

UNIVERSITY OF EDUCATION, WINNEBA

INVESTIGATING THE CAUSES OF POOR ACADEMIC PERFORMANCE OF FEMALE STUDENTS IN MATHEMATICS

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**A dissertation in the Department of Mathematics Education,
submitted to the School of Graduate Studies in partial fulfillment
of the requirements for the award of the degree of
Master of Education
(Mathematics Education)
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DECLARATION

STUDENT'S DECLARATION

I, CONFIDENCE ANTO ARTHUR, declare that this project with the exception of quotations and references in published works which have all been identified and acknowledged, is entirely my original research and that no part of it has been presented for another degree in this university or elsewhere.

SIGNATURE:

DATE:



SUPERVISOR'S DECLARATION

I hereby declare that the preparation and presentation of this work were supervised in accordance with guidelines and supervision of project report laid down by the University of Education, Winneba.

NAME OF SUPERVISOR: DR. FRANCIS OHENE BOATENG

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DATE:.....

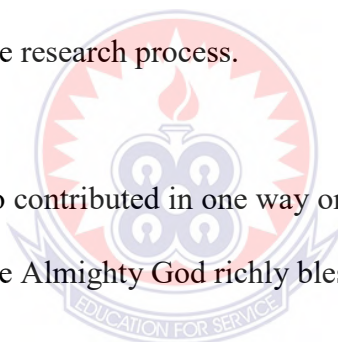
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DEDICATION

This research project is dedicated to my mother Mrs. Aameh Gladys who encouraged me in my effort to pursue further in life, and my sisters Arthur Anto Evelyn and Arthur Anto Prudence.



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ABSTRACT

The study was conducted to investigate the causes of poor academic performance of female students in mathematics in the Bia West District. The targeted population of study comprised all the Senior High Schools, the NGOs, the Bia West Education Directorate and Female SHS Graduates in the study area. A Sample of 400 respondents was selected from the population using convenience and stratified sampling technique. Descriptive correlational research design was adopted for the study. The instrument for collecting data was questionnaire. The study established that poor foundation, math anxiety, dyscalculia, practical lessons, and being boring among others cause poor academic performance of female students in mathematics at the Senior High School level. The study found students' interest in mathematics as the strongest factor that predicts students' performance in mathematics notwithstanding the significant contribution of other factor variables. The study recommended the following; parents should have positive attitude and outlook towards female education and always encourage girls to adopt successfully educated women both near and far in the society as role models, that government should formulate a policy of selective admission with elements of affirmative action for female students at the Senior High School level in the country, and finally, parents should exercise greater responsibility towards the welfare of their children especially girls.

CHAPTER ONE

INTRODUCTION

1.0 Overview

Chapter one deals with the historical background of the study, the problem statement, research questions and the objectives of study. The chapter also contains information on the justification of study, scope of study, limitations of study and the organization of the study. The main concern of the study is to investigating the causes of poor academic performance of female students in mathematics in the Bia West District at the Western North Region of Ghana, with the view to assess the impact of the causal factors of gender disparities in education on female access to and academic performance in mathematics.

1.1 Background to the Study

Education is generally viewed as a positive force with a wide range of impacts on society and human development. Throughout the world, people look up to education as a conduit to achieve sustainable change and development. Education contributes to the development of analytical mind and reasoning power in the individual which helps everybody to build up a sense of confidence, self-esteem and self-respect, Witt DD (2012). Anderson (1992) states that “in today’s world, a child who is not educated is disadvantaged in terms of income, health and opportunity.

In coming years, a society that does not educate its children will be disabled in terms of the economic productivity and social welfare of its people”. This is more unique for the girl-child who is seen as a child today but who later becomes a woman and also a mother. Educating the girl means educating the whole family. And what is true of families is also true of communities

and ultimately the whole nation (UNICEF, 2004). According to Bellamy (2003), there can be no positive significant or sustainable transformation in societies and in fact in poverty reductions until girls receive the quality basic education they need to take their rightful place as equal partners.

Female education has significant implications for maternal and child welfare development. There is a positive relationship between female education and improved household incomes and nourishment (Caldwell, 1979 cited in Anamuah-Mensah, 2000, p. 7). Education is seen as one single important contributor to national economic growth, self-sufficiency and cultural reawakening of a people (World Bank, 1999, p. 16; Abosi & Brookman-Amisah, 2007, p. 284).

It appears that education and development are intertwined. Quality education provides a conduit for the socialization of a people into their political and cultural value-system and makes available quality human capital for economic development (Webster, 1988). The quality of education and the active participation of all groups of people (male and female) are significant indicators which should come into play before a nation can realize the full benefits of education. The realization that the Ghanaian educational system is traditional, conservative and parochial in nature in the midst of tough demands and challenges of rapid social and economic development (GPRS II, 2006, pp. vi-vii) guided past and present regimes in this country to initiate changes, most, in the form of educational reforms, to the educational system to make it more responsive and relevant to the nation's social, economic and political milieu. The obvious question that all and sundry should be asking is that what has these "reforms" achieved with regard to equity participation of the sexes in Senior High School education? Or has female participation in Senior High School education attained acceptable national standards all these years of "reforming" our educational

system? Or yet still why do we continue to battle with gender inequality or low female access and participation in our educational system especially at the Senior High School level?

In the second half of the twentieth century, governments in the developing countries expended a huge part of their budgetary allocations to the education sector. In Sub-Saharan Africa, for instance, between 1965 and 1973, Cote d'Ivoire despite experiencing economic difficulties allocated high proportions of its gross national product (GNP) and public expenditure to education. This represented 7.4 per cent of GNP and 31.7 per cent of public expenditure respectively in 1973 and in 1981 it represented 45.0 per cent. Similarly, other African countries spent between 25 per cent and 30 per cent of their GNP on education with a larger proportion on higher education during this time (Assie-Lumumba, 1995 cited in Higher Education in Africa, Crises, Reforms and Transformation – N'Dri T. Assie-Lumumba, 2006).

The expansion in educational expenditure was against a backdrop of considerable political change as newly independent nations like Ghana accepted the challenge for determining their educational policies and choices. The rationale was, among other things, to increase access to education, foster national unity, satisfy social justice and provide an urgent need to develop a human resource base for the socio-economic growth of their nations (Hallak, UNESCO, 1990).

The investment made by governments paid off. A tremendous growth in literacy rates, educational access, facilities and personnel occurred especially at primary and secondary levels in most developing countries. In Sub-Saharan Africa, by 1990 female enrolments had increased to 72.5 per cent of those of males, Ford LE (2002). In Latin America, literacy rates increased from 72 per cent in 1970 to 83 per cent in 1985 with near gender parity achieved. In other

countries such as Chile, Cuba, Bahrain, Panama and Tunisia significant levels of school life expectancies of more than 10 years very similar to those of the wealthier countries of the North were achieved (Elbakri, 1998). Notwithstanding this positive development, the problem of gender inequality in education provision continues to persist in many countries of the developing world (UNESCO, 2003a). Ghana is no exception. Ghana's educational system is characterized by gender inequality at many levels. It is believed in Africa and of course in some parts of Ghana that most parents give preferential treatment to boys especially in matters concerning education. It is really sad that up till now in some societies, girls are still made to live in their shadows, denied education and other rights, and socially exploited so much that their rights to attain womanhood before going into child bearing are being aborted and abused, La Franiere S (2005). In situations, where they are allowed to attend school, a good number of them are later withdrawn for one reason or another before completing Senior High School. This invariably causes to their poor performance. For example, a 16-year-old girl living in Debiso, (a small settlement in central part of the Bia West District), who was the only girl among the four children of her parents, was enrolled in a public school, but was later withdrawn to work as a house-help to a wealthy couple. Investigation into her case revealed that her father decided to withdraw her from school because he did not want to 'waste' his meager resources in educating a female child who is poor in mathematics and will eventually be given out in marriage. The girl's sad story is, but just one of the typical examples of many girls whose education is truncated by one reason or another (Mamman, 2003 p. 3). Accordingly, this study tries to look at the causes of poor academic performance of female students in mathematics in some selected Senior High Schools in the Bia West District at Western North Region of Ghana.

1.2 Statement of the Problem

Education provision has formed an essential service in the social sector of Ghana over the years. In the last significant 3 to 5 years, there has been a decreased demand for female education provision in mathematics related courses in Ghana (GTEC, 2019). In 2015, girls representing 38 percent and boys 62 percent of senior high levels enrolled in mathematics related courses in Ghana (OECD/UNESCO, 2011). This situation is not different from that of the Bia west District. According to the headmasters of the three (3) visited schools in the District by the researcher, they all agreed to the fact that academic performance of female students in mathematics has declined. Within the period of four consecutive years, thus 2018-2021, the performance of female students in mathematics looks very poor in the District per records from the District Education Directorate at Bia West, DDSRA (2021).

According to the Education Directorate of the Bia West District, the WAEC results of female students in Core Mathematics for the past five years have not been encouraging. The statistics from the results indicate that, in 2018, out of 365 female students presented for the WASSCE examination, only 40% indicating 146 students passed in mathematics, in 2019 out of 220 female students presented for the WASSCE examination, only 20% indicating 44 students passed in mathematics. In 2020, out of 400 female students presented for the WASSCE examination, only 25% indicating 100 students passed in mathematics, just recently in 2021, out of 400 female students presented for the WASSCE examination, only 30% indicating 120 students passed in mathematics. This indicates a decline in female academic performance in mathematics, which situates for a gap that needs to be researched on in the Bia West District of Ghana.

Moreover one of the attributable reasons for gap in mathematics performance between males and females is the inherent unfairness in school-based assessment (Griffith, 2005; Njabili, et al. 2005; Asim, 2007) which may results from teachers' incompetence in assessment.

However, in the Bia District not much studies has been conducted to investigate the factors that cause poor academic performance of female students in mathematics. It is in this light that this study sought to examine the factors causing poor academic performance of female students in mathematics at the Senior High School level.

1.3 Purpose of the Study

The study sought to investigate the causes of poor academic performance of female students in mathematics, concentrating on the Bia West District in the Western North Region.

The specific objectives are to:

1. Determine the effect of poor foundation, math anxiety, dyscalculia, practical lesson and lack of interest on the academic performance of female students in mathematics in Senior High School education.
2. Determine the effect of school-environment conditions on the academic performance of female students in mathematics in Senior High School education.
3. Analyse the role of the Bia West District, parents, school authorities, NGOs and other stakeholders in improving academic performance of female students in mathematics in Senior High School education.

1.4 Research Questions

The following questions, which will help chart a further investigational course for the research, were formulated to guide the study.

1. What is the effect of poor foundation, math anxiety, dyscalculia, practical lesson and lack of interest on academic performance of female students in mathematics in Senior High School education?
2. What effect does school-environment conditions have on the academic performance of female students in mathematics in Senior High School education?
3. How would the Bia West District, parents, school authorities, NGOs and other stakeholders improve female students' academic performance in mathematics in Senior High School education?

1.5 Significance of the Study

Education provision has been characterized by the incidence of gender disparities for many reasons in Ghana as stated earlier. Ghana initiated major education reforms in 1974, 1987, 2007 through to 2013, to invoke the active participation of females of school-going age. It is at this same time that NGOs and other stakeholders rose to combat gender differences in Ghana Education. Despite these reforms and activities, the problem of female inequality in mathematics education provision continues to persist in Ghana (GSS, 2010, p.11). The present study sets out against this backdrop of events to examine female student's participation in mathematics in Senior High School education in the Bia West District with the view to assess the impact of the causal causes of gender inequalities on female students' participation and make policy recommendations to address this developmental menace. The study is relevant because it will help to identify and understand the challenges confronting female access, interest, participation

and ability to mathematics subjects in Senior High School education in Ghana and also will provide data for future studies into female student's participation to mathematics subjects in Senior High School education. Thus, in the academic field this work seeks to serve as a basis for further study into the complex questions of gender disparities.

1.6 Delimitations of the Study

The study covered the period of female mathematics performance in WASSCE results from 2019 to 2021. It also studied some of the valiant activities of some NGOs, Institutions, Municipalities/Districts/Metropolis and the Girls Education Unit of GES that negatively or positively, causes gender disparity or inequality in Ghana education. The study focused on investigating the causes of poor academic performance of female students in mathematics in Senior High School education in the Bia West District in the Western North Region of Ghana.

1.7 Limitation of the Study

Inadequate time and funds constituted constraints which limited the researcher's efforts to reach all schools. Therefore, the Senior High Schools in the study areas were sampled. Poor record keeping and data management posed some difficulties in extracting data from the existing literature in the schools and education offices.

1.8 Organization of the Study

The whole research work is divided into five chapters. Chapter One introduces the research work and looks at the background of the study, problem statement, the purpose of the study, research questions and significance of the study. Other aspects of Chapter One include limitations and organization of the study. Chapter two provided the theoretical framework and key concepts on

which the study was based, in addition to a historical development of high school education in Ghana and a framework for assessing female student's poor performance in mathematics as a subject in education. Chapter Three is devoted to methodology which describes the research design, the population and sampling procedures, data collection procedures and data analysis. In Chapter Four, results and discussions of the findings are presented. Finally, the summary of findings, conclusions and recommendations constitute the concluding Chapter of the research which is Chapter Five.



CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter sheds more light on the topic under study. Through the review of related literature, the study is repositioned in the appropriate theoretical perspective. The chapter also attempts to define key concepts and terms on which the study is based, provide a historical development of Senior High education in Ghana and a framework for assessing the impact of the causal factors. In this part of the study, an attempt is made to examine available literature which has been offered as major explanations for restricted academic performance of female students in mathematics in Africa and elsewhere in the world with a view to assessing their influence on investigating the causes of poor academic performance of female students in mathematics in Senior High School in the Bia West District in the Western North Region of Ghana.

2.1 Theoretical Framework of the Study

The theoretical framework of the study highlights on the reviewed educational theories or philosophies that connect with the factors considered in the objectives, review concepts/ definitions and terminologies relating to the objectives.

2.1.1 Plato and Socrates' Perspectives on teaching and learning methods

Maganga (2013), as he made a study on Plato and Socrates work, he found that the knowledge of geometry have been in possession even before the birth of a child. Contextual variables (Context), Learning environment, Location of schools ,Teacher students relationship, Teaching methods , Teaching and learning resources, Relevance of text books, School management system, Language, Cultural Resources, Curriculum Content Predictor variables (Input), Students

cultural background , Teacher and Students' power relationship , Students' learning background , Teaching ability , Students' attitude , Teacher qualification , Syllabus in use , Teaching experience , Class size , Learning resources Mediating variables (Process) , Teacher's characteristics , Student's characteristics , Learning Skills , Fear of the subject , Teaching styles , Students confidence , Mob psychology , Time table , Teachers personality , Perceived importance of the subject Outcomes variables (Product) , Student's performances in mathematics , The quality of teaching practices , Logical reasoning , Learners creativity in problems solving , Ability to question correctly , Interest in science subjects. Thus according to Plato it is known that the ideas or general concept behind the concrete entities were experienced through senses, by means of questions set that awaken knowledge or understanding of such ideas behind concrete phenomena. This implies that students could become good in mathematics as teachers give them more questions to awaken their knowledge and understanding on mathematics concepts. It was declared that ideas must have existed in our mind even before our birth. Such knowledge is termed a priori, that means knowledge which is their prior to and independent of any experience (Maganga, 2013). Therefore questions came on how teachers keep in mind that their learners had concepts or ideas that they should help them develop such ideas and cultivate what is in their experience as they immerse in the module or topic under study.

2.1.2 John Locke and Knowledge of Practice

John Lock said that empiricism is an epistemological position which contends that genuine knowledge is what comes to us through our sensory experiences. This means that the only sources of genuine knowledge are senses of sight, hearing, touching, smelling and tasting. John Locke stated that the child's mind is like a white sheet of paper on which experiences are recorded (Tarcov, 1989). This implied that teaching methods in mathematics needs to involve

five sense organs of students in the class. While teaching, students must be given tasks to attempt with the guide of a teacher; they must see clearly what is been written on the chalkboard and practically solve mathematics problems. Teachers should be able to teach students in such a way that students can practically do what they are taught, hearing it well by minimizing number of students in overcrowded classes and use of actual environment to make students understand mathematics (Maganga, 2013). Therefore the researcher wanted to know whether in actual teaching students practically learn mathematics and how teachers help students to solve, interact with teaching materials as well as the impact of school environments to students learning.

2.1.3 Paul Freire and the Learning Environment

Freire (1921-1997), an influential thinker about education in the late 20th was the first philosopher to concern himself with oppressed people whose natural rights to liberty and property were violated. In his book (Freire, 1970) —Pedagogy of the Oppressed he suggested that educational activities should be conducted under existing experiences of the participants (Maganga, 2013). Teachers should discuss with their students and help them in re-labeling or generating new ideas (Smith 2002). This implies that mathematics teachers are supposed to teach their students in the actual living environments of their students. Students can be taken to field such as farms, pitch or football grounds to learn many forms of diagrams as examples. This will make students not to forget what they have practically learned. According to Maganga (2013), Freire was insisting on the use of dialogue method whereby teachers should discuss with their students about their learning environments. The methods involve students discussing together or conversing, rather than using written books and syllabuses in a curriculum of study as what Paul Freire called banking education. Banking system of education the one that teachers deposit knowledge to the students.

Bartlett (2008), as he learned from Freire's work, banking education is a relationship of domination in which the teacher has knowledge that he/she deposits in the heads of the passive objects of assistance, his/her students. In contrast to banking education, Freire proposed a problem posing education that encourages students to become active in thinking. Problem posing education relies upon dialogue and critical consciousness, democratic teacher-student relationships, the concretion of knowledge through interaction, and a curriculum grounded in students' interests and experiences. The theory by Freire raised some questions to us whether in teaching mathematics there is an element of banking as students are dominated by their teachers in classes or there is any democratic way of teaching and learning in mathematics classes. Do teachers and students have a culture of discussing mathematics concepts?

2.1.4 John Dewey

John Dewey (1859-1952) proposed a pragmatic philosophy of education that education was a process of reconstructing and reinstituting experience to promote individual's efficiency and good citizenship. It goes all the way from the birth of the individual to his death. The curriculum content should not be burdened with subjects that are unrelated to the pupils' lives and every day experiences. If mathematics contents are related to learner experiences students' performance might be good. This needs to be in line with teachers' teaching methods for which their methods of delivery must be in line with such experiences.

2.1.5 Julius Nyerere

Julius Nyerere according to Mtitu(2014) was the founder and the first president of Tanzania who introduced a policy of education, the education for self-reliance, which was a means of inducing socialism in the country. According to Nyerere (1967), the need for curriculum change was insisted in both content and pedagogical approaches. This means that, there was a need for a

curriculum to be tailored on the teachers' and students' daily life and the classroom practices need to connect students' real life what Nyerere called —praxis|. Various changes have been made in Tanzania on teachers' teaching methods. Methods such as student's centered methods were the proposed one (URT, 2010). In order to achieve this in mathematics today, teachers need to actively engage learners in their teaching and learning process to make them practically learn mathematics.

2.2.0 Conceptual Framework of the Study

Conceptual framework of the study shows the diagrammatical presentation on how the causative factors such as poor foundation, mathematics anxiety, dyscalculia, practically based, being boring etc leads to the academic performance of the student and its effect it will have on the student.

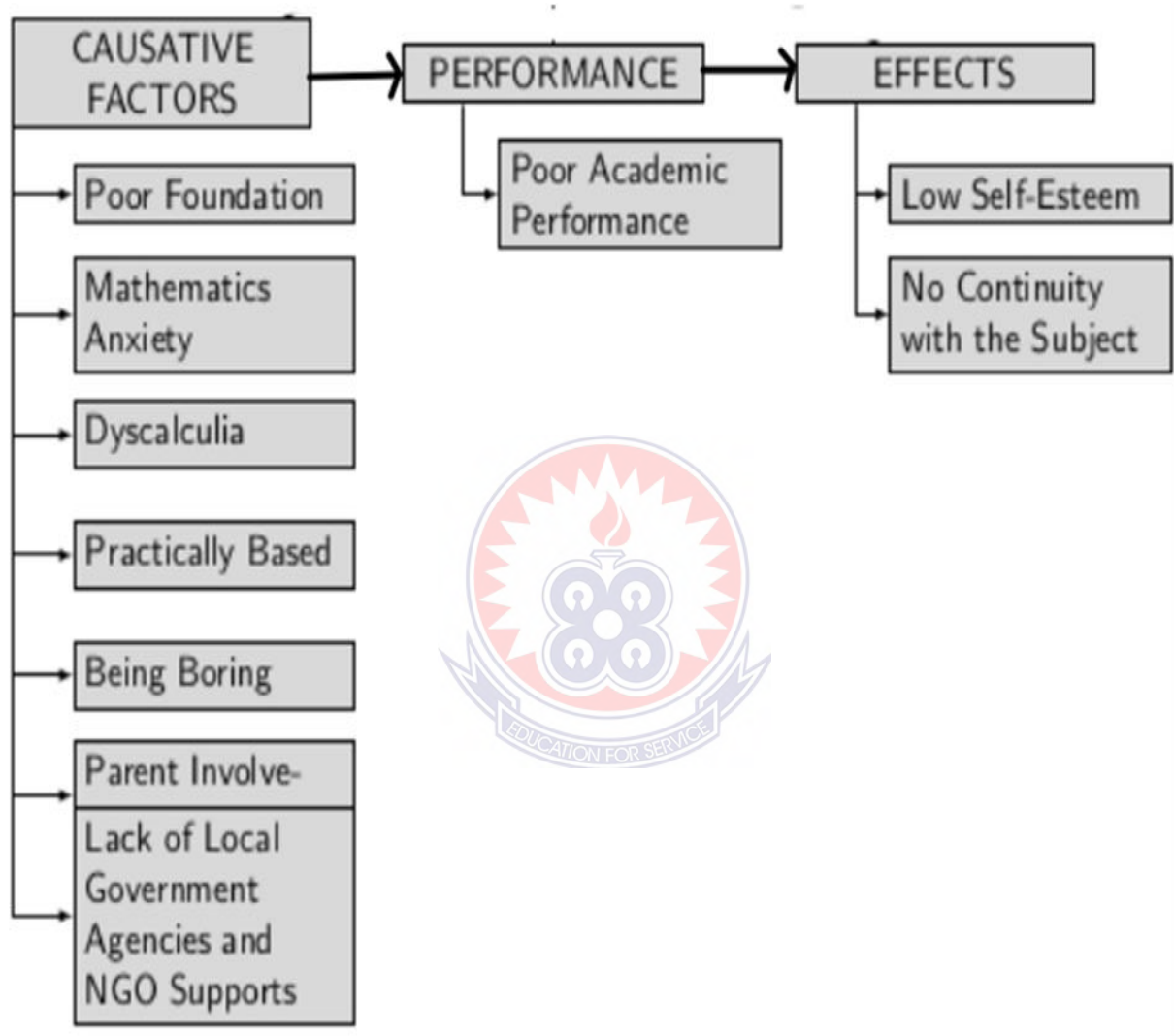
In other to study about the female child in the study of Mathematics, the following must be known: Causative factors, Performance and Effects.

The Causative Factors of the student's Mathematics career are those factors that are responsible for causing the Performance.

These factors include; Poor Foundation on the subject, Mathematics Anxiety, Dyscalculia, lack of Practically Based teaching, Being Boring during teaching, limited Involvement from Parents and lack of Local Government Agencies and NGO supports to the student.

If any of these Causative factors is not handled carefully, it affect the student's Performance in a negative way hence Poor Academic Performance.

The Performance of the student has several Effects on the learner. Some of these effects include Low Self-Esteem from the student in towards Mathematics and may also lead to No Continuity with the Mathematics subject.



2.2.1 Senior High School Education in Ghana

Senior High School Education in Ghana is a kind of education that lasts for 3 years. It is provided to students between the ages of 14-20 years. The Senior High School ends on the West Africa Senior School Certificate Examination (WASSCE). This kind of education comes after junior High school that is then followed by the tertiary education as it is in the Ghanaian educational system.

2.2.2 Poor Performance

Poor performance is legally defined as when a student's behavior or performance might fall below the required standard. Dealing with poor performance is, however, a legal minefield. This might explain why some students tend to confuse poor performance with negligence, incapacity or misconduct.

2.2.3 Mathematics Education

The students' mathematics education presents one of the valid measures of students' likelihood of progression into the tertiary institution in Ghana. Failure of students to obtain a minimum grade of C6 in mathematics at the West African Senior School Certificate Examination (WASSCE) will deny students the opportunity of tertiary education until the students attain age 25 to qualify as mature applicants for admission into tertiary institution.

2.2.4 Factor

Factor is an event whose behavior or operations produces some desirable or undesirable results in a particular circumstance

2.2.5 Female Education and Development

Education is the prime mover in the lives of individuals and in a nation's development. Education also provides the key to economic asset for individuals and nations. According to Psacharapoulous and Patrinos (2002) every year of schooling lost represents a 10 to 20 per cent reduction in girls' future incomes. They argued that countries could raise per capita economic growth by about 0.3 per cent points per year or 3 per cent points in the next decade if they attained gender parity in enrolment.

When girls are educated it has implications for improved infant/child and maternal health with rippling effects on household incomes and nourishment. For instance, a literate woman gains access to employment more easily than the illiterate woman and tends to manage scarce capital better by bringing to bear the knowledge and skills acquired in training to ensure greater success.

There is a direct relationship between female education on mathematics fields and poverty reduction. Educated women tend to have smaller family sizes and reduced fertility which has great potential benefits for their future generation. For instance, UNDP's statistics have indicated that the high fertility rate in Tanzania and Ghana in the early 70s (1970-75) dropped drastically from 6.8 births per woman to 5.1 and 6.9 to 4.1 respectively between 2000 and 2005 due to continued and sustained efforts at ensuring the participation of girls in education in the two countries (UNDP, 2004b). Female education on mathematics field is important for a nation's development. The relevance of female education on mathematics subjects to Ghana's national development process has long been recognized by scholars in the past. Dr. J. E. Kwegyir Aggrey once stated that if you educate a man, it is an individual who have been educated but if you

educate a woman, then you have educated nation that has been educated (Cited in IBIS Survey Report on Female Education, 2007, p.1).

2.2.6 Female Education in the Framework of International and National Context

Female education is been framed in two different categories, consisting of the international and national context.

2.2.6.1 Female Education in the international context

Since time immemorial, education has been recognized as one single significant contributory factor to economic development (World Bank, 1999, p. 16). The recognition of education as key to sustainable development, peace building and effective participation in the democratization process or governance system of a nation has informed several international gatherings. The 1948 Universal Declaration of Human Rights highlights the importance of education in this light. In the Article 26 of the Declaration, education was considered first and foremost as a fundamental human right of everyone. The Declaration recognised that “elementary” education would be free and compulsory, and that higher levels of education would be equally available on merit for the realization of the benefits of education. The World Conference on Education held in Jomtein, Thailand in 1990, introduced an expanded vision of “Education for All” with its six main goals which anchored education into a local, national and global context. Building upon the Jomtein Conference, after the World Education Forum in Dakar in April 2000 most governments in the world committed themselves to ensure that by 2015 all children would complete a full course of good quality primary education, significantly expand learning opportunities for youth and adults, halve illiteracy levels and eliminate gender disparities at all levels of education by 2015. The overriding importance of achieving universal primary education by 2015 and eliminating gender disparity in primary and secondary education by 2005, and at all levels of education by 2015 are a part of the Millennium Development Goals adopted by the UN General

Assembly in 2000. The eight goals that the 189 countries signed included commitments to education, health and environmental sustainability.

2.2.7 The National Context

Since 1925 female education has received official recognition and backing in the educational policy of this country. The Guggisberg's Sixteen Principles helped to put female education in the national context. 2 of the 16 principles (4 and 2) advocated equal opportunities for both boys and girls in basic education and the provision of secondary education with an educational standard that will help young men and women to enter a university (McWilliam & Kwamena-Poh, 1958, p. 58). The education reform program of 1987 provided a great boost for the important role of female education in the development process of this nation. The legal framework for the reform which was set under the constitutional arrangement of the 1992 Constitution enjoined the government to put in place a system of education that will allow all children of school-going age to access a free compulsory universal basic education (fCUBE) within five years of the assumption of office by the year 2005. In the same vein, the 1992 Constitution also required the government to intensify efforts to achieve functional literacy and stressed the need for the provision of secondary and higher education. Additionally, the government was required to create equal access to technical and vocational education on the basis of capacity by every appropriate means with progressive introduction of free education (Graham & Hormeku, 2011, p. 73). Gender equality has received attention in all spheres of the Ghanaian national life. The Ghana Government has promulgated many acts on gender issues and also ratified some existing conventions with the ultimate aim of evoking contributions from all and sundry in the national development process. For instance, in 1986, the government ratified the convention on the

“Elimination of all Forms of Discrimination Against Women and Children (CEDAW) (Awumbila, 2001, p. 56).

2.2.8 Factors causing Female Poor Academic Performance in Mathematics Subjects in Education

The theoretical framework for this research draws on available international and national literature. A synthesis of studies conducted in Ghana, Africa and the world at large has identified a cascade of factors that causes female poor academic performance in mathematics subjects in education. These factors are multi-faceted and interrelated. They are synthesized into socio-economic-culture practices and conditions, school-environment or school-related conditions, political and institutional policy practices of governments.

2.2.9 Socio-Cultural Practices

In many societies and communities, home-environment practices have been identified as significant influences which cause mathematics education of female students. Coombs postulated that cultural values, norms and practices, attitudes and anxiety significantly influence the poor performance of female students in mathematics.

2.2.10 Mathematics anxiety

Students with math anxiety do not simply dislike math for them, math causes debilitating feelings of fear and failure that hurt their ability to perform. The pressure and lack of confidence these students feel when faced with math causes their brain to freeze and forget even the things they do know. He observed that these things contribute to sexual disparities in education of a given society (Coombs, 2000). Home-environment factors have a direct relationship with a child’s education. Poor parental perceptions about the benefits of education and negative attitudes towards female student’s education contribute to low familial investment in female

student's mathematics education in developing countries. According to Fraser, parental attitudes exercise greater influence than intelligence in a child's education (Fraser, 2009).

According to Clerk studies by a group of ethnographers into the forces behind the success of children in the midst of poverty in Africa indicated that poor children of all family types succeed in their education because their parents inculcate discipline and good study habits into them (Clerk, 2006 cited in Astone & Mclanaham, 1991). Burns observed that in Buganda parents viewed western formal education with skepticism because educated girls became discontented, immoral and felt reluctant to undertake heavy field labour (that is farming). Despite this, parents invested in their children's education because it offered opportunities for the expression of one's higher social status in the community and helped their sons to obtain lucrative jobs and daughters a higher bride-wealth in marriage (Burns 2008). Khan found similar practices in Nepal. He found that economic conditions have influenced cultural practices in a way that families actively promoted the education of their daughters to increase their chances of marrying a "white collar" husband and poor families concentrated their resources to educate one son through secondary education to obtain a lucrative job (Khan, 1993).

2.2.11 Dyscalculia

Dyscalculia is a learning difficulty that causes students to struggle with formulas, shapes and numbers-related concepts. This makes it difficult for them to understand and process math problems. These students usually fall for behind their peers in math and have trouble with number-related problems that do not improve with ongoing practice. Cultural sanctions on women have also been identified as a major factor which restricts girls' participation in education in societies and communities of Indian, African and Pacific cultures (Commonwealth Secretariat, 2008). Psacharopoulos (2010) indicated that in the Middle East and North Africa,

religious and socio-cultural traditions such as early marriage, child bearing and an unwillingness to allow girls to travel long distances have contributed to low participation of women in education in those regions. This pattern of educational provision and attendance is echoed in other regions of the developing world. In Nepal, for example, early marriage and motherhood account for 40 percent of girls who get married before age 15 (UNESCO, 2003a). Gender differences are seen as a significant influence which negatively affects female participation in education in many communities and societies. The long traditional and conservative belief that a woman's role lies in the kitchen or home has tipped the balance in favour of male children in education in many countries.

Lichter's study into high school drop-outs in some developing countries indicated that while 47 percent of boys indicated that their fathers earnestly desired college education for them only 17 percent of girls reported same. Similarly, 40 percent of boys and 32.5 percent of girls respectively indicated that their mothers wanted college education for them (Lichter, 1962).

2.2.12 Socio-Economic Practices and Conditions

Certain socio-economic conditions and practices have been implicated for causing the early termination of children's education in some societies in the developing countries. Socio-economic status of families is the foremost factor. This relates to a family's level of educational attainment, occupation and income. Tadoro in his studies on school performance of children in some developing countries identified four determinants of a female student capacity to learn which eventually determine female student's poor performance in mathematics in education. These are poor foundation, peer group interaction and the type of students whom an individual associate with, the student's interest, intelligence and ability, and early nutrition and health.

2.2.13 Poor Foundation

Poor foundation: math challenges are not always a result of a learning difficulty. For many students who struggle with math, it is simply because they do not have the proper foundation needed for success. These students may have fallen behind in a unit or moved on to advanced material before they were ready, leading to falling grades. He argued that these factors cause the performance of both sexes (Tadoro, 1985, cited in Zewide, 1994, p. 7). Some studies have indicated that there is a positive relationship between a family's socio-economic status and the education of children.

A female student educational attainment would be high if the student's family socio-economic status is high and vice versa "ceterus paribus". According to Kelly there is a strong correlation between parental income and social status and mathematics interest of girls than for boys (Kelly, 1984). As the Robbins' Report (1963) observed despite the astounding academic abilities of children of manual working class and those of the upper middle-class, only 11 percent of children of lower manual working-class compared to 44 percent of upper middle-class children went to grammar school. Mac-Gayin's (1996) study into factors which influence educational attainment of children in Cape Coast found that about 94 percent of the subjects with lower than secondary school educational attainment had mothers whose educational attainment was lower than secondary education. Bishop indicated similar patterns of discrimination in education provision among university students in Pakistan. He indicated that the degree of literacy within a home and the attitude of parents towards education constituted the most significant influences for admissions of students into the university for literate or illiterate parents in Pakistan. He found that at the University of Karachi, children of parents with university education were in greater percentage of about twenty times more compared to children of illiterate parents (Bishop, 2005).

Economic considerations have motivated familial preference for investing in male education rather than female education over the years (Burns, 2008; Khan, 1993). The act of families placing high premium on the economic contributions of girls has been identified as a factor which restricts girls' participation in education. Handa (1996) found that for the academically elite high school, income was the single most influential characteristic affecting enrolment. Poverty has been implicated as a major underlying factor in the decisions of parents and families to invest less in female education. In many families in poor societies and communities, girls are tasked to make contributions in the form of child care, home production, agriculture and trade which are essential for the survival of family members and the education of siblings. Girls' contributions to their families begin at an early age and this underpins low priority given to female education in those communities. Investment in the education of boys in many poor families is seen, however, as a security for old age (Psacharopoulos, 2010).

2.2.14 It requires a lot of practice

Math is not something that students automatically “get”. It takes and practices to understand math, since many students do not enjoy math, getting them to sit down and practice can be a struggle. Without that practice, students can have a hard time keeping up with what they are learning because they still don't have a handle on the basics.

Again, Psacharopoulos argued that the phenomenon of low female participation in education goes beyond the issue of poverty. He observed that other factors such as parents' unwillingness to bear the educational cost of books, uniforms and other expenses contribute to low female

participation in education. Khan (1993) found that both economic and cultural factors conspire to make women lag far behind men in terms of number of years of schooling and in grades achieved throughout the South Asian region. According to him early marriage, concern for girls' moral and physical welfare, segregation and seclusion in some countries combine in various ways to limit and restrict female education. On the economic front, he found poverty as the most pervasive barrier to female education in the South Asian region.

In the 1990s, the incidence of poverty compelled poorly educated rural and ethnic minorities like farmers and upland Kinh to drop below the poverty line with serious implications for their children's participation in education in Vietnam. As a result of the high incidence of poverty, in 1999 only 32 per cent of children of about 45 per cent rural farmers and minority Kinh ethnic group which constituted only 8 per cent of majority ethnic minorities to enroll in upper secondary schools (Joint Report of Government and Donor-Nongovernmental organizations poverty working group, 1999, Hanoi).

2.2.15 Reputation of being boring

It has a reputation of being “boring”: math has a reputation of being an unpopular mix of difficult and boring. Many students just aren't excited to learn about math. And when students aren't excited, they tend to do the bare minimum before moving on to something they would rather be doing, which is not going to help set them up for success in math class.

Girls' enrolment often surpassed that of males. Jayaweera (2001) indicated that gender is not an important influence but rather the type of school girls attended and the socio-economic status of a student were factors responsible for this healthy development. Jayaweera, however, observed

that throughout most of the region of Asia, the educational base for women's participation in technological studies and technological work was very limited.

2.2.16 Schools-Environment or School-Related Conditions

Academic performance of the sexes is a characteristic feature in the whole saga of gender inequality in education provision. Females are perceived as being academically inferior to males in many societies and communities in the developing countries. A study in Mali on academic performance of males and females found that almost a third of households surveyed admitted that they differentiated between females and males because they thought males were more intelligent than females (UNESCO, 2003a). Scholars are divided over the issue of female academic performance. Some scholars argue that the assertion is real and attribute its causes to the socio-economic environment.

Other scholars argue that the assertion is a perceived relationship in developing countries. Duncan's (2004) review of several studies in Africa by Hussen (1977) and Kann (1981) indicated that there was a weak relationship between the socio-economic background of parents and the academic achievement of students in Ugandan and Botswana's schools. Simon and Alexander (2009) concluded differently. They postulated that home background has important influences on the achievement of pupils and students in primary schools and lower secondary schools in those countries. The role played by females at home has been implicated as contributing to poor female performance in mathematics at school. Most girls were tasked to provide domestic services in the form of cooking, care of siblings as training for their future roles as wives and mothers. This tended to affect their attendance and performance at school. A study which analyzed 'O' level (Grades 11 - 12) examination results in Botswana, Zambia and

Kenya showed that girls performed poorer than boys in almost all subjects especially in the Physical Sciences, Biology and Mathematics. The analysis, however, showed that females did better in English Literature in all the three countries (Duncan, 2004 cited in Zewide, 1994). In Zambia, similar analysis, however, indicated lower females' examination scores in English, Social Science, Mathematics and Physical Science. Poor female academic performance in Zambia was attributed to parental discouragement of females to involve in counting activities in school. Chinapa (1983), however, found no significant gender differences in achievement levels in the national examination results conducted at the end of primary level in Botswana. In Mauritius females' performance was found to be better than males. A similar pattern of female performance was found in the UK. Females attained higher performance than males in reading, mathematics, verbal and non-verbal reasoning in school examinations. Some of the reasons adduced as explanations for males' poor performance included a tendency for males' disregard for academic work, indulgence in "laddish behaviour and bravado acts and male peer-group pressure. Females, however, emphasized collaboration and sharing (Arnot&Phipps, 2003). In Chile, in university selection tests females performed less well than males as in the US National Assessment of Education Progress testing (UNESCO, 2003a). Female self-imposed low self-esteem has been identified as a factor which causes female poor academic performance in education and especially in mathematics, science and technology studies in many countries. As a result of females' poor perception of their academic prowess they tend to shy away from offering subjects such as mathematics and the physical sciences. This has caused female performance in mathematics, scientific and technical education in most developing countries.

Houphouet-Boigny (2000) indicated that in Côte d'Ivoire female students in higher education chose liberal professions so that they can combine a career with family life rather than risk to

enter into the study of the sciences. He found that in 2001-2002 female students' preference for mathematics education accounted for a lower female participation interest rate (20 percent) at the Université de Cocody but 33 percent in private technical education. Similar trends are prevalent in other countries. In Chile, though females have higher performance in mathematics than males at secondary level yet their education in science and technology-related courses is lower than males. Referring to the participation of the sexes in mathematics education at secondary level, it was found that from 1995 to 1996 females achieved 82.2 percent in commercial specialization. However, males attained 58.5 percent and female's 13.1 percent respectively in industrial specialization (UNESCO, 2003a).

The pervasiveness of the notion that females are academically less intelligent than males extends its influence beyond the home environment into the school system. Debele (2002) in her study of female education wastage identified the role of women in a society and the organisation of school system as major underlying factors which restrict female poor performance in mathematics education. At the school level, teachers indulge in segregative acts against females.

According to Evans and King (2001) the lack of female teacher role models, male discriminative attitudes and male "image" projection are some of the institutional barriers which causes female poor performance in the study of mathematics and the physical sciences at school. Sex role stereotyping in school textbooks is a significant influence. The characterization of women in mathematics educational materials was found to be only 10 percent and in the few illustrations found they were portrayed as weak and passive characters, and providers of household chores (Biraimah, 2011). According to sociologists of education, classroom interaction between males and females, and students and teachers exercise significant influence on the performance of

females. Male attitude especially among peers has been found to have negative effects on girls' aspirations in science. According to Kelly (1985), in Britain, adolescent boys consistently undermined girls' efforts to participate in mathematics classes by making disparaging remarks about them and asserting that they (boys) considered science to be a male domain. It has been found that in science and technology studies, teachers tended to answer boys more often than girls in mathematics and science classes but at the same time this also provided major explanations why Teachers pay more attention to girls in non-math/science classes (Margolis & Fisher, 2002).

Harding argues that there are no physical and intellectual barriers to women's full performance or participation in mathematics science and technology studies except that in some countries formidable legal, cultural or socio-cultural barriers contribute to the devaluation and underutilization of women's knowledge in science and technology (Harding, 1992). Ellis (1990) has also debunked the assertion that women and females have "low capacity" for mathematics and technological studies. He found that in the Caribbean women attained higher levels of literacy and numeracy than males. For instance, results in Secondary School Examinations at General Proficiency level showed that a larger proportion of females entered for chemistry and mathematics than males, and an equal proportion of females as males entered for the study of physics.

Nagat El-Sanabary's (2012) studies into women's participation and performance in mathematics, science and technological studies in the regions of the Middle East and North Africa showed that higher proportions of women participated in math, science and engineering courses at university level than in western countries. Nagat attributed this healthy development to good access to science and mathematics education at the secondary level in the two regions of the world (Nagat,

1993). According to Gail Kelly, analysis of student performance in mathematics, natural sciences, medical and health-related fields in 41 countries in Asia, Latin America and Africa revealed that 50 per cent or more of the students who participated were women. He also found that in 13 countries the proportion of women who participated in the mathematics, medical and health-related fields were greater than 50 per cent. He admitted, however, that female participation in mathematics did not exceed 50 per cent in any of the countries. The highest percentage was 32 per cent in Cuba (Kelly, 1991). According to an evaluation of the Science, Technology and Mathematics Education (STME) clinics organized in Ghana it was found that female participation in mathematics and science education was high. The report indicated that for a five-year period, from the beginning of the STME clinics in 1987 to 1992, the number of girls who entered for GCE “A” Level Science Examinations increased from 368 out of a total of 3,241 students to 2,212 girls out of 9,417 students. This amounted to 24 per cent which represented an increase of 13 percent. Also, in 1997, out of 47 doctors and five dentists who graduated from the Korle-Bu Teaching Hospital Medical School, 15 female doctors annexed 16 of the 21 prizes awarded to deserving officers. This achievement was attributed to the impact of the STME clinics (AnamuahMensah&Atakpa, 1999; STME Co-ordinator, 2002, cited in Sutherland-Addy, 2002, p. 88-89).

2.2.17 Political and Institutional Policy Practices

Political and institutional policy practices of governments constitute significant factors that cause poor academic performance of female students in mathematics in education in the developing world. The pervasiveness of the perception that girls are academically inferior to boys provides significant influences in decisions to sideline girls in education, employment and power sharing or governance systems. Women have become subjects of various forms of discrimination which

impinge on their steady progression in the society. In some instances, women are subjected to discriminatory and segregate practices on the labour market and performance of schedules. Raj argues that often a woman's long years of education and training do not constitute significant factors in female employment. According to him, most women suffer discriminatory acts such as lower grade placement, underpayment for equal work and shorter hiring/employment periods despite possessing equal or better qualifications than their male counterparts (Raj, 1982). The absence of adequate female role models and employment avenues for women underpins the under representation or marginalization of women in labour issues in developing countries (Raj, 1982).

According to Coombs, limited employment opportunities for women affects female occupational aspirations and expectations and this contributes to produce few female role models which eventually impinges on female participation in education (Coombs,2000). Duncan has drawn attention to the negative impact of labour practices against women in the teaching profession in Africa. He observes that 'While women form the majority of the teachers in primary schools in the Western countries, this is not true in many African countries. The proportions decline even further at the secondary and tertiary levels. Less information is available concerning women in administrative positions. Nevertheless, it is clear that in most African countries, few are appointed as principals. Segregating women into lowest states of jobs, school authority and staffing structures, reinforce the view that women occupy a subordinate position in the work place' (Duncan, 2004 cited in Zewide, 1994, p. 9). According to a 1993 UNDP Human Development Report in industrialized countries discrimination against women largely abounds in employment and wages with women getting less than two-thirds of the employment opportunities and about half the earnings of men.

Hussain, however, argues that discrimination against women labour market issues is not a phenomenon which affects every kind of job. In professions such as the medical and scientific spheres of human endeavour women were not discriminated against men. Rather, they were favoured and paid more highly than men. According to UNESCO data on labour issues in Pakistan, in the fields of engineering and technology, and teaching women were however paid significantly less (Hussain et al, 2007). In Ghana, the provisions of Article 35 of the 1992 Constitution guarantee all people's equal opportunity to participate in all spheres of national life.

Additionally, the government has ratified a convention which calls for an end to all forms of discrimination against women and children (Awumbila, 2001, p.56). On the Labour market, the Industrial Relations Act of 1965 entitles women to equal pay and since 1971 women have been entitled to three months' pay of maternity leave in the country (Aryeetey, 2000, p.338).

Female performance in public life is however restricted due to a number of deep-seated socio-cultural structures, systems and practices such as traditional notions which advocate a preference for the education of male children. According to Oware, female access to the formal job market in urban areas is quite limited. This is because most women do not possess the required skills and qualifications for entry (Oware, et al, 1998, cited in UNDP Ghana Human Development Report, 2007, p. 112).

2.3 Empirical Basis of the Study

There is no single and definite definition of the concept of education. The concept connotes different meanings to different groups and cultures. There is, however, a thin thread of commonality among all scholars and cultures regarding the meaning of the concept. "Education" refers to the act of teaching and learning. Schultz (1963) sees education as a process "to draw out

of a person something potential or latent; to develop a person morally and mentally so that he or she is sensitive to individual and social choices and is able to act on them; to fit a person for a calling by systematic instruction and to train, discipline and form abilities” (Schultz, 1963). In another classic definition, “Education is taken to mean all sorts of self-improvement in addition to the transfer of knowledge and skill” (Smith, 1985). The Collins Colbuld Advanced Learner’s for students (2003) also explains the concept of education as the process by which an individual develops his or her mind through learning at a school, college or university, and in the process of doing so he or she gains knowledge and skills from what is being taught.

From the definitions given above, education connotes a process of sustained and systematic interaction that helps an individual and the society at large to realize self- improvement and enhanced quality of life through the transfer of knowledge and skills (UNESCO, 1975). For purposes of this study, the working definition of the concept of education adopted is the one that perceives the concept as the process of enrolling a child in an institution with demarcated physical structures provided with teaching-learning materials, equipment, and trained pedagogical professionals who impart knowledge and skills to people within specific time frame with the intent of making the child a useful individual or person and one who contributes to the realization of the development potentials of his or her community or nation (Abosi and Brookman-Amissah, ed.,2007, p. 56).

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter provides a detailed description of the approach used in conducting the study. The design of the study, target population as well as the techniques utilized in the selection of the sample, are also explained in this chapter. The data gathering tool and procedure are also described. Finally, the sources of data and data analysis techniques are also explained in this chapter.

3.1 Research paradigm

Research paradigm is defined as an approach to research that is considered the standard by a fluent people of researchers in the field based on having been both verified and practiced for a long period of time. The three most common types of paradigms are positivism, constructivism or interpretivism and pragmatism. The positivist paradigm type of research paradigms is the one used in this research since it is of exploring social reality based on the idea that one can best gain an understanding of human behavior through observation and reason.

3.2 Research Design

Research design as an important aspect of research, basically, must be the most appropriate to appropriately measure what is being measured and obtain the data that will lead to a valid conclusion (Levin, 2006). A research design therefore provides the glue that holds the research project together. It is used to structure the research and show all its major parts work together to address the central research objectives. The aim of this research was to explore the implication of

the causes of poor academic performance of female students in mathematics education in Bia West District.

The researcher found it most appropriate to use a descriptive correlational design. Descriptive correlational design is a method designed to determine if two or more variables are associated with each other. It is also used to describe the behaviour or characteristics of a population.

According to Osuala (2001), descriptive correlation approach provides a snapshot of the current state of affairs and the relationship among variables for prediction of future events from the present knowledge. The approach as used in this study provided an adequate description for making a wide range of policy decisions. It also helped the researcher to discover the relationship between female students' interest in mathematics and female student's poor academic performance in mathematics senior high education in the study sites and made recommendations for future amendments for the scheme if any.

3.3 Population

The complete set of cases from which a sample is selected is called the population whether it describes human beings or not (Saunders et al, 2007). It is a group of individuals or items that share one or more common characteristics from which data can be gathered or analyzed. Population is also defined as all the people who live in a particular city, country or area. For purposes of this research, 600 population was selected which comprised 105 Female Senior High School Students, 103 NGOs Officials, 93 Bia West District Education Directorate Officers, 118 Parents, 121 Tutors and 60 Female SHS Graduates in the study area

3.4 Sample and Sampling Technique

Sampling Technique is collecting information about some group of people in order to answer the research questions set. Sampling technique is the strategy the researcher applies during the statistical sampling process. A sample is a subset of a larger group called the population (Fink, 2003). A sample constitutes the proportion of units selected for investigation from a population. Sampling constitutes the use of definite procedures to select a part of a whole to obtain certain characteristics of the whole (population). Simple random and stratified sampling techniques were used to select a sample for the study. The sample size was determined by obtaining the list of Senior High Schools (SHS) in the Bia West District and the list of SHS were further restricted to the Sefwi Debiso Educational Circuit which finally served as a sample frame. For purposes of the study stratified and simple random sampling techniques were adopted. This is because all members of the study area cannot be studied. Moss (1994) is of the view that you cannot study everyone everywhere doing everything. Stratified sampling technique was used to select the five schools. The researcher first divided the population into sub population (strata). The strata included form 1,2 and 3. After dividing the population, a random sampling method was conducted to select three schools from each sub population, specifically, the fishbowl draw. To get the sample size for each of the strata, the fishbowl simple random was used to select schools from which respondents were selected for the study. For each of the stratum, pieces of paper equal the sample size to be selected from each strata and YES were written on the required number to be sampled by the researcher. In the form 1 class stratum for example, four pieces of paper were used and, YES was written on two pieces of paper. These papers were put into a container and shuffled, and the researcher picked a piece of paper from the container. The process of picking was done until each school had a chance of being picked. After the exercise, all the picked pieces of paper with “YES” written on them were selected. The same procedure

was done for selection of rest of the participated schools. Stratified random sampling technique was employed because it increases the likelihood of representativeness, especially if the sample is not very large (Fraenkel & Wallan, 2006). Stratified sampling method also ensures that the key characteristics of individuals in the population are included in the sample. Each of the five schools represented a strata from which the sample was drawn. Each group was important to be included in the sample of the researcher; as such no group was left out. After this, the researcher employed proportional allocation to ensure that each selected school was allocated the appropriate respondents that corresponds with the number of female students in each school.

Three schools in the circuit area were selected which gave the total sample size. Conscious effort was made to ensure that a fair representation of all corners of the circuit area was achieved, so the schools were far away from each other. Simple random and stratified sampling techniques were used to select a sample size of 400 respondents. This sample size is chosen because the population is variable and will need to measure more of them to make sure to capture the atypical as well as the typical respondents. This consisted of, 35 tutors, 35 municipal education officials, and 35 Non-Governmental Organization officials selected through random sampling, and 25 current female students, 240 female students who have completed school and 30 parents who were literates selected through purposive sampling. A total of 400 respondents were chosen for the study. The names of Senior High Schools which operated in the study areas were Bia Senior High School, Adjoafua Senior High School, Elluokrom Senior High School, and for purposes of economy, proximity and timeliness, these three schools were used for the study in the area. The schools selected were located far from each other. This was done to ensure that data obtained covered a wide area of the study area.

3.5 Sources of Data

The study relied on two main sources of data namely, secondary and primary data. The primary sources were the first-hand information gathered through the use of a freshly prepared material. Primary data is made up of new materials collected by the researcher for the purpose of the study. Primary data were obtained from the administration of questionnaire. The primary data which served as the source of data is provided in the appendix.

The primary data were gathered from the administration of the structured and semi structured questionnaire to subjects connected to education provision namely, parents, teachers and education office officials. Other subjects were current female students and Senior High School female graduates, municipal staff and Non-Governmental Organizations (NGOs) officials.

Secondary data is made up materials which have been gathered previously and are old. It has the advantage of being inexpensive and easily accessible but sometimes flawed in terms of appropriate data. The secondary data covered a review of relevant literature on the historical development of education, state of female student's interest in mathematics education at the Bia West District of Ghana, and causes of gender disparities in mathematics education in the rest of the world.

3.6 Data Collection Instruments and Procedures

The researcher used questionnaire as the data collection instruments. Self-administered questionnaire was the major instrument that was used to collect the data. Close-ended questions were put together into questionnaire to form the data gathering instrument for the study. Two weeks were used in administering and collecting the questionnaires. Permission was first sought from the managers, headmasters, headmistresses, parents, municipal directorate of education,

NGOs, Senior High Schools and homes of the selected current female SHS graduates of the selected case study area before the questionnaires were administered. Information about females who had completed Senior High School and parents who took part in the study were obtained through purposive sampling from visits to their homes. The response rate for the administration of questionnaire to the subjects was high. Every questionnaire sent out was filled and returned. The reason for the high response rate could be that the set of questionnaires was handed over to the subjects personally and collected when it was completed.

3.7 Validity and Reliability of the Instrument

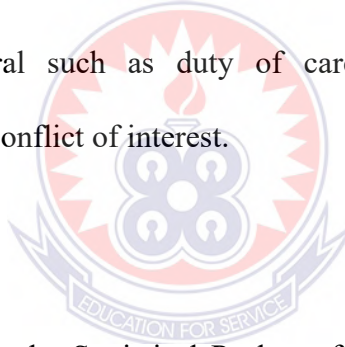
The researcher established the validity of the instrument used before data was collected. To know the content and face validity of the instrument, the questionnaire was given to the supervisor and experts in research to look through it and the necessary corrections made. The reliability of the study addressed the similarity of the results through repeated trials. Reliability is the degree to which a question consistently measures (Gay 1992). Mugenda (1999) defines reliability as the measure to which research instrument yields consisted results after repeated trials. The identified problems were supplied with the instruments and were scored manually by the researcher for the consistency of results. The responses were analyzed after which two weeks period was allowed to pass before the same treatment to be applied to the same respondents and analysis done. The results were recorded accordingly. The questionnaire obtained satisfactory Cronbach Alpha of 0.78

Reliability of an instrument is the degree to which an instrument yields consistency in its results after repeated trials. Different researchers conduct the same observation on the same sample and the correlation between their different sets of results gives similar ratings with my away by just

0.78. To obtain the reliability of the instrument, the questionnaire was administered on the same group of respondents in the pilot study on two separate times and the results between the first and second test correlated to obtain the co-efficient of reliability similar to what the earlier researchers had.

3.8 Ethical issues

Amongst the causes of poor academic performance of female student's in mathematics, which the researchers has noted and many as are attitudes of the learners towards the subject, lack of teaching experience, economic conditions, lack of appropriate teaching methods and low motivation of teachers attitudes, the best method and data was used, shared of information economy professionals in general such as duty of care, confidentiality of information, whistleblowing and avoidance of conflict of interest.



3.8 Data Analysis

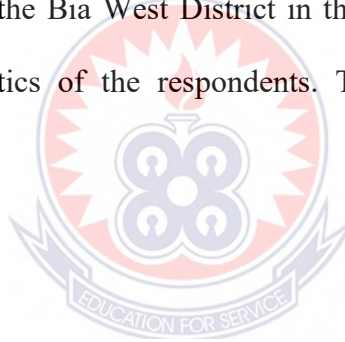
The data gathered was coded into the Statistical Package for Social Sciences (now Statistical Product and Service Solutions) versions 16 and tried also on excel. The analytical procedures utilized include descriptive statistics and correlation analysis (translated into absolute figures and appropriate means and standard deviations. The analysis of data involved editing, coding, categorization, tabulation and interpretation. The analysis revealed unsuspecting errors and omissions which if they had not been corrected, would have posed difficulties in the interpretation of the data. The responses were derived according to the relevant themes of the study

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION

4.0 Introduction

This chapter presents the key analysis and discussions of the study which is derived from the data collected, using SPSS Statistical Software. The findings relate to poor foundation (PF), Mathematics anxiety (MA), Dyscalculia (DC), Practical based (PB), Being Boring (BB), Girls involvement (GI), Female Academic Performance (FAP), Education Reform Programs (ERP) and Local Government Agencies and NGO's Support (LGA). The chapter also discusses how these factors have caused poor academic performance of female students in mathematics in Senior High School education in the Bia West District in the Western North Region of Ghana and the demographic characteristics of the respondents. Table 4.1 shows the demographic characteristics of the respondents.



4.1 Response Rate

A total of 400 questionnaires were sent out to collect data from respondents comprising eighty (80) comprising teachers, Parents and NGO staffs and two hundred and twenty (320) female students at the selected Senior High Schools in the Bia West District, Ghana. However, after the data collection exercise, it was realized that 387 out of the 400 questionnaires sent out were good to be included in the analysis. Whilst some of the questionnaires were not returned, key questionnaires that were critical in meeting the study objectives were not answered on some of the returned questionnaires. In spite of this, 387 questionnaires comprising 78 teachers Parents and NGO staffs and 309 students were deemed good to be used gave a response rate of 86.4%.

According to Bowling (2004), a response rate of 75.0% is good in social science research, though he admits that the higher the response rate, the better the analysis.

4.2 Demographic Data

The demographic data of the respondents were grouped into four categories in one single table and good descriptions were made afterwards. The four categories include; Gender of the respondents, Age of the respondents, Academic qualification of the respondents and position or rank of the respondents as indicated in table 1.

Table 1 : Demographic Characteristics of the Respondents (N=400)

| Variable | Students N (%) | Educational Officials N (%) | Teachers N (%) | Municipals & NGOs N (%) | Parents N(%) |
|-------------------------------|-------------------|--------------------------------|-------------------|----------------------------|-----------------|
| Gender | | | | | |
| Male | 0(0%) | 8(26.6%) | 11(36.6%) | 5(16.6%) | 5(16.6%) |
| Female | 400(100%) | 22(73.3%) | 19(63.3%) | 25(83.3%) | 25(83.3%) |
| Age | | | | | |
| 15-24 | 400(100%) | 0(0%) | 0(0%) | 0(0%) | 0(0%) |
| 25-34 | 0(0%) | 16(53.3%) | 22(73.3%) | 11(36.6%) | 18(60%) |
| 35-44 | 0(0%) | 10(33.3%) | 6(20%) | 13(43.3%) | 7(23.3%) |
| 45-54 | 0(0%) | 3(10%) | 2(6.67%) | 4(13.33%) | 5(16.67%) |
| 55-64 | 0(0%) | 1(3.3%) | 0(0%) | 2(6.6%) | 30(100%) |
| Academic Qualification | | | | | |
| Student | 300(66.6%) | 0(0%) | 0(0%) | 0(0%) | 0(0%) |
| SSCE/ WASSCE | 100(33.33%) | 0(0%) | 0(0%) | 0(0%) | 27(90%) |
| BECE | 0(0%) | 0(0%) | 0(0%) | 0(0%) | 2(6.6%) |
| Diploma | 0(0%) | 45(15%) | 23(76.6%) | 0(0%) | 0(0%) |
| Bachelors' Degree | 0(0%) | 11(36.6%) | 7(23.3%) | 21(70%) | 1(3.3%) |

| Position/Rank | | | | | |
|----------------------|------------|----------|-----------|-----------|----------|
| Student | 300(66.6%) | 0(0%) | 0(0%) | 0(0%) | 0(0%) |
| SHS Graduate | 100(33.3%) | 0(0%) | 0(0%) | 0(0%) | 0(0%) |
| Security Guard | 0(0%) | 0(0%) | 0(0%) | 0(0%) | 1(3.3%) |
| Sanitation Worker | 0(0%) | 0(0%) | 0(0%) | 0(0%) | 5(16.6%) |
| Commercial Driver | 0(0%) | 0(0%) | 0(0%) | 0(0%) | 3(10%) |
| Farmer | 0(0%) | 0(0%) | 0(0%) | 0(0%) | 21(70%) |
| Sen. Supt | 0(0%) | 0(0%) | 22(73.3%) | 0(0%) | 0(0%) |
| Prin. Supt. | 0(0%) | 5(16.6%) | 8(26.6%) | 0(0%) | 0(0%) |
| Dep. Director | 0(0%) | 7(23.3%) | 0(0%) | 0(0%) | 0(0%) |
| Director | 0(0%) | 1(3.3%) | 0(0%) | 0(0%) | 0(0%) |
| ProgrammeMgr | 0(0%) | 0(0%) | 0(0%) | 9(30%) | 0(0%) |
| . | | | | | |
| Grant Assistant | 0(0%) | 0(0%) | 0(0%) | 4(13.3%) | 0(0%) |
| Reg. Opr. Mgr. | 0(0%) | 0(0%) | 0(0%) | 7(23.3%) | 0(0%) |
| Desk Officer | 0(0%) | 0(0%) | 0(0%) | 10(33.3%) | 0(0%) |

Source: Author's Field Survey, 2022

The variable gender age represents the sex and age of client at the time responding to the questionnaire. For analytical purposes, the age was categorized and the default rate for the various categories was computed. During the period in the questionnaire answering, the minimum age of students was 15 years and the maximum was 24 years. The Educational Officials were between the ages of 25 and 64 years with 16(53.3%) of the 30 respondents who were aged not more than 34 years. 10(33.3%) of the Educational Officials were between the ages of 35 and 44 years. Only 4 respondents were between the ages of 45 and 64 years. The result in the Table 1 also indicates gender categorization of respondents, attributing more of the respondents to being females than males. All the 30 students' respondents were female.

Again it can also be described that, the mix of age and gender groupings of respondents who expressed their opinions on the trend of Girl child education. The four age groupings (15-24, 25-34, 35-44 and 45-54) that most of the respondents fell into were economically active. This

indicates that, from the survey, the ages of the respondents reflect a high rate of the population who are economically active or the potential labour force. The study would therefore attain a diverse description of results as far as the objective is concerned. While there were significantly increased teachers who were between the ages of 25 and 34 years, only 2 representing 6.6% were between the ages of 45 to 54 years. The remaining 20% were between 35 to 44 years old.

In terms of academic qualification, 66.6% of the student respondents were still in the classroom whereas only 33.3% were graduates with a SSCE/WASSCE. Almost all (90%) of the parents were holding BECE, 6.67% were holding BECE and only one, representing 3.3% of the parents was holding a Bachelor's Degree. 15% of the Educational Officials and 76.6% of the Teachers were Diploma Holders. However, it was clear from Table 1 that respondents from the Municipal & NGOs had higher education with the minimum being the Bachelor's Degree (70%) and the maximum being Master's Degree (30%). This is similar with the Educational Officials when more than half of them attributed that they had Master's Degree.

The occupation, position or rank of the respondents became an imperative assessment to ascertain the category of professions that are interested in girl child education in the case study municipality to inform decision making. Table 1 showing the occupation, position or rank of various respondents who answered the questionnaire depicts that, just one of the parents was a security guard. Another 5 of the parents were sanitation workers at Zoomlion Ghana Limited. Again, 3 of the parents were commercial drivers of taxi and 'trotro' cars. Roughly 70% of the parents were farmers. This indicates and confirms that the most the parents had no or little formal education.

The rank of the Educational Official ranged from being Senior through Principal Superintends (16.6%) through Assistant Director (56.6%) and Deputy Director (23.3%) to Director (3.3%). Teachers were either Senior Superintends (73.3%) or Principal Superintends (26.6). Respondents from the Municipals & NGOs like Center of Posterity Interest Organisation (COPIO), Action Aid Ghana and Western North Women Development Foundation (WNWDF), asserted that their positions in the organizations included Programme Manager (30%), Grant Assistant (13.3%), Regional Operations Manager (23.3%) and Desk Officer (33.3%). Discussion of Table 1 shows that efforts were made to sample a cross section of the general stakeholders so that views and results could be generalized. Views from the rest of the people were all captured in this study and logical conclusion was drawn from the opinions.

4. 3 The effect of poor foundation, math anxiety, dyscalculia, practical lesson and lack of interest on academic performance of female students in mathematics.

This indicated on the views of Tutors, Educational officials, Parents, Municipal/District/NGO on how poor foundation, math anxiety, dyscalculia, practical lesson and lack of interest have on the academic performance of female students in mathematics in the Bia West District of Ghana.

4.3.1 Poor foundation (PF)

Table 2 presents how poor foundation in mathematics caused poor academic performance of female students in mathematics in Senior High School at the Bia West District of Ghana. The meaning of each of the variables under consideration was computed. Mean and Standard Deviation were calculated as shown in Table 2. The questions sought to find out how poor foundation causes poor academic performance of female students in mathematics in Senior High

School Education, the issues were considered as 'factors'. The responses to questions provided by the respondents were put together and labeled 'Agree' and 'Disagree'. 'Agree' responses connote the factors have negative causes and "Disagree" responses imply that the factors do not cause poor academic performance of female students in mathematics in Senior High School education. The total means and respective standard deviations generated by the responses were used for the analysis. The results of the analysis are shown in Table 2

Table 2: Responses on Poor foundation (PF)

| Poor foundation | N | Mean | Standard Deviation | Decision |
|------------------------|-----------|-------------|---------------------------|-----------------|
| Female students | 58 | 3.88 | 1.196 | High |
| Tutors | 58 | 3.94 | 1.192 | High |
| Education officials | 58 | 3.92 | 0.986 | High |
| Parents | 58 | 4.08 | 1.217 | High |
| Municipal/District/NGO | 58 | 3.27 | 1.364 | High |
| Average mean | 58 | 3.82 | 1.191 | High |

Note: 1 – 2.44 = Low/Poor; 2.45 – 2.9 = Moderate; 3.0 – 4.0 = High/Good

Source: Author's Field Survey, 2022

The analysis reveals that for Education officials, while a mean of 0.08 of the responses with a standard deviation of 0.986 were against (Disagree) the notion that, poor academic performance of female students in mathematics in education at SHS level is caused by poor foundation, 3.92 of the responses were for (Agree) the notion which give a decision of high. For Tutors, while 0.06 of the mean responses indicated that poor foundation did not influence poor academic

performance of female students in mathematics in Senior High School education a mean of 3.94 indicated that poor foundation influenced poor academic performance of female students in mathematics in Senior High School education. Again, for Parents, while 0.02 of the responses population mean indicated 'Disagree' for the assertion that poor foundation influenced poor academic performance of female students in mathematics in Senior High School education, 4.08 of the mean indicated it did. In short, the analysis of data indicates that poor foundation negatively causes poor academic performance of female students in mathematics in Senior High School education level in the three study areas. The result is in agreement with Fraser, (2009) who said that poor foundation and parental attitudes exercise greater influence than intelligence in a child's education and to be précised Bia West District.

4.3.2 Mathematics anxiety (MA)

Mathematics anxiety has been identified as factor which causes poor academic performance of female students in mathematics in Senior High School education in developing countries.

Table 3 presents how Mathematics anxiety in mathematics caused poor academic performance of female students in mathematics in Senior High School at the Bia West District of Ghana. The meaning of each of the variables under consideration was computed. Mean and Standard Deviation were calculated as shown in Table 3.

The questions sought to find out how mathematics anxiety causes poor academic performance of female students in mathematics in Senior High School Education, the issues were considered as 'factors'. The responses to questions provided by the respondents were put together and labeled 'Agree' and 'Disagree'. 'Agree' responses connote the factors have negative causes and

“Disagree” responses imply that the factors do not cause poor academic performance of female students in mathematics in Senior High School education. The total means and respective standard deviations were generated for analysis. The results of the analysis are shown in table 3

Table 3: Responses on Mathematics Anxiety (MA)

| Mathematics Anxiety | N | Mean | Standard Deviation | Decision |
|----------------------------|-----------|-------------|---------------------------|-----------------|
| Female students | 58 | 2.90 | 0.861 | Moderate |
| Tutors | 58 | 3.94 | 1.192 | High |
| Education officials | 58 | 2.92 | 0.986 | Moderate |
| Parents | 58 | 3.08 | 1.827 | High |
| Municipal/District/NGO | 58 | 3.71 | 0.364 | High |
| Average mean | 58 | 3.31 | 1.046 | High |

Note: 1 – 2.44 = Low/Poor; 2.45 – 2.9 = Moderate; 3.0 – 4.0 = High/Good

Source: *Author’s Field Survey, 2022*

The analysis of data indicates that for Municipal/District/NGO, 3.71 of the mean respondents indicated mathematics anxiety was a factor which causes poor academic performance of female students in mathematics education in Senior High School with 0.364 standard deviation which indicates a high contribution factor. For the Education Officials, 2.92 of the respondents mean indicated that Mathematics anxiety was a factor which causes poor academic performance of female students in mathematics in Senior High School education with a standard deviation of 0.986 of the respondents which answered to a moderate contribution factor. In the Parents view, while 3.08 of the responses mean indicated that Mathematics anxiety was a factor which causes

poor academic performance of female students in mathematics in Senior High School education but, 1.827 value of standard deviation of the responses indicated as high to that assertion. In a nutshell, the incidence of mathematics anxiety is believed to be a greater factor that causes poor academic performance of female students in mathematics in Senior High School education level in the study areas which must be checked and solve. These findings are in harmony with Psacharopoulos (2010) who indicated that in the Middle East and North Africa, religious and socio-cultural traditions such as mathematics anxiety, child bearing and an unwillingness to allow girls to travel long distances have contributed to poor academic performance of female in education in those regions and to be précised Bia West District.

4.3.3 Dyscalculia (DC)

In societies or communities where the practice of calculation by females is ripe, the practice has been identified as a factor which causes poor academic performance of female students in mathematics in Senior High School education. Table 4 presents how Dyscalculia in mathematics caused poor academic performance of female students in mathematics in Senior High School at the Bia West District of Ghana. The meaning of each of the variables under consideration was computed. Mean and Standard Deviation were calculated as shown in Table 4.

The questions sought to find out how dyscalculia causes poor academic performance of female students in mathematics in Senior High School Education, the issues were considered as 'factors'. The responses to questions provided by the respondents were put together and labeled 'Agree' and 'Disagree'. 'Agree' responses connote the factors have negative causes and "Disagree" responses imply that the factors do not cause poor academic performance of female students in

mathematics in Senior High School education. The total means and respective standard deviations are generated for analysis. The results of the analysis are shown in table 4.

Table 4: Responses on Dyscalculia (DC)

| Dyscalculia | N | Mean | Standard Deviation | Decision |
|------------------------|-----------|-------------|---------------------------|-----------------|
| Female students | 58 | 3.62 | 0.921 | High |
| Tutors | 58 | 3.94 | 0.133 | High |
| Education officials | 58 | 2.70 | 0.746 | Moderate |
| Parents | 58 | 2.08 | 1.387 | Low |
| Municipal/District/NGO | 58 | 3.11 | 0.204 | High |
| Average mean | 58 | 3.09 | 0.678 | High |

Note: 1 – 2.44 = Low/Poor; 2.45 – 2.9 = Moderate; 3.0 – 4.0 = High/Good

Source: *Author's Field Survey, 2022*

For female students, 3.62 of the responses mean indicated that dyscalculia causes poor academic performance of female students in mathematics in Senior High School education level in the study areas with a standard deviation of 0.921 of the responses indicated that it does. In the view of the Tutors, 3.94 of the responses mean showed that dyscalculia causes poor academic performance of female students in mathematics in Senior High School level in the study areas, while 0.133 of the responses standard deviation also indicated that it does. In the parents aspect, 2.08 range of the responses mean indicated that dyscalculia causes poor academic performance of female students in mathematics in Senior High School level in the study areas while 1.387 of the responses standard deviation Agreed to that accordingly. From the analysis in Table 4, dyscalculia causes poor academic performance of female students in mathematics in Senior High School

education level in the study areas. This finding is again in tandem with Psacharopoulos (2010) who indicated that in the Middle East and North Africa, religious and socio-cultural traditions on believes such as dyscalculia, contributed to low participation of females in education in those regions. The researcher is of the view that even though Psacharopoulos (2010) did his research in Middle East and North Africa, the findings have shown that dyscalculia is also prevalent in West Africa of which Ghana is involved and to be précised Bia West District.

4.3.4 Practically based (PB)

Certain practices have been identified as factors which causes poor academic performance of female students in mathematics in Senior High School education in developing countries. For purposes of this study, practically based, girls' involvement in family businesses, girls' provision of domestic chores and cost-sharing in education were assumed as 'factors', and an analysis conducted to assess their impact on poor academic performance of female students in mathematics in Senior High School level. Table 5 presents how practically based in mathematics caused poor academic performance of female students in mathematics in Senior High School at the Bia West District of Ghana. The meaning of each of the variables under consideration was computed. Mean and Standard Deviation were calculated as shown in Table 5.

The questions sought to find out how practically based causes poor academic performance of female students in mathematics in Senior High School Education, the issues were considered as 'factors'. The responses to questions provided by the respondents were put together and labeled 'Agree' and 'Disagree'. 'Agree' responses connote the factors have negative causes and "Disagree" responses imply that the factors do not cause poor academic performance of female

students in mathematics in Senior High School education. The total means and respective standard deviations are generated for analysis. The results of the analysis are shown in table 5

Table 5: Practically based (PB)

| Practically based | N | Mean | Standard Deviation | Decision |
|--------------------------|-----------|-------------|---------------------------|-----------------|
| Female students | 58 | 3.26 | 0.628 | High |
| Tutors | 58 | 3.05 | 0.783 | High |
| Education officials | 58 | 2.82 | 0.816 | Moderate |
| Parents | 58 | 3.08 | 1.087 | High |
| Municipal/District/NGO | 58 | 2.71 | 0.904 | Moderate |
| Average mean | 58 | 2.98 | 0.844 | Moderate |

Note: 1 – 2.44 = Low/Poor; 2.45 – 2.9 = Moderate; 3.0 – 4.0 = High/Good

Source: *Author's Field Survey, 2022*

The analysis of data shows that on an average of 1.92 of the responses by parents disagree that it requires a lot of practice was not a factor that causes poor academic performance of female students in mathematics in Senior High School level in the study areas, 3.08 of the responses by same parents agree that it was a factor. For tutors, an average of 1.95 of the responses indicated that the requirement of a lot of practice was not a factor that caused poor academic performance of female students in mathematics in Senior High School level in the study areas but 3.05 of the respondents agrees that it was a factor. For the female students, while 1.74 of the responses indicated 'Disagree' to the fact that it requirement of a lot of practice was a factor that caused

poor academic performance of female students in mathematics education at the Senior High School level in the study areas, an average of 3.26 of the responses indicated it was a factor.

In short, lack of mathematics practicing causes poor academic performance of female students in education at the Senior High School level in the study areas or school. These results agree with the ideology that says that ‘practice makes a man perfect’, so we should always try on things and never feels reluctant.

4.3.5 It has a reputation of being boring (BB)

The next issue considered is the reputation of being boring. The results of the analysis are shown in Table 6. Table 6 presents how Reputation of being boring in mathematics caused poor academic performance of female students in mathematics in Senior High School at the Bia West District of Ghana. The meaning of each of the variables under consideration was computed. Mean and Standard Deviation were calculated as shown in Table 6.

The questions sought to find out how reputation of being boring causes poor academic performance of female students in mathematics in Senior High School Education, the issues were considered as 'factors'. The responses to questions provided by the respondents were put together and labeled ‘Agree’ and ‘Disagree’. ‘Agree’ responses connote the factors have negative causes and “Disagree” responses imply that the factors do not cause poor academic performance of female students in mathematics in Senior High School education. The total means and respective standard deviations were generated for analysis. The results of the analysis are shown in table 4.6

Table 6: Reputation of being boring (BB)

| Being boring | N | Mean | Standard Deviation | Decision |
|------------------------|-----------|-------------|---------------------------|-----------------|
| Female students | 58 | 3.60 | 0.366 | High |
| Tutors | 58 | 2.34 | 1.052 | Low |
| Education officials | 58 | 2.71 | 0.804 | Moderate |
| Parents | 58 | 3.12 | 1.380 | High |
| Municipal/District/NGO | 58 | 3.01 | 0.982 | High |
| Average mean | 58 | 2.96 | 0.917 | Moderate |

Note: 1 – 2.44 = Low/Poor; 2.45 – 2.9 = Moderate; 3.0 – 4.0 = High/Good

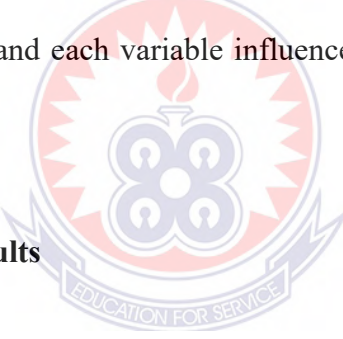
Source: *Author's Field Survey, 2022*

In the female students view, 1.40 of the mean responses indicated that the poor academic performance of female students in mathematics in Senior High School education is not caused as a result of it being a reputation of being boring 'Disagree' but 3.60 of the responses mean indicated that it does 'Agree'. For the tutors view, 2.66 of the mean responses indicated that the poor academic performance of female students in mathematics in Senior High School education is not caused by it being boring 'Disagree' but 2.34 responded that it adversely does 'Agree'. In the parents view, while an average of 3.12 of the responses indicated that the poor academic performance of female students in mathematics in Senior High School education is caused by it being a reputation of being boring 'Agree', only 1.88 of the responses mean indicated it does not 'Disagree'. In short, the analysis revealed that the reputation of being boring adversely cause poor academic performance of female students in mathematics in Senior High School education as indicated by Parents, Tutors and the female students as well.

4.3.6 Correlation Analysis

Correlation is concern with describing the strength of relationship between two variables. In this study the correlation co-efficient analysis was undertaken to find out the relationship between how the causing factors discussed correlate to each other on the academic performance of female students in mathematics education. Statistically, the study found a positive significant correlation between the variables ($r = .818$, $p < 0.05$) The results of Pearson's correlation coefficient further show a positive relationship between the causes of poor academic performance of female students in mathematics education ($r = .647$, $p < 0.05$). As a rule, the correlation coefficients between 0 and 0.30 marks a weak correlation, from 0.30 to 0.70 a moderate correlation, and between 0.70- 1.0 an elevated correlation. Table 7 shows the amount of relationship that exists between the variables themselves and each variable influences on Academic Performance (AP) on female student.

Table 7: correlation Analysis Results



| Variables | PF | MA | DC | PB | CS | BB | GI | FAP | ERP | LGA | AP |
|-----------|----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| PF | 1 | 0.562 | 0.531 | 0.553 | 0.512 | 0.513 | 0.502 | 0.511 | 0.532 | 0.503 | 0.651 |
| MA | | 1 | 0.503 | 0.551 | 0.530 | 0.541 | 0.511 | 0.562 | 0.502 | 0.514 | 0.793 |
| DC | | | 1 | 0.543 | 0.512 | 0.503 | 0.502 | 0.531 | 0.522 | 0.513 | 0.831 |
| PB | | | | 1 | 0.512 | 0.523 | 0.501 | 0.517 | 0.530 | 0.509 | 0.724 |
| CS | | | | | 1 | 0.513 | 0.502 | 0.511 | 0.532 | 0.503 | 0.590 |
| BB | | | | | | 1 | 0.513 | 0.502 | 0.520 | 0.532 | 0.683 |
| GI | | | | | | | 1 | 0.531 | 0.502 | 0.551 | 0.702 |
| FAP | | | | | | | | 1 | 0.532 | 0.503 | 0.583 |
| ERP | | | | | | | | | 1 | 0.533 | 0.526 |
| LGA | | | | | | | | | | 1 | 0.676 |
| AP | | | | | | | | | | | 1 |

Correlation is significant at the 0.05 level (2-tailed).

Source: Field Work, Using SPSS-23.0, 2019

Given the results obtained regarding the influence of poor foundation(PF) on the causes of academic performance(AP) of female students' in mathematics, it can be argue that poor foundation plays a significant role in female students' mathematics academic performance with a correlation of 0.651 indicating a strong positive correlation between them which connotes an causative factor. Furthermore, poor foundation in mathematics has a positive effect on female students' mathematics performance. This further strengthens the argument that as students assist their peers in learning mathematics and provide the needed support for mathematics education, it does strengthen their ability to achieve good results in mathematics. These provide the basis that students' cooperative learning of mathematics is necessary for providing conducive environment for further mathematics achievement. The attitude towards mathematics education and achievement could be improved as student poor foundation predicts students' mathematics achievement. The findings further support the assertion that students in cooperative learning tend to achieve higher with fewer errors than their peers who undertake individual mathematics learning. The study further confirms that as students collaboratively study mathematics, the students' level of enjoyment in learning mathematics increases. From the preceding, the result of the study does not support the hypothesis that poor foundation does not predict female students' mathematics education. The study concludes that poor foundation positively and significantly influences students' mathematics academic performance.

The students' mathematics anxiety (MA) was investigated to ascertain its impact on students' academic performance (AP). The correlation analysis results suggested 0.793 which is a strong positive relationship between mathematics anxiety and female students' academic performance.

This further suggests that as female students' anxious in mathematics increases, the students' motivation, how students collaborate in learning mathematics as well as students' academic performance also increase. Also, students' anxiety in mathematics increases as teachers' quality of teaching mathematics increases. The more teachers improve their skills and adopt different strategies that improve students learning outcomes, the more students' anxiety in mathematics decreases. Furthermore, as female students' interest is improved, students' mathematics education increases and significantly predicted.

Thus, the present study rejects the hypothesis that female students' mathematics anxiety does not significantly predict students' mathematics education performance. However, I accept that female students' mathematics anxiety significantly and positively influences female students' academic performance in mathematics education.

The influence of mathematics dyscalculia (DC) in teaching was assessed to determine its influence on the academic performance (AP) of female students' in mathematics. The results suggested 0.831 indicating a strong relationship between female mathematics anxiety in learning mathematics and female students academic performance in mathematics education. The results do not support the hypothesis that dyscalculia in teaching mathematics does not predict students' mathematics achievement.

Thus the alternative that mathematics teachers' dyscalculia positively and significantly influences female students' academic mathematics achievement is accepted. The study further maintains that female students' interest in mathematics is significantly influenced by teachers' quality of mathematics calculation instruction. The findings coincides with the findings by

winheller et al. (2013) which suggest that the teachers' pedagogical content knowledge in mathematics improves the quality of instruction delivered and students' interest in mathematics.

This finding further suggests that recruitment of teachers into the private and public senior high schools and tertiary institutions should take cognizance of the teachers' content knowledge. Mathematics should not be taught by anyone who has taken mathematics as part of his/her tertiary program but rather should be the preserve of those who have been trained to teach mathematics. This will help inculcate the discipline and the love for teaching the subject of mathematics.

Despite the importance of poor foundation, mathematics anxiety, and dyscalculia as significant factors that influence female students' academic performance (AP) in mathematics, we cannot neglect the effect of female students' expression of mathematics being boring (BB) as another important factor that improves female students' academic performance in mathematics. The findings do not support the hypothesis that female students' expression of mathematics being boring does not significantly predict students' academic performance (AP). However, the findings support the alternative claim that female expression of mathematics being boring predicts female students' academic performance in mathematics.

4.3.7 Girls' involvement in the provision of domestic chores (GI) and Cultural Practices

Furthermore, the study sought to find out how the involvement of girls in the provision of domestic chores and cultural practices causes poor academic performance of female students in mathematics in education at the Senior High School level. Table 8 presents how Girls

involvement in the provision of domestic chores and cultural practices caused poor academic performance of female students in mathematics in Senior High School at the Bia West District of Ghana such as Some chores in schools are only for females (sweeping, cleaning, serving of staffs etc) where with the moment the males will have that as an opportunity to study whiles in addition to, females observing menstrual period mostly do not come to school and even if they come, they are not allowed to do certain things The meaning of each of the variables under consideration was computed. Mean and Standard Deviation were calculated as shown in Table 8. The questions sought to find out how girls involvement in the provision of domestic chores and cultural practices causes poor academic performance of female students in mathematics in Senior High School Education, the issues were considered as 'factors'. The responses to questions provided by the respondents were put together and labeled 'Agree' and 'Disagree'. 'Agree' responses connote the factors have negative causes and "Disagree" responses imply that the factors do not cause poor academic performance of female students in mathematics in Senior High School education. The total means and respective standard deviations were generated for analysis. The results of the analysis are shown in table 8

Table 8: Girls' involvement in the provision of domestic chores (GI) and cultural practices

| Girls involvement | N | Mean | Standard Deviation | Decision |
|--------------------------|----------|-------------|---------------------------|-----------------|
| Female students | 58 | 3.90 | 0.676 | High |
| Tutors | 58 | 1.44 | 1.832 | Low |
| Education officials | 58 | 2.91 | 0.701 | Moderate |
| Parents | 58 | 3.42 | 1.770 | High |
| Municipal/District/NGO | 58 | 3.10 | 0.892 | High |

| | | | | |
|---------------------|-----------|-------------|--------------|-----------------|
| Average mean | 58 | 2.95 | 1.174 | Moderate |
|---------------------|-----------|-------------|--------------|-----------------|

Note: 1 – 2.44 = Low/Poor; 2.45 – 2.9 = Moderate; 3.0 – 4.0 = High/Good

Source: *Author's Field Survey, 2022*

The analysis revealed in Table 8 shows that only 0.10 mean responses of female students indicated that girls' involvement in their family domestic services do not (Disagree) cause poor academic performance of female students in mathematics in education at the Senior High School with a standard deviation of 0.676 but 3.90 of the mean responses of the female students indicated that it does (Agree) cause at the Senior High School which indicates high. In the views of the Municipal/District/NGO, 0.90 of the mean responses indicated girls' involvement in their family domestic services do not (Disagree) cause poor academic performance of female students in mathematics in education at the Senior High School while 3.10 of the responses mean indicated that it causes females in mathematics education with a decision of high. For parents, while 1.58 of the mean responses indicated that girls' involvement in their family domestic services do not (Disagree) cause poor academic performance of female students in mathematics in education at the Senior High School, 3.42 of the responses mean indicated that it cause (Agree) female mathematics performance in education at the Senior High School. In a nutshell, girls' involvement in their family domestic services causes poor academic performance of female students in mathematics in education at the Senior High School level in the views of the female students but it is not so to the Parents and NGO/District/Municipal. The role played by girls at home has been implicated as contributing to poor female mathematics performance at school. Most girls were tasked to provide domestic services in the form of cooking, care of siblings as training for their future roles as wives and mothers. However the results from the female students contrasted with Simon and Alexander (2009) who postulated that girls' involvement in

their family domestic services affects female mathematics performance in education, and this may be as a result of the parents of females in the study area's ability to manage their household chores without affecting the education of their girl child.

4.4 The effect of school-environment conditions on the academic performance of female students in mathematics.

The impact of school-environment conditions on the academic performance of female students in mathematics connotes with the influence of the teaching ability of the teacher, perceptions given by the peers and on which time mathematics subjects are been taught on their time table which affects the academic performance of female students in mathematics.

4.4.1 School-Environment Conditions

For purposes of the analysis, female academic performance in mathematics, female performance in mathematics studies and teacher attitude and questioning techniques were assumed as 'factors', and an analysis of the collected data was carried out to assess their impact on academic performance of female students in mathematics in education at the Senior High School level.

4.4.2 Female academic performance in mathematics (FAP)

Table 9 presents how Female academic performance in mathematics caused poor academic performance of female students in mathematics in Senior High School at the Bia West District of Ghana. The meaning of each of the variables under consideration was computed. Mean and Standard Deviation were calculated as shown in Table 9.

The questions sought to find out how female academic performance in mathematics causes poor academic performance of female students in mathematics in Senior High School Education, the issues were considered as 'factors'. The responses to questions provided by the respondents were put together and labeled 'Agree' and 'Disagree'. 'Agree' responses connote the factors have negative causes and "Disagree" responses imply that the factors do not cause poor academic performance of female students in mathematics in Senior High School education. The total means and respective standard deviations were generated for analysis. The results of the analyzed data on female academic performance are shown in Table 9.

Table 9: Female academic performance in mathematics (FAP)

| Female Academic performance | N | Mean | Standard Deviation | Decision |
|------------------------------------|-----------|-------------|---------------------------|-----------------|
| Female students | 58 | 3.60 | 0.366 | High |
| Tutors | 58 | 2.34 | 1.052 | Low |
| Education officials | 58 | 2.71 | 0.804 | Moderate |
| Parents | 58 | 3.12 | 1.380 | High |
| Municipal/District/NGO | 58 | 3.01 | 0.982 | High |
| Average mean | 58 | 2.96 | 0.917 | Moderate |

Note: 1 – 2.44 = Low/Poor; 2.45 – 2.9 = Moderate; 3.0 – 4.0 = High/Good

Source: *Author's Field Survey, 2022*

In the female students view, 1.40 of the mean responses indicated that the poor academic performance of female students in mathematics in Senior High School education is not caused as a result of female academic performance 'Disagree' but 3.60 of the responses mean indicated

that it does 'Agree'. For the tutors view, 2.66 of the mean responses indicated that the poor academic performance of female students in mathematics in Senior High School education is not caused by female academic performance 'Disagree' but 2.34 responded that it adversely does 'Agree'. In the parents view, while an average of 3.12 of the responses indicated that the poor academic performance of female students in mathematics in Senior High School education is caused by female academic performance 'Agree', only 1.88 of the responses mean indicated it does not 'Disagree'. In short, the analysis revealed that female academic performance adversely cause poor academic performance of female students in mathematics in Senior High School education as indicated by Parents, Tutors and the female students as well. In short, the analysis that, the academic performance of female students did not affect their participation in education at the Senior High School level is reveals that female academic performance affects female performance in mathematics in education at the Senior High School level. The analysis has shown that a child's educational attainment is related to the child's level of intelligence as stated by Tadoro, (1980) cited in Zewide, (1994).

4.5 The role of the Bia West District, parents, school authorities, NGOs and other stakeholders in improving female students' academic performance in mathematics.

There are some measures that the Bia West District, parents, school authorities, NGOs and other stakeholders can adapt to improve female students' academic performance in mathematics in the District as to implement Sub-agencies interventionist support measures.

4.5.1 Sub-Agencies Interventionist Support Measures

Municipal and Non-Governmental Organizations (NGOs) provide assistance to schools in the form of exercise books, library books, scholarships or bursaries or indirectly construct school buildings, libraries. The study analyzed the collected data to find out the impact of the activities of the two bodies on female mathematics education at the Senior High School level. For purposes of the study, 'support package' was considered as any social enhancement program like scholarship/bursary or academic/moral improvement program instituted by any agency or body intended to support female education at the Senior High School level. Table 10 presents how Local Government Agencies and NGOs Support Package caused poor academic performance of female students in mathematics in Senior High School at the Bia West District of Ghana. The meaning of each of the variables under consideration was computed. Mean and Standard Deviation were calculated as shown in Table 10.

The questions sought to find out how Local Government Agencies and NGOs Support Package causes poor academic performance of female students in mathematics in Senior High School Education, the issues were considered as 'factors'. The responses to questions provided by the respondents were put together and labeled 'Agree' and 'Disagree'. 'Agree' responses connote the factors have negative causes and "Disagree" responses imply that the factors do not cause poor academic performance of female students in mathematics in Senior High School education. The total means and respective standard deviations were generated for analysis. The results of the analysis are shown in table 10

Table 10: Local Government Agencies and NGOs Support Package

| Local Government | N | Mean | Standard Deviation | Decision |
|-------------------------|-----------|-------------|---------------------------|-----------------|
| Female students | 58 | 3.60 | 0.366 | High |
| Tutors | 58 | 2.34 | 1.052 | Low |
| Education officials | 58 | 2.71 | 0.804 | Moderate |
| Parents | 58 | 3.12 | 1.380 | High |
| Municipal/District/NGO | 58 | 3.01 | 0.982 | High |
| Average mean | 58 | 2.96 | 0.917 | Moderate |

Note: 1 – 2.44 = Low/Poor; 2.45 – 2.9 = Moderate; 3.0 – 4.0 = High/Good

Source: *Author's Field Survey, 2022*

In the female students view, while 3.60 of the responses mean and 0.366 standard deviation indicated that the three Assemblies and Non-Governmental Organizations initiated specific social support programs to support female students performance in mathematics education (Agree) only 0.40 of the mean responses indicated that the three Assemblies and Non-Governmental Organizations did not (Disagree) initiate any specific social support programs to support female students performance in mathematics education indicating High. For the Municipal/District/NGO, while 3.01 of the mean responses and a standard deviation of 0.982 indicated that the three Assemblies and Non-Governmental Organizations initiated specific social support programs to support female students' performance in mathematics education (Agree), 1.99 of the responses mean indicated that it did not (Disagree) initiate any specific social support programs to support female students' performance in education. Tutors viewed that, while 2.34 of the mean responses indicated that the three Assemblies and Non-

Governmental Organizations initiated specific social support programs to support (Agree) female students performance in mathematics education, an average of 2.66 of the responses mean indicated the three Assemblies and Non-Governmental Organizations did not (Disagree) initiate any specific social support programs to support female students performance in mathematics education that it did not initiate any specific social support programs to support female students performance in mathematics education at the Senior High School level unlike the government that has been doing a lot to support female and male students performance in mathematics at school which is buttressed by McWilliam and Kwamena-Poh, (1958) who stated that since 1925, female education has received official recognition and backing in the educational policy of this country. They opined that Guggisberg's Sixteen Principles helped to put female education in the national context. Two of the sixteen principles (4 and 2) advocated equal opportunities for both boys and girls in basic education and the provision of secondary education with an educational standard that will help young men and women to enter a university. Based on these findings, the researcher thinks that NGOS and the Assemblies should play a significant role in promoting female students performance in school as they operate in the communities.

4.5.2 Roles of the individual agencies in supporting the academic performance of female students in mathematics at the Bia West District.

There are some measures that the Bia West District Assembly, parents, school authorities, NGOs and Tutors agreed to adapt/implement in order to improve female students' academic performance in mathematics in the District.

4.5.2.1 District Assembly

The Assembly made a provision to provide assistance to schools in the form of scholarships or bursaries or indirectly construct school buildings, libraries, and with this scholarship package will encourage the female child to take her mathematics subject serious, to learn in order to enhance the performance of the female students since there is a sponsorship package for further academic continuation into the tertiary level.

4.5.2.2 Parents

Parents also made a huge impact on the savage of female students' education in mathematics in the District by making a provision to assist the female child with extra classes in mathematics subjects and also provide them with text books, which will help to improve the performance of the female students and also combat the problem in the District.

4.5.2.3 School Authorities

For purposes of the study, school Authorities also was factored as an agent that can help to this problem in the District. School Authorities agreed to give an award every academic year and also give special attention to female students with good performance in mathematics and also motivate the less performing once in order to support female mathematics education at the Senior High School level in the District.

4.5.2.4 Non-Governmental Organizations (NGO's)

The Non-Governmental Organization (NGO's) made a provision to provide assistance to schools in the form of organizing mathematics quiz competition among the S.H.S in the District and award the female participants from each school package, which will encourage the female child to take their mathematics subject serious, to learn in order to enhance the performance of the

female students since there is a package for further academic continuation into the tertiary level and also to represent the District in any competition outside the District.

4.5.2.5 Tutors

Tutors also made a thought on the problem of female students' education in mathematics in the District by making a provision to assist the female child with different methodology when teaching mathematics subjects and also change attitude which will make them fear at mathematics lessons, which will help to develop interest in mathematics, and will improve the performance of the female students and also combat the problem in the District.

4.5.2.6 Summary

In conclusion, each agent in the District as been Tutors, Educational officials, Parents, Municipal/District/NGO has indicated a role and support on the causative factors indicated in the District by the female students in the research as to be poor foundation, math anxiety, dyscalculia, practical lesson and lack of interest which caused the poor academic performance of female students in mathematics in the Bia West District of Ghana. And with each individual providing to as indicated in the discussions to females will help up to solve this problem.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This chapter presents summary of findings, the recommendations and the final conclusion of the study based on the key findings. Specifically, appropriate recommendations have been made to address the factors that have caused and affected female performance in mathematics in secondary education as discussed in Chapter Four in a bid to achieve a sustainable level of female performance in Senior High School education in the Bia West District. The recommendations made are based on the set objectives outlined in the study.

5.1 Summary of the Findings

Taking into consideration, the analysis of data in the previous chapter, it can be deduced that, the study came out with these findings.

Poor foundation, Mathematics anxiety, dyscalculia directly correlate with academic performance of female students' in mathematics at Senior High School education in the Bia West District. Again, poor foundation and reputation of being boring, and the incidence of practically based have no direct relationship with female students' performance in mathematics at the Senior High School level. Furthermore, some cultural practices such as menstrual periods and some chores on females has negative influence on female students' performance in mathematics in Senior High School education.

There is a causal link between girls' involvement in domestic services and female mathematics performance in Senior High School education in Bia Senior High School.

Also, the involvement of girls in their family occupational activities like trading has a positive relationship with female students' performance in mathematics at Senior High School education in Adjoafua and Elluokrom Senior High Schools in the Bia West District.

5.2 Conclusions

In conclusion, it is worthy to note that circumstances differ from place to place and the social terrain being dynamic keeps changing from time to time just as the factors which precipitate events in the social milieu also change status from time to time. The study has revealed that factors such as poor foundation, mathematics anxiety, girls' involvement in home management services and the act of questioning students in schools which some scholars postulated as significant factors which negatively affect female students performance in mathematics in education turned out to be insignificant influences and non-starter factors in the issue of female students participation/performance in mathematics in education at the Senior High School level in the case study area or schools in the Bia West District. The study, however, revealed that poor foundation, mathematics anxiety, dyscalculia, practically based, reputation of being boring, poor female academic performance, low female performance in mathematics studies, girls' involvement in family business, government educational policies and weak institutional social support at the local level turned out as significant factors that causes poor academic performance of female students in mathematics at the Senior High School level in the study areas. This latter group of factors has negatively caused poor academic performance of female students in mathematics in education at the Senior High School level in Bia West District and has contributed to the whole saga of low female students' performance in mathematics in Senior High School education in this country.

From the findings, it can be concluded that a combination of attitudinal, socio-cultural, economic, political, operational and institutional factors have conspired to restrict female students performance in mathematics in education at the Senior High School level in the study areas. As a way out of the problem, a number of recommendations have been made which if accepted and implemented by policy makers, policy implementing agencies, social support groups and parents as a whole would help to correct the lapses that have plagued female mathematics education at the Senior High School level in the three case study schools in Bia West District and help to improve female students participation/performance in mathematics in education to acceptable levels in the country as a whole.

5.3 Recommendations

The factors that cause poor academic performance of female students in mathematics in Senior High School education relate to poor foundation, mathematics anxiety, dyscalculia and practically based, socio-cultural practices, socio-economic conditions, school-environment conditions and institutional policy practices. Any efforts directed towards promoting and achieving sustainable female students' performance in mathematics in secondary education would require multiple perspectives and multi-sectorial approaches including policy changes to correct these shortcomings in the society.

5.3.1 Parental attitudes, behavioral and interest patterns, and perceptions

Firstly, parents should have positive attitude and outlook towards female education and always encourage girls to adopt successfully educated women both near and far in the society as role models. Additionally, parents should often collaborate with school authorities to organize durbars and open-days for students. Some successfully educated women in the communities and

outside could be invited to share their experiences or talk with the girls. Also, parents should always endeavour to provide their daughters' schools needs such as provisions, mathematics textbooks, pamphlets, stationery and up-keep money because the failure to do so make girls feel unhappy in school and tends to affect their performance in mathematics in school.

5.3.2 School-environment conditions

Secondly, improved female academic performance will contribute to improved female academic performance in mathematics in Senior High School education, and will enhance female training and skill acquisition in the country. The government should amend the national curriculum designed for Senior High Schools to incorporate a new formulation of the concept of “remedial tuition”. The government should formulate a policy that would expand the scope of remedial tuition to serve the needs of weak students and provide extra tuition for female students. It is suggested that a Remedial Tuition Scheme should be incorporated into the national curriculum of the Senior High Schools. The scheme should make provision for additional teaching hours of at least two and at most three hours of tuition for three days each in every week.

It is also suggested that the government should pay an allowance of ten Ghana Cedis (GH¢ 10.0) per teacher per week in the Senior High Schools to compensate for the extra man-hours they would spend on the remedial tuition because head teachers and heads of institutions in the Ghana Education Service currently receive responsibility allowances between GH¢ 20.0 and GH¢ 30.0 from the government (Payment of Allowances to Heads of Schools, 2008, Bia West District Education Directorate).

Additionally, the government should institute a mathematics Scheme for female education with support from industries and organizations. The scheme should give recognition and support to all female students and female teachers in the field of mathematics. Female students in Senior High Schools who excel in science and mathematics should be given awards and a support package of financial award and study material to encourage them to pursue mathematics in their education.

5.3.3 Political and institutional policies of government

Thirdly, for the nation to derive the expected benefits of female mathematics education, it is suggested that the government should formulate a policy of selective admission with elements of affirmative action for female students at the Senior High School level in the country. Currently, any candidate who obtains a total aggregate between 6 and 30 is deemed qualified to be admitted to pursue a program of study at the tertiary level. For purposes of economy, the government should incorporate this selection procedure into the Computerized School Selection and Placement System (CSSPS) at the Secondary school level and any other admission selection procedures for tertiary institutions other than the universities and lower the qualifying entry grades to 35 for girls. It is worthy to note that the universities have already instituted the policy of affirmative action on their own volition in the admissions of students. What needs to be done at the university level regarding female admission is that the government should appoint a committee of officials from the Universities, Polytechnics, Ministry of Education, Youth and Sports, Ghana Education Service and eminent Ghanaians. The Committee members should be mandated to visit institutions that implement the program to check its implementation, and if lapses are found the Committee should make recommendations to the government to apply the necessary regulatory measures to ensure that the scheme operates smoothly.

Alternatively, government should enact a policy that will ensure gender equity in the admission of girls at the Senior High School level. For instance, the government should introduce a quota system in the admission of students into tertiary. One way equity can be achieved is to spell out the admission of Senior High School graduates on a fifty: fifty (50:50) or fifty-five: forty-five (55:45) male-female bases to ensure that girls with lower pass grades are admitted. Another way to achieve gender equity is to operate special tertiary Universities for female students who do not meet the admission entry requirements. Girls who will be admitted to these tertiary Universities with lower grades should undergo an initial one year tune-up tuition after which they can join the mainstream of University. This means that if the tertiary program is four years, this group of female students will pursue their course in five years. Both parents and government will need to make sacrifices to achieve the objectives of such a program.

In addition, government's policies should give recognition to the issue of female education at all levels in the education sector of this country. The government should formulate a policy that would accord female mathematics education at the Senior High School level greater attention such as issues of prudent economic management of the national economy, low-cost health finance provision (health insurance) and energy matters have occupied central positions in the activities of political parties in the country. Political parties should formulate policies on female mathematics education in their manifestos. Each party should spell out the nature of the problem, measures it will employ to solve the problem at each level and how it will mobilize resources to deal with the problem. The policies of parties should be tabled on the political platform of the parties for scrutiny by the general public so that the issues which will emanate from the discussions will inform the decisions of the electorate whether to vote for or vote against a party in the general elections.

Again, government should set up a separate fund with contributions from government, private individuals and institutions within the country solely for financing female mathematics education in the country. The fund could serve the purpose of providing financial support for the organization of sensitization programs such as durbars, seminars and talks on the relevance of female mathematics education, provide scholarship or bursaries for girls who excel in their studies, pay tutors who will organise extra tuition for female students as stated earlier on and purchase materials and equipment for female students.

5.3.4 Government sub-agencies and non-governmental organizations

District/Municipal/Metropolitan Assemblies should show more commitment to the development of education at the Senior High School level than they are doing now. Currently, the Assemblies spend a lot of their development budget on education at the basic level as stated earlier on. Firstly, the Assemblies should increase their share of development assistance to education for female mathematics education at the Senior High School level. Most of the Senior High Schools do not have adequate on-campus residential accommodation or facilities for girls. The Assemblies should now focus their attention on the provision of residential accommodation in the form of dormitory facilities to increase female intake in the Senior High Schools.

Secondly, the Assemblies should establish a scholarship scheme for female mathematics education. From the scheme, financial assistance could be given out to support girls who enroll in the Senior High Schools. Every year, provisions and stationery items could be supplied to all female students from the scheme. Additionally, the Assemblies should collaborate with school authorities at the local level to establish night schools for girls who have completed Junior High

School or Senior High School who did not obtain the entry requirements to enter Senior High Schools or tertiary institutions. The purpose of the night schools is to organize and conduct remedial classes for these girls to enable them improve upon their performance to further their education.

The municipality should take steps to attract Non-Governmental Organisations to their operational areas. The District should enter into collaborative programs with NGOs to provide study materials such as mathematics textbooks, pamphlets and stationery for girls. Alternatively, NGOs should develop programs which will bring parents, school authorities, female students and officials of the Assemblies together to discuss issues related to female education such as girls' welfare, academic performance and human rights at the Senior High School level.

Besides, NGOs should organize talks and seminars at certain times for parents, girls and government officials at local and national levels to sensitize the roles and responsibilities so that the stakeholders would be empowered to demand changes to policies and practices that might be harmful or retrogressive to female education especially at the Senior High School level whenever necessary.

5.3.5 Mathematics anxiety, early marriage and provision of domestic duties

Lastly, the issue of teenage pregnancy is a multi-faceted problem and this needs a multi-faceted approach to overcome it. Both parents and victims have a role to play to overcome this social and moral challenge in the society. Parents should exercise greater responsibility towards the welfare of their children especially girls. Parents should foster the culture of parent-child interaction in their family relations. Parents, especially mothers should often interact with their daughters to find out their needs, interests and challenges at any time so that they can take immediate steps to solve

any emerging problems their daughters may face in their education. On the part of the victims, it was realized that most of them suffered child-isolation or neglect because they neither had access to, nor the moral courage to discuss their problems with their parents.

School clubs and social groups such as the Virgins' Clubs which seek women's welfare and development should regularly organize workshops for girls on fundamental human rights and advocacy skills. When girls are empowered this way, it will help them to have self-confidence to discuss their problems with their parents. Constant parent-child interface will enable parents to know the problems and needs of their daughters and give quick attention to save them from falling victims to the machinations of unsuspecting but irresponsible people.

5.4 Suggestion for Further Studies

I suggest this study would be extended to the Western North Region as a whole to know both the positive and negative sides of the academic performance of female students in mathematics in order to come out with possible solution to combat this problem in the Region and also further work on the factors and their level of effect of on the female academic performance should be undertaken.

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APPENDICES

APPENDIX I

QUESTIONNAIRE FOR SENIOR HIGH FEMALE STUDENTS AND GRADUATES

This questionnaire is designed to INVESTIGATE THE CAUSES OF POOR ACADEMIC PERFORMANCE OF FEMALE STUDENTS IN MATHEMATICS IN SENIOR HIGH SCHOOL EDUCATION IN BIA WEST DISTRICT OF GHANA. This study is being conducted as part of the requirements for a master's project at the University of Education, Winneba. This research is for academic purpose only so any information given will be treated confidentially. Your response is very important. Please answer all of the questions. The questions have been designed in such a way that you only tick using the scale Agree = "A", Disagree = "D" and where possible you provide brief explanations. I understand that by returning the/this questionnaire, I am giving my informed consent as a participating volunteer in this study. I understand the basic nature of the study and agree that any potential risks are exceedingly small. I also understand the potential benefits that might be realized from the successful completions of this study. I am aware that the information is being sought in a specific manner so that no identifiers are needed and so that confidentiality is guaranteed. I realize that I have the right to refuse to participate and that my right to withdraw from participation at any time during the study will be respected with no coercion or prejudice.

Thanks for spending few minutes of your time to answer these questions.

A) Demographic Data

1. Name of School:

2. Age:

9 – 13 []

14 – 17 []

18 + []

1. Gender:

Male Female

2. Academic Qualification:

Student WASSCE/Graduate

B) Response Data

| S/N | Content Area | A (agree) | D(Disagree) |
|-----|---|-----------|-------------|
| 1 | Is female students' mathematics performance in education important in the development of this country? | | |
| 2 | Is the level of female students' mathematics performance in education at Senior High School (SHS) level in your municipality/School what you expect it to be? | | |
| 3 | Is female mathematics performance in education at SHS level caused by socio-economic practices here? | | |
| 4 | Does the perception or belief that female academic performance is poor affect female student's performance in mathematics education at SHS level in your municipality/School? | | |
| 5 | Is female student's mathematics performance in education at SHS level caused by poor foundation in your municipality/School | | |
| 6 | Should parents bear part of the cost (fees, levies etc.) of providing education at the SHS level in this country? | | |
| 7 | Would you say that beliefs that a woman's role lies in the | | |

| | | | |
|----------|---|--|--|
| | kitchen or in housekeeping cause female student's mathematics performance in education at SHS level in your municipality/School. | | |
| 8 | In your opinion, does poverty cause female student's mathematics performance in education at SHS level in your municipality/School? | | |

C) Explanatory data

9 How does the act of girls performing domestic chores cause female student's mathematics performance in education at SHS level in your municipality/school?

Explain

.....

.....

.....



10 Show how the act of engaging girls in family businesses like trading or farming cause female students mathematics performance in education at SHS level in your municipality/School?

Explain

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.....

11 What role do you expect government to play to improve female students mathematics performance in education at SHS level?

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.....

Stakeholders' data

12 What has the Municipal/School done to improve female students' mathematics performance in education at the SHS level here since 2015?

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.....

13 In order to improve female students mathematics performance in education at the SHS level in your municipality/School what do you suggest these groups should do:

NGOs:

.....
.....

School Authorities:

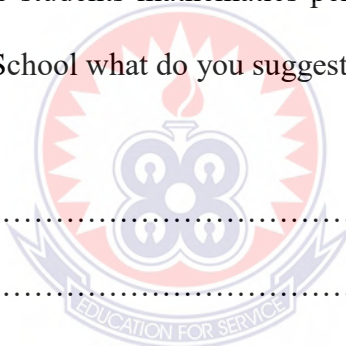
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.....

Parents/Guardians:

.....
.....

Ministry of Education, Science and Sports:

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Municipality:

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End. Thank you, God Bless you



APPENDIX II

QUESTIONNAIRE FOR EDUCATION DIRECTORATE OFFICIALS

This questionnaire is designed to ASSESS THE CAUSES OF POOR ACADEMIC PERFORMANCE OF FEMALE STUDENTS IN MATHEMATICS IN SENIOR HIGH SCHOOL EDUCATION IN THE BIA WEST DISTRICT OF GHANA. This study is being conducted as part of the requirements for a master's project at the University of Education, Winneba. This research is for academic purpose only so any information given will be treated confidentially. Your response is very important. Please answer all of the questions. The questions have been designed in such a way that you only tick using the scale Agree ="A", Disagree ="D and where possible you provide brief explanations.

I understand that by returning the/this questionnaire, I am giving my informed consent as a participating volunteer in this study. I understand the basic nature of the study and agree that any potential risks are exceedingly small. I also understand the potential benefits that might be realized from the successful completions of this study. I am aware that the information is being sought in a specific manner so that no identifiers are needed and so that confidentiality is guaranteed. I realize that I have the right to refuse to participate and that my right to withdraw from participation at any time during the study will be respected with no coercion or prejudice.

Thanks for spending few minutes of your time to answer these questions.

A) Demographic data

1. Gender:

Male [] Female []

2. Age:

25 – 34 [] 35 – 44 [] 45 – 54 [] 55 – 64 []

3. Position/Rank:

Director [] Assistant Director [] Principal Superintendent [] Other []

4. Academic Qualification:

Diploma [] Bachelors' Degree [] Masters' Degree []

B) Response data

| S/N | Content Area | A (Agree) | D (Disagree) |
|-----|---|-----------|--------------|
| 1 | Should female education in mathematics be encouraged in national development efforts in this country? | | |
| 2 | Did the Education Reform Program of 1974 address the issue of female participation/performance in mathematics education at the SHS level? | | |
| 3 | In your opinion did the Education Reform Program of 1986 address the issue of female participation/performance in mathematics education at the SHS level? | | |

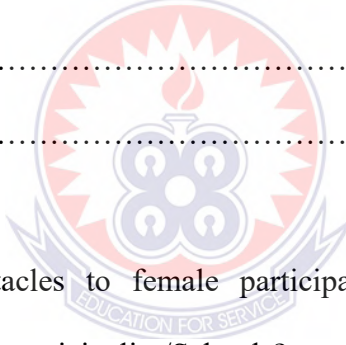
| | | | |
|--|--|--|--|
| | | | |
|--|--|--|--|

5. Assess female participation/performance in mathematics education at SHS level in your municipality/Schools.

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.....

6. How would you like female mathematics academic performance to be like in your municipality/Schools?

Explain:
.....
.....



C) Explanatory data

7. What are some of the obstacles to female participation/performance in mathematics education at SHS level in your municipality/Schools?

Please, list them:

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.....

8. How have these obstacles you listed in question 4 caused female participation/performance in mathematics education at the SHS level in institutions in your municipality/Schools?

9. Explain:

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.....
.....

10. Would you say that policies in the education sector have contributed to low female participation/performance in mathematics education at SHS level over the last four (4) years?

11. Explain:

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.....

12. What should government do to improve female participation/performance in mathematics education at the SHS level?

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13. If your answer to question 2, is “Agree” explain its causes on female participation/performance in mathematics education at SHS level since 1974 in your municipality/Schools.

.....
.....

14. If your answer to question 3, is “Agree” explain its causes on female participation/performance in mathematics education at SHS level since 1986 in your municipality/Schools.

.....
.....

15. What interventions or female-related programs have the Municipal/Metropolitan Assembly introduced to improve female participation/performance in mathematics education at the SHS level here?

.....
.....

16. Has female participation/performance in mathematics education at SHS level improved since the interventions?

Explain:.....

.....
.....

D) Stakeholders data

17. What can these stakeholders do to improve female participation/performance in mathematics education at the SHS level in your municipality/Schools?

NGOs:

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.....

School Authorities:

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Parents/Guardians:

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.....

Ministry of Education, Science and Sports:



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Municipality:

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End. Thank you, God Bless you



APPENDIX III

QUESTIONNAIRE FOR TEACHERS

This questionnaire is designed to ASSESS THE CAUSES OF POOR ACADEMIC PERFORMANCE OF FEMALE STUDENTS IN MATHEMATICS IN SENIOR HIGH SCHOOL EDUCATION IN THE BIA WEST DISTRICT OF GHANA. This study is being conducted as part of the requirements for a master's project at the University of Education, Winneba. This research is for academic purpose only so any information given will be treated confidentially. Your response is very important. Please answer all of the questions. The questions have been designed in such a way that you only tick and where possible you provide brief explanations.

I understand that by returning the/this questionnaire, I am giving my informed consent as a participating volunteer in this study. I understand the basic nature of the study and agree that any potential risks are exceedingly small. I also understand the potential benefits that might be realized from the successful completions of this study. I am aware that the information is being sought in a specific manner so that no identifiers are needed and so that confidentiality is guaranteed. I realize that I have the right to refuse to participate and that my right to withdraw from participation at any time during the study will be respected with no coercion or prejudice.

Thanks for spending few minutes of your time to answer these questions.

A) Demographic data

1. Name of School:

2. Gender:

Male Female

3. Age:

25 – 34 []

35 – 44 []

45 – 54 []

55 – 64 []

4. Rank:

Senior Superintendent [] Principal Superintendent [] Assistant Director [] Other []

5. Academic Qualification:

Diploma []

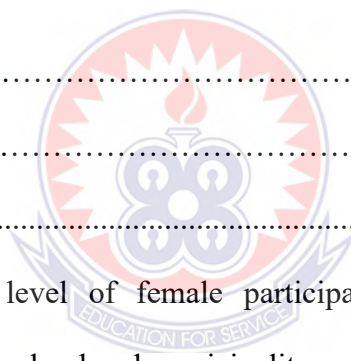
Bachelors' Degree []

Masters' Degree []

B) Response data

6. What role can female mathematics education play in national development efforts of this country?

Explain:.....
.....
.....



18. Are you satisfied with the level of female participation/performance in mathematics education at SHS level in your school and municipality as a whole?

Agree [] Disagree []

If your answer is “Agree”, explain

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.....

19. If your answer is “Disagree”, what are the constraints to female participation/performance in mathematics education at SHS level here?

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.....

C) Explanatory data

20. What is the level of female participation/performance in the study of mathematics-related courses in institutions in your municipality/School?

Explain:.....
.....
.....

21. What are some of the hindrances to female students' participation/performance in the study of mathematics-related courses at SHS level in institutions in your municipality/School?

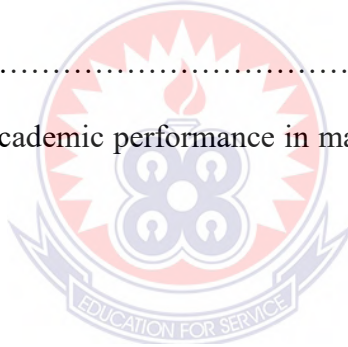
22. Explain:

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.....

23. What is your view of female academic performance in mathematics at the SHS level in your municipality/School?

Explain:

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.....



24. How can female students' academic performance in mathematics at SHS level in schools/institutions be improved in your municipality/School?

25. Explain:

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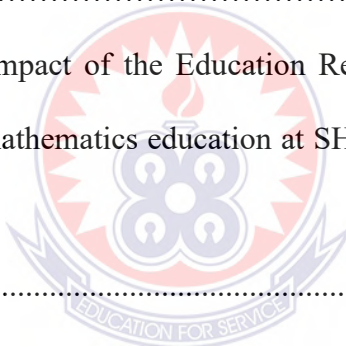
26. Whose responsibility is it to ensure that female participation/performance in mathematics education at the SHS level meets national standards?

Explain:.....
.....
.....

27. In your opinion, was the issue of female participation/performance in mathematics education at the tertiary or SHS level addressed by the Education Reform Programs of 1974 and 1986?

Explain:.....
.....
.....

28. In your view, what was the impact of the Education Reform Program of 1974 on female participation/performance in mathematics education at SHS level here? Explain, please, give specific examples:



.....
.....
.....

29. What has been the impact of the Education Reform Program of 1986 on female participation/performance in mathematics education at SHS level here? Explain, please, give specific examples:

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.....
.....

D) Stakeholders data

30. Suggest means stakeholders can effectively use to address the issue of female participation/performance in mathematics education at the SHS level.

NGOs:

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.....

School Authorities:

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.....

Government:

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.....



End. Thank you, God Bless you.

APPENDIX IV

QUESTIONNAIRE FOR MUNICIPAL AND NGO OFFICIALS

This questionnaire is designed to ASSESS THE CAUSES OF POOR ACADEMIC PERFORMANCE OF FEMALE STUDENTS IN MATHEMATICS EDUCATION IN SENIOR HIGH SCHOOL IN THE BIA WEST DISTRICT OF GHANA. This study is being conducted as part of the requirements for a master's project at the University of Education, Winneba. This research is for academic purpose only so any information given will be treated confidentially. Your response is very important. Please answer all of the questions. The questions have been designed in such a way that you only tick and where possible you provide brief explanations.

I understand that by returning the/this questionnaire, I am giving my informed consent as a participating volunteer in this study. I understand the basic nature of the study and agree that any potential risks are exceedingly small. I also understand the potential benefits that might be realized from the successful completions of this study. I am aware that the information is being sought in a specific manner so that no identifiers are needed and so that confidentiality is guaranteed. I realize that I have the right to refuse to participate and that my right to withdraw from participation at any time during the study will be respected with no coercion or prejudice. Thanks for spending few minutes of your time to answer these questions.

A) Demographic data

1. Name of Municipality/NGO.....
2. Gender:
Male [] Female []
3. Age:

25 – 34 [] 35 – 44[] 45 – 54[] 55 – 64[]

4. Academic Qualification:

SSCE/WASSCE [] Diploma [] Bachelors’ Degree []

Masters’ Degree []

B) Response data

5. Position/Rank:.....

6. How relevant is female education in mathematics is in current national development efforts in this country?

Explain:

.....
.....
.....

7. What are some of the challenges to female participation/performance in mathematics education at SHS level in the municipality?

.....
.....
.....

8. In your opinion would you say that female participation/performance in mathematics education at SHS is constrained by socio-cultural practices or factors such as poor foundation, mathematics anxiety and beliefs that a woman’s role lies in the kitchen or house-keeping?

Agree [] Disagree []

Explain:

.....
.....
.....

C) Explanatory data

9. How have the following perceptions or practices influenced female participation/performance in mathematics education at SHS level in your municipality/School?

Poor foundation:

.....
.....
.....

Beliefs that a woman's role lies in the kitchen

.....
.....
.....



Belief that women perform academically poorly

.....
.....
.....

Mathematics anxiety

.....
.....
.....

10. Is the claim that economic circumstances and practices (e.g. poverty, girls performing domestic chores, engaging girls in family businesses like farming/trading etc) cause female participation/performance in mathematics education at SHS level true?

Agree [] Disagree []

11. If your answer to question 6 is ‘Disagree’, explain.

.....
.....
.....

12. If your answer to question 6 is “Agree”, how have these practices or circumstances caused female participation/performance in mathematics education at SHS level in your municipality/School?

Poverty

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.....
.....



The act of engaging girls in family businesses, e.g. farming/trading

.....
.....
.....

Girls performing domestic chores

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.....
.....

.....

.....

.....

31. Has the Municipal/Metropolitan Assembly any programs that address challenges female students encounter in schooling at the SHS levels here?

Agree [] Disagree []

32. If your answer is “Agree” what have been the effects of these programs on female participation/performance in mathematics education at the SHS level in your municipality/School?

33. Explain:

.....

.....

.....



D) Stakeholders data

34. What can the following stakeholders do to improve female participation/performance in mathematics education at the SHS level in your municipality/School:

Parents/Guardians:

.....

.....

Ministry of Education, Science and Sports:

.....

.....

Municipal/Metropolitan Assembly:

.....

.....

The End. Thank you, God Bless you.



APPENDIX V

QUESTIONNAIRE FOR PARENTS

This questionnaire is designed to ASSESS THE CAUSES OF POOR ACADEMIC PERFORMANCE OF FEMALE STUDENTS IN SENIOR HIGH EDUCATION IN THE BIA WEST DISTRICT OF GHANA. This study is being conducted as part of the requirements for a master's project at the University of Education, Winneba. This research is for academic purpose only so any information given will be treated confidentially. Your response is very important. Please answer all of the questions. The questions have been designed in such a way that you only tick and where possible you provide brief explanations.

I understand that by returning the/this questionnaire, I am giving my informed consent as a participating volunteer in this study. I understand the basic nature of the study and agree that any potential risks are exceedingly small. I also understand the potential benefits that might be realized from the successful completions of this study. I am aware that the information is being sought in a specific manner so that no identifiers are needed and so that confidentiality is guaranteed. I realize that I have the right to refuse to participate and that my right to withdraw from participation at any time during the study will be respected with no coercion or prejudice. Thanks for spending few minutes of your time to answer these questions from the interview guide.

A) Demographic data

1. Sex:

Male [] Female []

2. Age:

25 – 34 [] 35 – 44 [] 45 – 54 [] 55 – 64 []

3. Academic Qualification:

Student [] BECE [] SSCE/WASSCE [] Diploma []

Bachelors' Degree [] Masters' Degree []

4. Occupation.....

B) Response data

5. How relevant is female mathematics education in current national development efforts in this country?

Explain:.....

.....
.....

6. What are some of the challenges to female participation/performance in mathematics education at SHS level in the District?

.....
.....
.....

7. In your opinion would you say that female participation/performance in mathematics education at SHS is constrained by socio-cultural practices or factors such as poor foundation, mathematics anxiety and beliefs that a woman's role lies in the kitchen or house-keeping?

Agree [] Disagree []

Explain:.....

.....
.....

C) Explanatory data

8. How have the following perceptions or practices influenced female participation/performance in mathematics education at SHS level in your municipality/School?

Poor foundation:

.....
.....
.....

Beliefs that a woman's role lies in the kitchen

.....
.....
.....

Belief that women perform academically poorly

.....
.....
.....

Mathematics anxiety

.....
.....
.....

9. Is the claim that economic circumstances and practices (e.g. poverty, girls performing domestic chores, engaging girls in family businesses like farming/trading etc) cause female participation/performance in mathematics education at SHS level true?

Agree [] Disagree []

10. If your answer to question 10 is ‘Disagree’, explain.

.....
.....
.....

11. If your answer to question 10 is “Agree”, how have these practices or circumstances caused female participation/performance in mathematics education at SHS level in your municipality/School?

Poverty

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.....
.....



The act of engaging girls in family businesses, e.g. farming/trading

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Girls performing domestic chores

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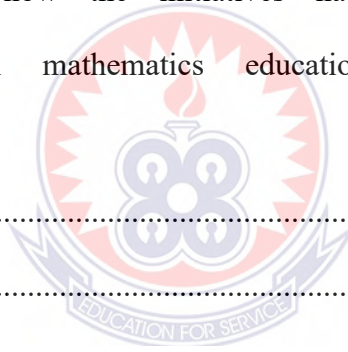
16. What are your expectations about government policies on mathematics education at SHS level?

Explain:.....
.....
.....

17. Did the policy initiatives or measures in the Education Reform Programs of 1974 and 1986 meet your expectations regarding female participation/performance in mathematics education at the SHS level?

Agree [] Disagree []

18. If you “Agree”, explain how the initiatives have helped to improve female participation/performance in mathematics education at SHS level in your municipality/School.



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19. If your answer to question 8 is “Disagree”, state your reservations about the policy initiatives.

1974 Education Reform Program

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1986 Education Reform Program

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20. Has the Municipal/Metropolitan Assembly any programs that address challenges female students encounter in schooling at the SHS levels here?

Agree []

Disagree

[]

If your answer is “Agree” what have been the causes of these programs on female participation/performance in mathematics education at the SHS level in your municipality/School?

Explain:

.....

.....

.....

D) Stakeholders data

21. What can the following stakeholders do to improve female students participation/performance in mathematics education at the SHS level in your municipality/School:



Parents/Guardians:

.....

.....

Ministry of Education, Science and Sports:

.....

.....

Municipal/Metropolitan Assembly:

.....

.....

The End. Thank you, God Bless you.

