizes and I get good marks in Financial Accounting from my teachers, it motivates me to study.*

*The way my teacher teaches me makes me understand Financial Accounting easily. The way he directs us, and takes his time motivates me.*

This suggests that subject delivery by instructors and motivation by stakeholders of Financial Accounting education as role models are perhaps warranted as an encouragement to increase students' performance in Financial Accounting which results in a positive perception of the subject. The findings support the findings of several studies (Geiger & Ogilby 2000; Malgwi, 2006; Yu, 2011) that Financial Accounting students have a positive perception of Financial Accounting because they are motivated to study Financial Accounting.

From the students responses ( $M= 4.17$ ,  $SD= 1.13$ ), they opposed the view that only intelligent students can study Financial Accounting. This conflicts with the finding of Riordan, St. Pierre, and Matoney (as cited in Geiger & Ogilby, 2000) who suggested that Financial Accounting may retain quality students and may actually attract higher performing students to major in Financial Accounting.

The results of the means reported in Table 8 are above the average of means of 3.00. This indicates that students had a positive perception of the learning of Financial Accounting. This is because students disagreed with most



of the statements which were indicating negative assertions of the studying of Financial Accounting.

Since students have a positive perception of Financial Accounting, there is the need to find out the relationship between students' perception of Financial Accounting and their academic performance in Financial Accounting. Pearson Product Moment Correlation was used to find out the relationship and the result is presented in Table 9.

**Table 9: Relationship between Students' Perception of Financial Accounting and their Academic Performance in Financial Accounting**

		Financial Accounting Test Score
Perception of	Correlation coefficient	.223
Accounting	Sig. (2-tailed)	.000
	N	370

Correlation is significant at the .01 level (2-tailed)

From Table 9, Pearson correlation was used to find out whether there was a significant relationship between students' perception of Financial Accounting and their academic performance in Financial Accounting. The results indicated that there was a weak significant positive relationship between students' perception of Financial Accounting and their academic performance in Financial Accounting ( $r = 0.223$ ,  $p < 0.01$ ). This implies that students' positive perception of Financial Accounting has a weak relationship with the academic performance of students in Financial Accounting. Thus, students with a positive perception of Financial Accounting may not necessarily academically perform well in Financial Accounting as compared to students who have a negative perception of Financial

Accounting. The implication of this is that students who have a positive perception about Financial Accounting as a subject may fairly perform well in Financial Accounting.

It may be argued that students who perceive Financial Accounting positively might devote much attention to the learning of the subject as compared to students who perceive the subject negatively. This may be as a result of complacency because, they are motivated by their friends, teachers and parents and do not fear studying related mathematics subjects such as Financial Accounting and as already suggested by the study, positive perception of Financial Accounting translates into an acceptable performance in Financial Accounting and vice versa. This finding harmonies with the claims of some studies (Adetayo, 2010; Semukono, Orobia & Arinaitwe, 2013) which found that positive perception of Financial Accounting influences students' performance in Financial Accounting positively.

#### **Relationship between Teachers' Characteristics and the Mathematics Ability of Financial Accounting Students**

Research question four investigated the relationship between the teachers' characteristics (gender, academic and professional qualification, years' of experience, area of specialization, mathematics background and perception) and the mathematics ability of the students. To answer this research question, Point biserial correlation was used to find the relationship between the gender of the teacher and the mathematics ability of the Financial Accounting students. Pearson Product moment correlation was used to find out the relationship between the

teachers' characteristics (academic and professional qualification, years' of experience, area of specialization, mathematics background and perception). The result was reported in Table 10.

**Table 10: Relationship between Teachers' Characteristics and the Mathematics Ability of the Students (N= 13)**

Variable	Mathematics Ability	
	Correlation	Sig. (2-tailed)
Gender	0.316	.572
Academic and professional qualification	0.751	.000
Area of specialization	0.331	.000
Years' of experience	0.673	.000
Mathematics background	0.247	.000

Correlation is significant at 0.05 level (2- tailed)

From Table 10, the results indicated a positive relationship ( $r= 0.316$ ,  $p >0.572$ ) between the gender of the teacher and the mathematics ability of Financial Accounting students. However, gender of teachers does not play a significant role in determining the mathematics ability of the Financial Accounting students. This is consistent with the conclusions of Kimani, Kara and Njagi (2013) and Akiri and Ugborugbo (2008) who found that there was no significant relationship between the gender of the teacher and students' mathematics achievement and negates the findings of Okoro, Ekanem and Udoh (2012) who found that there was a significant relationship between the gender of the teacher and students' mathematics achievement.

Secondly, the results from Table 10 indicates that there is a strong positive relationship ( $r= 0.751$ ,  $p< 0.00$ ) between the qualification of the teacher and the mathematics ability of the Financial Accounting students. This implies that the qualification of the teacher has a strong relationship with the mathematics ability of the Financial Accounting students. In other words, students whose teachers have higher qualifications would likely have better mathematics ability than students whose teachers have lower qualifications. In addition, the results of descriptive statistics showed that all the teachers (100%) have academic and professional qualification. The presence of this 100% well qualified teachers may be connected to the high rate of students' achievement. This outcome compliments the findings of some scholars (Goldhaber & Brewer, 1996; Betts, Zau, & Rice, 2003; Rice, 2003; Bressoux, Kramarz & Prost, 2008; Zuzovsky, 2009) who inferred from their studies that teachers' qualification students had a positive relationship with students' achievement in Mathematics and contradicts the reportage of Wenglinsky (2000) and Greenberg et al. (2004) who agreed that qualification of the teacher was not significantly related to students' achievement.

Thirdly, Table 10 indicates that there is a weak significant positive relationship between the area of specialization of the teachers and the mathematics ability of the Financial Accounting students ( $r= 0.330$ ,  $p < 0.01$ ). This implies that the area of specialization of the teacher has a weak relationship with the mathematics ability of the Financial Accounting students. In other words, students whose teachers specialized strictly in Financial Accounting are likely to have higher mathematics ability than students with teachers who

specialized in other subject areas apart from Financial Accounting such as Management. The results of descriptive statistics gathered indicated that 84.6% of the teachers have a major in Financial Accounting. This high percentage of teachers is favourable to students' achievement. This highlights the works of Goldhaber and Brewer, 1996; Darling-Hammond, 2000; EFA, 2002; Wilson and Floden, 2003; Ball (as cited in Ansong, 2009) who found positive relationships between teachers' subject majors and students' achievement and negates the findings of Invargson, Beavis, Bishop, Peck and Elsworth (2004) who found an inconsistent relationship between teachers' subject majors and students' achievement.

Table 10 also indicates that there is a strong significant positive relationship between the years' of experience of the teachers and the mathematics ability of the Financial Accounting students ( $r= 0.673, p < 0.01$ ). This implies that the years' of experience of the teacher has a strong relationship with the mathematics ability of the Financial Accounting students. Thus, the years' of experience of the teachers, may determine the mathematics ability of the Financial Accounting students in their classes. Similarly, teachers of Financial Accounting students with more years' of experience, will have their Financial Accounting students having higher mathematics ability than students of teachers with a few years' of experience. This reinforces the results of various investigators (Greenwald, Hedges & Laine, 1996; Betts, Zau, & Rice, 2003; Centre for Public Education, 2005; Rivkin, Hanushek, & Kain, 2005; Rosenholtz as cited in Darling-Hammond, 2000; Hawkins, Stancavage, and Dossey, 1998) who

discovered a significant positive association between years of experience of the teacher and students' performance in Mathematics. This refutes the discoveries of Hanushek, (1997); Martin et al. (2000); Wenglinsky, (2002) who found no correlation between years' of experience of the teacher and the academic achievement of students in Mathematics.

Lastly, Table 10 indicates that there is a weak significant positive relationship between the mathematics background of the teachers and the mathematics ability of the Financial Accounting students ( $r= 0.247$ ,  $p < 0.01$ ). This implies that the mathematics background of the teacher has a weak relationship with the mathematics ability of the Financial Accounting students. Thus, the mathematics ability of the teachers, may probably determine the mathematics ability of the Financial Accounting students in their classes. This implies that teachers with a mathematics background may likely have the mathematics ability of their Financial Accounting students higher than teachers without mathematics background. This concurs the assessments of some studies (Harbison & Hanushek, 1992; Murnane & Willett, 1996; Rowan, Chiang & Miller, 1997; Hill, Rowan & Ball, in press); Floden & Meniketti, 2006) Poe & Stickler, 2008) who reported a correlation between the mathematics knowledge of the teacher and the mathematics performance of students.

### **Perception of Teachers**

Teachers were asked to respond to five items pertaining to their perception of Mathematics and Financial Accounting. The result is presented in Table 11.

**Table 11: Summary of teachers' responses on their Perception of Mathematics Needed in Financial Accounting**

Reasons	Mean	SD
Financial Accounting which contains maths concepts is difficult to teach	4.7	0.48
Teachers with Maths background are able to teach better	3.15	1.34
Maths ability of the students is directly related to the competence and performance of the teacher.	3.3	1.7
Students taught by teachers with higher maths background have high level of understanding and perform better in Financial Accounting than teachers without higher maths background	3.4	1.4
Maths ability of the student influences his or her academic performance in Financial Accounting	3.6	0.76

SA-Strongly Agree, A-Agree, NS-Not Sure, D-Disagree, SD-Strongly Disagree

Mean ranges: Strongly Disagree (4.01 – 5.00); Disagree (3.01 – 4.00); Undecided (2.01- 3.00); Agree (1.01 – 2.00) and strongly Agree (0.00 – 1.00).

Average of Means = 3.00

Note: Any mean above mean ranges average 3.00 indicates that the students disagreed with the assertion made. Any mean ranges average below 3.00 indicates that students agreed with the assertion made.

Generally, the results of the means reported in Table 11 are all above 3.00. This indicates that teachers have a positive perception of the learning of Financial Accounting. This is because teachers disagreed with most of the statements

which were constructed unfavourably of how teachers perceive mathematics reflecting in the academic performance of Financial Accounting students.

The data suggests that teachers disagreed with the statement that 'Financial Accounting which contained Mathematics concepts was difficult to teach' (M= 4.7, SD= 0.78). This is what two teachers had to say:

*Most of the Mathematics concepts required in Financial Accounting are some of the easy topics exposed to every student who studies core mathematics. Percentages, ratios and fractions are not difficult. I don't see any difficulty on building on this basic mathematics to teach Financial Accounting.*

*Financial Accounting deals with formats, which is derived from the word 'formulas' in mathematics. Once you know the formulas (formats), it is easy to teach Financial Accounting.*

Also, according to the teachers, students taught by teachers with mathematics background are able to understand and perform well in Financial Accounting than those taught by teachers without mathematics background as shown in Table 18 (M= 3.4, SD=1.4). In an interview with the teachers, one teacher commented that:

*During my school days I had a teacher who diverted from his statistics background to Financial Accounting; because of his mathematical background he was able to teach us Financial Accounting excellently than the other teachers who did not have any higher mathematics background*



*but started with the basics of Financial Accounting. Those with mathematics background are able to grasp the concepts of Financial Accounting easily.*

The teacher interviewees acquiesced that the mathematics ability of the students is directly related to the competence and performance of the teacher (M= 3.3, SD= 1.7). A teacher remarked that:

*Financial Accounting is full of calculations. A teacher must assist students to learn and understand basic mathematics such as addition, subtraction and fractions. If the student was not properly exposed by the teacher at the primary level, it will affect his ability to calculate, studying Financial Accounting will therefore be a problem as a result of the unskilful methods which was used by a 'so called' teacher.*

It can be presumed from the results from Table 18 and transcribed interviews with the teachers that teachers have a positive perception about mathematics ability influencing the academic performance of students. The findings support the works of Gallister, 2003; Kapoor, 2004; Malthus, & Fowler, 2009) who concluded that Financial Accounting teachers had a positive perception of mathematics influencing Financial Accounting students' academic performance.

Since teachers have a positive perception that mathematics has an influence on Financial Accounting students and their academic performance, there is the need to find out the relationship between teachers' perception of mathematics influencing the academic performance of Financial Accounting

students and the mathematics ability of the students. The results are presented in Table 12.

**Table 12: Relationship between Teachers' Perception of Mathematics influencing the Academic Performance of Financial Accounting Students' and Mathematics Ability of Students**

		Financial Accounting Test
		Score
Perception of Financial Accounting Teachers	Correlation coefficient	.566
	Sig. (2-tailed)	.000
	N	370

Correlation is significant at the .01 level (2-tailed)

From Table 12, Pearson correlation was used to find out whether there was a significant relationship between the perception of the teacher about students' academic performance in Financial Accounting and the mathematics ability of the Financial Accounting students. The results indicate that although there is a positive relationship between the perception of the teacher and the mathematics ability of the Financial Accounting students, the relationship is statistically insignificant. ( $r = 0.566$ ,  $p < 0.01$ ). This implies that the perception of the teacher does not have any significant relationship with the mathematics ability of the Financial Accounting students. Thus, the perception of the teacher, cannot, be envisioned to have a relationship the mathematics ability of the Financial Accounting students in their classes. The results reflects the earlier work of Bakado (2000) who found no relationship between the perception of teachers and the academic performance of students and contradicts the findings of Renz (2012)

who found a significant relationship between the perception of the teacher and the academic performance of students.

### **Students' Academic Performance in Mathematics by Gender**

To determine whether there was a statistically significant difference in the academic performance of male and female Financial Accounting students in mathematics, a two-tailed independent sample t-test was computed in Table 13.

**Table 13: Differences in Students' Academic Performance in Mathematics by Gender**

Gender	N	M	SD	T	df	P
Male	229	21.76	5.76	6.23	368	0.001*
Female	141	20.40	4.73			

\*Significant,  $P < 0.05$

Results in Table 13 indicate that male Financial Accounting students' academic performance in mathematics was significantly higher ( $M=21.76$ ,  $SD=5.76$ ) than their female counterparts ( $M=20.40$ ,  $SD=4.73$ ). The results further show that ( $p < 0.001$ ,  $t=6.23$ ,  $df = 368$ ) male students academically performed better in mathematics compared to female students. The findings can be assumed to indicate that males performed better because some females accept societal and cultural attitudes regarding mathematics as a male stereotyped subject which has linkage with occupations such as medicine, engineering and Financial Accounting. Therefore they are not motivated to attach importance to learning mathematics to perform academically well.

Also, different behaviours, skills and cognitive abilities as a result of brain sizes, hormones and genetics can also be an attribute. Other female students are

influenced by the school and classroom procedures such as no female teacher to act as an academic role model for them, poor instructional methods, materials and assessment procedures adopted by the teacher, teachers' characteristics as well as the values, objectives, goals and learning styles they possess all influence the gender differentiation in the mean score. According to Wigfield, Battle, Keller and Eccles (2000), females appear to respond more positively to subjects if taught in cooperative or individualized manner rather than a competitive manner. From this assertion students were taught in a competitive manner which did not favour females which resulted in a higher mean score for males. This judgement is consistent with the reports of some authors (Manger, 1996; Alao & Adeleke, 2000; Blithe, Forbes, Clark & Robinson as cited in Adeleke, 2007; Fan & Chen as cited in Huang, 2010) who concluded that males perform better than females in Mathematics. This supposition refutes the findings of Otchey, (2000); Chambers and Schreiber (2004); Farooq, Chaudhry, Shafiq and Berhanu (2011) who concluded in their studies that females perform better than males in mathematics. The size of this difference was found to be  $r = 0.38$  which represent a medium sized effect.

Therefore, the null hypothesis that there is no significant difference between male and female students' academic performance in mathematics was rejected. It can be construed from the results that gender significantly has an impact on students' academic performance in Financial Accounting. This finding supports the conclusions of Assessment of Performance Unit (1980); Fennema and Carpenter, (1981); Basseyy, Joshua and Asim (2008); Arslan, Çanlı and Sabo

(2012) that there is a significant difference between male and female students' performance in mathematics. This inference disproves some works (Regassa, 1999; Sprigler & Alsup, 2003; Ding, Song & Richardson, 2007; Chukwuyenum & Adunni, 2013) that there is no significant difference between male and female students' performance in mathematics.

### **Students' Academic Performance in Financial Accounting by Gender**

To determine whether there was a statistically significant difference in the academic performance of male and female Financial Accounting students in Financial Accounting, a two-tailed independent sample t-test was computed in Table 14.

**Table 14: Differences in Students' Academic Performance in Financial Accounting by Gender**

Gender	N	M	SD	T	df	P
Male	229	66.86	14.68	7.06	368	0.001*
Female	141	64.96	14.59			

\*Significant,  $P < 0.05$

Results in Table 14 indicate that female Financial Accounting students' academic performance in Financial Accounting was significantly lower ( $M=64.96$ ,  $SD=14.59$ ) than their male counterparts ( $M=66.86$ ,  $SD=14.68$ ). The results further show that ( $p < 0.001$ ,  $t=7.06$ ,  $df = 368$ ) male students academically performed better in Financial Accounting compared to female students. This finding may probably be that because Financial Accounting is full of mathematical concepts, that is, to be able to perform well in Financial Accounting, you must be mathematically inclined, some females fear or regard

mathematics as a male stereotyped subject, and therefore they are not spurred to study Financial Accounting which involves learning and understanding certain mathematical concepts to academically perform well. This can also be denounced on the instructional methods, materials, assessment tools and motivational orientation given by the Financial Accounting teacher which may favour males than females thereby swaying the performance of males in being higher than the performance of females in Financial Accounting. This outcome reinforces the investigations of some authors (Doran, Bouillon & Smith, 1991; Koh & Koh, 1999) who concluded that males academically perform better than females in Financial Accounting. Conversely, Mutchler, Turner and Williams (1987); Tyson (1989); Tho (1994); Razvan et al. (2010); Udoukpong, Emah and Umoren (2011) found out in their studies that females perform academically better in Financial Accounting than males. The size of this difference was found to be  $r = 0.38$  which represent a medium sized effect.

Therefore, the null hypothesis that there is no significant difference between male and female students' academic performance in Financial Accounting was rejected. This can be explained that gender significantly influences students' academic performance in Financial Accounting. This finding supports what some authors (Trine & Schellenger, 1999; Al-Tamimi & Al-Shayeb, 2002; Abdullah, 2005; Kirk & Spector, 2006; Suleiman & Mohezar, 2006) have reported in their studies that there was a significant difference between male and female Financial Accounting students' performance in Financial Accounting. However, the finding contradicts the conclusions of

various works (Gammie, Jones & Robertson-Millar, 2003; Turner, Holmes & Wiggins, 1997; Ekanem, 2008; Okafor & Egbon, 2011) who reported that they found no significant difference between male and female Financial Accounting students' performance in Financial Accounting.

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

In this concluding chapter, synopsis of the research problem, the methodology, and key findings of the study have been presented. The recommendations and suggestions for future research have also been highlighted.

#### **Summary**

Evidence from Financial Accounting education literature indicates that perception, teacher characteristics and gender of the student are some of the mathematics ability factors which may influence students' performance (Adetayo, 2010; Iheanchor, 2007; Gracia & Jenkins, 2003). These reports raise questions about the factors that influence the mathematics ability of students and how they contribute to the academic performance in Financial Accounting. This study was therefore carried out to find out whether mathematics ability and some factors really influence the academic performance of students in Financial Accounting.

To find out, a descriptive survey design with a mixed research approach was adopted for the study. Senior high schools that offered Financial Accounting in Central Region were categorized into high and low performing schools based on individual performance in WAEC examinations. Two Financial Accounting classes were randomly selected in the participating schools since some participating schools had a minimum of two Financial Accounting classes and



some more than two classes. This was done after six schools had been randomly selected from the two school categories. Financial Accounting teachers who taught the selected classes in the participating schools automatically formed part of the survey. The respondents for the study constituted 370 students and 13 teachers. Two questionnaires, Financial Accounting students' questionnaire and Financial Accounting teachers' questionnaire were developed and administered to Financial Accounting students and teachers respectively in single sex and mixed senior high schools to find out about their gender and perception of students as well as the characteristics of their teachers (gender, qualification, years' of experience, area of specialisation, mathematics background and perception).

To find out the relationship among mathematics ability, perception and teachers' characteristics as well as the gender of the students and the academic performance of students, a mathematics achievement test which has concepts related to Financial Accounting was adapted from Yunker, Yunker and Krull (2009). This was administered to the second year students, and two terms Financial Accounting scores of students in the participating schools were collected from the teachers of the students who participated in the study.

### **Key Findings**

1. The study revealed that students' Mathematics ability had a significant positive impact on students' performance in Accounting. The specific mathematics areas (arithmetic, proportions and percentages, algebra and word exposition) needed in accounting showed a positive effect on the academic performance of financial accounting students with

proportions and percentages being the most influential area in mathematics. ( $r= 0.505$ ,  $p < 0.00$ ,  $N=370$ , 2 tailed.)

2. Accounting students had a positive perception of Mathematics and a significant positive association existed between students' perception of mathematics and their academic performance in accounting. ( $r= 0.204$ ,  $p < 0.01$ ,  $N= 370$ , 2 tailed.)
3. Financial Accounting students had a positive perception of Financial Accounting and a significant positive association existed between students' perception of mathematics and their academic performance in accounting. ( $r= 0.223$ ,  $p < 0.01$ ,  $N= 370$ , 2 tailed.).
4. Academic and professional qualification, area of specialization, years' of experience, mathematics background of the teachers were significantly related to the mathematics ability of the accounting students but the gender and perception of the teachers were not significantly related. Teachers positively perceived that mathematics had a reflection on the academic performance of students in the accounting subject.
5. There is a significant difference ( $p < 0.001$ ,  $t=6.23$ ,  $df =368$ ) between male ( $M=21.76$ ,  $SD=5.76$ ) and female ( $M=20.40$ ,  $SD=4.73$ ) Financial Accounting students' academic performance in Mathematics.
6. There is a significant difference ( $p < 0.001$ ,  $t=7.06$ ,  $df =368$ ) between male ( $M=66.86$ ,  $SD=14.68$ ) and female ( $M=64.96$ ,  $SD=14.59$ )

Financial Accounting students' academic performance in Financial Accounting.

### **Conclusions**

Mathematics ability is a significant explanatory factor which influences the academic performance of students in Accounting. Proportions and percentages contribute as the most influential of all the Mathematics concepts needed to be studied by Financial Accounting students. This was indicated by the WAEC Chief Examiner's Report in 2004 and 2005.

There was a significant positive relationship between students' perception of Mathematics and Financial Accounting and the academic performance of Financial Accounting students. This implies that because students have a favourable perception of Mathematics and Financial Accounting, they may have an acceptable academic performance in the Financial Accounting subject.

Teachers' characteristics (academic and professional qualifications, area of specialisation, years' of experience and mathematics background) positively and significantly are related to the academic performance of accounting students whereas the perception and gender of the teacher is not significantly related. This implies that Financial Accounting teachers who have higher qualifications, specialized to teach Financial Accounting, have more experience in teaching as well as a mathematics background are more likely to have students' who have higher mathematics ability. The gender and perception of the teacher has no significant role to play in the mathematics ability of the Financial Accounting students.

There was a significant difference between male and female Financial Accounting students' academic performance in Mathematics and Accounting. This implies that gender has an influence in the learning and academic performance of students in Accounting with males performing better than females.

### **Recommendations for Policy and Practice**

The following recommendations are offered based on the findings of the study.

1. Mathematics is an essential subject which influences students' academic progress. Students who do not have strong basic mathematics background or fear mathematics will be confronted with relentless academic challenges in terms of the nature of the Financial Accounting course. Teachers should teach students reading Financial Accounting basic and relevant mathematics topics to enable them understand the mathematics concepts needed in Financial Accounting.
2. There should be a platform to enlighten and guide students in selecting programmes they want to pursue. They should not be forced but rather stakeholders of education especially guidance coordinators and parents should counsel students before choosing Financial Accounting as a subject to read.
3. Teachers and other stakeholders of education should continue to motivate students to study Financial Accounting in order to perform well especially females. Scholarships and Non-Governmental Organisations' Support could

also be solicited for them to boost their academic performance in Financial Accounting.

4. Since students have a positive perception of Financial Accounting and mathematics, every effort through incentives and other motivational schemes should be made (for instance, putting in place contract signing bonus) by the Ghana Education Service to attract and retain the highly qualified and existing teachers in the teaching profession in order to avoid attrition and continue to increase the academic performance of students.

#### **Suggestions for Further Research**

1. A replication of the current study on a nation – wide basis by the Ghana Education Service or any interested organisation or individual will be commendable. This, it is hoped, will provide a more in-depth study into issues relating to other factors.
2. Explore what causes senior high school male students to perform better than females in Financial Accounting.

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## **APPENDICES**

**APPENDIX A**  
**UNIVERSITY OF CAPE COAST**  
**COLLEG OF EDUCATION STUDIES**  
**DEPARTMENT OF ARTS AND SOCIAL SCIENCES EDUCATION**  
**Financial Accounting Students' Questionnaire**

Dear Respondent,

The items in this questionnaire are being used purposely for research work on the topic ‘The Influence of Mathematics Ability on Some Factors Associated with Students’ Performance in Financial Accounting in Senior High Schools in the Central Region of Ghana.’

This instrument requires about 40 (forty) minutes to complete. Please be assured that any information you will provide will be treated with utmost confidentiality. Thank you for your co-operation.

**SECTION A: BACKGROUND DATA**

Instruction: Please tick [] the appropriate box; or write in the blank spaces provided where applicable.

1. Name of School.....

2. Sex            Male [  ]                      Female [  ]

3. Age            10 – 15 years [  ]

                    16 – 20 years [  ]

                    21 – 25 years [  ]

                    26 and above [  ]

4. Form .....

**SECTION B: PERCEPTIONS OF STUDENTS ABOUT MATHEMATICS.**

Please indicate the degree to which you Strongly Agree (SA), Agree (A), Disagree (D), Strongly Disagree (SD) or are Undecided (U) with each statement.

S/N	STATEMENTS	SA	A	D	SD	U
5	Mathematics is a difficult subject to study.					
6	I have always been afraid of mathematics					
7	Only intelligent students can study mathematics.					
8	Mathematics is a subject for males.					
9	I will never do well in mathematics even if I am taught by the best teacher.					
10	I do not enjoy studying mathematics.					
11	Mathematics is a boring subject.					
12	Mathematics is an irrelevant subject and not related to our lives.					
13	I am not highly motivated to study mathematics.					



**SECTION C: PERCEPTIONS OF STUDENTS ABOUT FINANCIAL ACCOUNTING**

S/N	STATEMENTS	SA	A	D	SD	U
14	Financial Accounting requires some knowledge in mathematics to study or do calculations.					
15	Financial Accounting is a difficult subject to study.					
16	I am afraid of Financial Accounting.					
17	Only intelligent students can study Financial Accounting.					
18	Financial Accounting is a subject for males.					
19	I will never do well in Financial Accounting even if I am taught by the best teacher.					
20	I do not enjoy studying Financial Accounting.					
21	Financial Accounting is a boring subject.					
22	Financial Accounting is an irrelevant subject and not related to our lives.					
23	I am not motivated to study Financial Accounting.					

**APPENDIX B**  
**UNIVERSITY OF CAPE COAST**  
**COLLEGE OF EDUCATION STUDIES**  
**DEPARTMENT OF ARTS AND SOCIAL SCIENCES EDUCATION**  
**Mathematics Achievement Test**

**Achievement test of understanding of mathematics related to financial accounting**

Calculators may not be used.

Do all scratch work on the test sheet

There are 24 items on this test. You will have 30 minutes to work on the test.

Do not spend too much time on any one question. If you are having trouble with a question, go on to the next question.

**TEST ITEMS**

1. What is the sum of C489,208 and C609,460?
  - A. C1,089,688
  - B. C1,098,668
  - C. C2,089,686
  - D. C2,098,668
  
2. Solve  $\frac{1}{5} + \frac{3}{30} + \frac{2}{10}$  and express your answer as a decimal.
  - A. 0.2
  - B. 0.3
  - C. 0.4
  - D. 0.5

3. If  $12x - 12 = 60$ , what is  $x$ ?
- A. 4
  - B. 6
  - C. 8
  - D. 10
4. Find the difference between C962,428 and C648, 247.
- A. C314,181
  - B. C314,811
  - C. C414811
  - D. C514,181
5. Convert the decimal number 0.428 into percentage form.
- A. 4.28%
  - B. 40.28%
  - C. 42.80%
  - D. 48.20%
6. The formula for calculating income tax is  $I = C \times P$ , where:  $I$  is the income tax,  $C$  is the cost of the product;  $P$  is the income-tax percentage. If a television costs GH¢1000 and the income tax is GH¢50, what is the income tax-rate in percentage terms?
- A. 5%
  - B. 8%
  - C. 10%
  - D. 15%

7. The cost of phone call is 40p for the first minute, and then 5p per minute for every additional minute. How much will a 30minute phone call cost?
- A. C1.85                      B. C18.5  
C. C180.5                     D. C185.0
8. By the end of the year, the population of Central Region is expected to increase 6% from the current population of 170,000. If this prediction is accurate, what will be its new population at the end of the year?
- A. 102,000 people  
B. 159,800people  
C. 176,000people  
D. 180,200people
9. If 2 less than 3 times a certain number is the same as 4 more than the product of 5 and 3, what is the number?
- A. 7  
B. 9  
C. 13  
D. 15
10. Calculate  $48.3 \times 5.1$ .
- A. 2.4633  
B. 24.633  
C. 246.33  
D. 2463.3

11. Last year, Rose's salary was GH¢1500. At the end of the year, she received a 15% increase in salary. What is her salary this year?

- A. ¢1515
- B. ¢1725
- C. ¢1825
- D. ¢1915

12. If  $x = -4$ , then calculate  $9x^2 - 10x - 6$ .

- A. - 178
- B. - 98
- C. 98
- D. 178

13. Divide 1575 by 5.

- A. 300
- B. 315
- C. 375
- D. 395

14. The profit for B.Y.A. Limited for this year is GH¢5,600,000. Its profit on sales in ratio terms is 0.20. What are the sales for the year?

- A. ¢1,120,000
- B. ¢2,800,000
- C. ¢11,200,000
- D. ¢28,000,000

15. If  $x = -4$ , then  $(x+8)(x-6)$ , solve for the answer.

10

- A. -4
- B. -2
- C. 2
- D. 4

16. Calculate  $(700-400) \times 5$

15

- A. 100
- B. 150
- C. 200
- D. 250

17. If 100 is 40% of  $x$ , then what is  $x$ ?

- A. 100
- B. 150
- C. 250
- D. 400

18. If  $2x + 3y = 14$  and  $x - y = 2$ , find  $x$  and  $y$ .

- A.  $x = 2, y = 3$
- B.  $x = 2, y = 4$
- C.  $x = 3, y = 2$
- D.  $x = 4, y = 2$

19. Take 30% of GH¢14000. Find the result.
- A. 1820
  - B. 3000
  - C. 4200
  - D. 5600
20. Factor this expression  $x^2 - 5x + 6 = 0$
- A.  $x_1=2, x_2=-3$
  - B.  $x_1=2, x_2=-2$
  - C.  $x_1=2, x_2=3$
  - D.  $x_1=2, x_2=2$
21. Find  $15,000 \times 0.04 \times \frac{2}{5}$ .
- A. 200
  - B. 240
  - C. 250
  - D. 350
22. On the 1<sup>st</sup> January, Kakum Rural Bank agrees to lend you GH¢60,000 for your education. They agreed to charge 8% interest every year payable on a monthly basis. How much interest will you pay at the end of January?
- A. 400.
  - B. 4800.
  - C. 5600.
  - D. 6800.

23. A fruit basket contains  $x$  apples and  $y$  oranges. There are 6 more oranges than there are apples. Yaw and Yaya decided to split the fruit equally. Each of them gets 13 pieces of fruits. How many apples and oranges were there in the fruit basket?

A.  $x = 8$  apples,  $y = 14$  oranges.

C.  $x = 10$  apples,  $y = 16$  apples.

B.  $x = 9$  apples,  $y = 15$  apples

D.  $x = 13$  apples,  $y = 13$  oranges.

24. Find the product of 8 and 0.3.

A. 0.32.

B. 0.204.

C. 2.4.

D. 32.





Bachelor's Degree [ ]

Master's Degree [ ]

Other [ ]

(Specify).....

4. Professional Qualification. Cert 'A' [ ]

PDGE [ ]

B. Ed [ ]

M. Ed/M. Phil [ ]

Others [ ] Specify.....

5. How long have you been teaching Financial Accounting?

Less than 1 year [ ]

1 – 5 years [ ]

6 – 10 years [ ]

11 – 15 years [ ]

16 – 20 years [ ]

21years and above [ ]

6. Did you ever study Financial Accounting? Yes No

7. Did you ever study elective/ advanced mathematics or any related  
mathematics subject (excluding core mathematics)? Yes No

If other, (please specify)-----

**PERCEPTIONS OF FINANCIAL ACCOUNTING TEACHERS ABOUT  
FINANCIAL ACCOUNTING AND MATHEMATICS**

Please indicate the degree to which you Strongly Agree (SA), Agree (A), Disagree (D) or Strongly Disagree (SD) with each statement.

<b>S/N</b>	<b>STATEMENTS</b>	<b>SA</b>	<b>A</b>	<b>D</b>	<b>SD</b>
8	Financial Accounting which contains mathematics concepts are difficult to teach.				
9	Financial Accounting teachers with mathematics background are able to teach better than teachers without mathematics background.				
10	The mathematics ability of Financial Accounting students is directly related to the competence and performance of the teacher.				
11	Students taught by teachers with mathematics background have high level of understanding than teachers without mathematics background.				
12	The mathematics ability of an Financial Accounting student influences his or her academic performance in Financial Accounting.				

**APPENDIX D**

**UNIVERSITY OF CAPE COAST**

**COLLEGE OF EDUCATION STUDIES**

**DEPARTMENT OF ARTS AND SOCIAL SCIENCES EDUCATION**

**THE INFLUENCE OF MATHEMATICS ABILITY ON SOME FACTORS**

**ASSOCIATED WITH STUDENTS' ACADEMIC PERFORMANCE IN**

**FINANCIAL ACCOUNTING IN CENTRAL REGION, GHANA**

**FOCUS GROUP INTERVIEW PROTOCOL FOR STUDENTS**

**A. General information**

Date: .....

Time commenced: .....

Discussion location: .....

**B. Interview Questions**

1. Is mathematics a difficult subject to study and why?
2. Have you always been afraid of mathematics and why?
3. Do you agree that only intelligent students can study mathematics and why?
4. Can you explain whether mathematics is a subject for males?
5. Do you agree that you will never do well in mathematics even if you are taught by the best teacher and why?
6. Do you enjoy studying mathematics, explain?
7. Is mathematics a boring subject, explain?
8. Is Mathematics an irrelevant subject and not related to our lives and why?
9. Are you highly motivated to study mathematics, explain?

10. Does Financial Accounting require some knowledge in mathematics to study or do calculations, explain?
11. Is Financial Accounting a difficult subject to study and why?
12. Are you afraid of studying Financial Accounting and why?
13. Is it only intelligent students, who can study Financial Accounting, explain?
14. Is Financial Accounting is a subject for males, explain?
15. "I will never do well in Financial Accounting even if I am taught by the best teacher", how do you agree with this statement?
16. Do you enjoy studying Financial Accounting, explain?
17. Is Financial Accounting boring to study and why?
18. Is Financial Accounting a relevant subject and related to our lives, explain?
19. Are you motivated to study Financial Accounting and why?

**APPENDIX E**

**UNIVERSITY OF CAPE COAST**

**COLLEGE OF EDUCATION STUDIES**

**DEPARTMENT OF ARTS AND SOCIAL SCIENCES EDUCATION  
THE INFLUENCE OF MATHEMATICS ABILITY ON SOME FACTORS**

**ASSOCIATED WITH STUDENTS' ACADEMIC PERFORMANCE IN**

**FINANCIAL ACCOUNTING IN CENTRAL REGION, GHANA**

**INTERVIEW PROTOCOL FOR TEACHERS**

**A. General information**

Date: .....

Time commenced: .....

Discussion location: .....

**B. Interview Questions**

1. What is your educational qualification?
2. How long have you been teaching Financial Accounting?
3. Which subject did you specialize in to teach?
4. Did you ever study elective/ advanced mathematics or any related mathematics subject (excluding core mathematics)?
5. What are some of the mathematics concepts related to Financial Accounting?
6. What is your opinion with explanation on whether Financial Accounting which contains mathematics concepts; is it difficult to teach?
7. Do you agree with the statement that “Financial Accounting teachers with mathematics background are able to teach better than Financial Accounting teachers without mathematics background”?

8. What is your view of whether the mathematics ability of Financial Accounting students is directly related to the competence and performance of the teacher?
9. Can you conclude that students taught by teachers with mathematics background have high level of understanding than teachers without mathematics background, and why?
10. Expatiate on whether the mathematics ability of an Financial Accounting student influences his or her academic performance in Financial Accounting?

**APPENDIX F**

**Introductory Letter**

**UNIVERSITY OF CAPE COAST**

**COLLEGE OF EDUCATION STUDIES**

**Department of Arts & Social Sciences Education**

*TELEPHONE:* +233 0332135411/+2330332132480/3 **University Post Office,**

*EXT.* (268). Direct: 35411. **Cape Coast, Ghana.**

Telegrams & Cables: University, Cape Coast.

**OUR REF: DASSE/ED/CSP/1110001**

**YOUR REF: *Date: 25<sup>th</sup>, February, 2013***

**TO WHOM IT MAY CONCERN**

**LETTER OF INTRODUCTION**

The bearer of this letter Miss Cynthia Osei Boateng is a graduate student of the Department of Arts and Social Sciences Education of the University of Cape Coast, Ghana. She requires some information from your institution for the purpose of writing a thesis a requirement of Phil Degree Programme.

I would be grateful if you would kindly allow her to collect the information from your institution. Kindly give the necessary assistance that Miss Cynthia Osei Boateng requires to enable her to collect the information.

Thank you for your co-operation.

**REV. DR. SETH ASARE-DANSO**

**HEAD OF DEPARTMENT**