

UNIVERSITY OF CAPE COAST

PERCEIVED CAUSES OF LOW ACADEMIC PERFORMANCE OF
SENIOR HIGH SCHOOL STUDENTS IN CORE MATHEMATICS IN THE
KUMASI METROPOLIS

DANIEL ASAMOAH

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KUMASI METROPOLIS

BY

DANIEL ASAMOAH

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Master of Philosophy Degree in Measurement and Evaluation

JUNE, 2018

DECLARATION

Candidate's Declaration

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

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

Name:

Supervisors' Declaration

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

Principal Supervisor's Signature Date

Name:

Co-supervisor's Signature Date

Name:

ABSTRACT

The study explored the perceived causes of low academic performance of Senior High School students in core mathematics in the Kumasi Metropolis. The study used the descriptive survey design with quantitative approach. Multi-stage sampling procedures were used to select a sample of 439 respondents which included 381 students and 58 core mathematics teachers. Students and teachers' questionnaires were used to collect data for the study. Means and standard deviations were used to analyse the data that was gathered. The findings of the study revealed that school-environment factors such as inadequate teaching and learning materials and unavailability of core mathematics textbooks were contributors to the low academic performance in core mathematics. The study also revealed that teacher-related factors such as lateness and absenteeism, inability of teachers to complete their syllabus and prepare their lesson notes contributed to the low academic performance in core mathematics. The study further revealed student-related factors such as lateness and absenteeism, students being unhappy in core mathematics classes, low self-esteem and poor attitudes toward core mathematics as contributors to the low performance in core mathematics. The findings of the study did not show any home-based factors as contributors to the low academic performance in core mathematics. Further analysis showed that students being unhappy and teachers' absenteeism in core mathematics classes had the highest factor loadings. Recommendations were made based on enforcing the necessary laws by stakeholders in education to curb lateness and absenteeism, provision of TLMs, exhibition of good attitudes towards core mathematics and good academic relationship among students and teachers.

KEYWORDS

Academic performance

Home-based factors

School environment factors

Senior High Schools

Student-related factors

Teacher-related factors

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DEDICATION

To Jessica, and my parents: Duku-Brempong and Nkrumah-Brempong

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CHAPTER ONE

INTRODUCTION

In the Kumasi Metropolis, it has been noticed that the academic performance of Senior High School students in core mathematics is low as compared to their academic performance in other core subjects (Educational Management Information System, 2012-2016). With reference to the relevance of core mathematics, the low academic performance in the subject in the metropolis poses relevant questions regarding its cause. This is because, core mathematics is recognised as a core subject in Ghana and thus, students' inability to pass will result in difficulties in progressing to the next educational level. The problem is worth studying because, a lot of concerns have been raised in the metropolis regarding the low academic performance of students in core mathematics. For example, the Metropolitan Director of Education in the Kumasi Metropolis from time immemorial, has been emphasising that the relatively low academic performance of Senior High School students in core mathematics must be taken serious, and come out with the factors that are responsible for it (Educational Sector Performance Report, 2015).

Mefor, (2014), Mensah, Okyere and Kuranchie (2013), Enu, Agyemang and Nkum (2015), among others, have stressed that factors originating from students, teachers, school environment and home affect students' academic performance in mathematics and other subjects. The study is therefore important because it seeks to provide evidence of these and other factors that are perceived as causing the low academic performance of Senior High School

students in core mathematics in the Kumasi Metropolis. This would serve as a policy guideline to curb the problem.

Background to the Study

Globally, education is seen as one of the key components of human and national development (Wambugi, 2014). This is because, education plays a significant role in the political, economic and social development of every country. As noted by Wambugi (2014), education is considered as a critical resource in that it helps a country to particularly equip the youth with respect to knowledge, skills and expertise in enabling them to be actively involved in the development of that country.

In this sense, the ability of a nation to develop largely depends on the availability of quality education to its citizens. The relevance of education that has been underscored globally has paved the way for the Ghanaian economy to put measures in place in ensuring that, its citizens are educated to acquire the necessary skills, knowledge and expertise to aid in the development of the country. The manifest function of education for a developing country like Ghana, therefore, is for the citizens to acquire the skill of literacy and numeracy (Baafi-Frimpong, Yaquarh, & Milledzi, 2016).

Looking at the manifest function of education in Ghana, it is very clear that numeracy, which emphasises computational skills and particularly mathematics, is very important. This is because, mathematics as a subject has a direct relationship with other subjects that are technical and scientific in nature. It is in this view that Unameh (2011) and Tshabalala and Ncube (2013) stressed that mathematics is the bedrock and a tool for scientific, technological and economic advancement of any country. Mathematics is very

vital not only because of the academic qualification one obtains, but also prepares the individual for the future irrespective of the work of life he or she chooses (Davis & Harsh, 2012). It must be pointed out that, mathematics relates to everything in the universe which is connected to the daily life of individuals and thus, it remains the subject that education and humans cannot function meaningfully without (Mefor, 2014).

Mathematics as a discipline is therefore held in high esteem due to its presence in all scientific discoveries (Akinyi, 2003). Notably, radio, television, telegrams, satellites, computers and calculators, among others, would not have come to being without the numerous results in pure mathematics (Akinyi, 2003). The importance of school mathematics is emphasised by its usage in various contexts and thus, people working in the public and private sectors require some basic (core) knowledge of mathematics in their daily endeavours. United Nations Educational, Scientific, and Cultural Organisation's report in science and technology in Africa (1999) maintains that, the development of knowledge and skills in mathematics is quintessential as it holds the key to Africa's industrialisation and poverty alleviation.

In Ghana, mathematics and more specifically, core mathematics is given all the necessary importance regarding the curriculum and all educational policies from the basic level to the secondary level. Sa'ad, Adamu and Sadiq (2014) explain that core mathematics helps the individual to develop basic computational skills which foster the desire and the ability to be accurate in problem-solving and also prepares the mind of the individual to appreciate and understand further mathematics.

In addition, the study of core mathematics helps the individual to develop logical and abstract thinking, recognise problems and provide solutions to, with related mathematical knowledge and also inculcate in the individual the ability to be creative and curious in discovering solutions in their daily lives (Sa'ad at al., 2014). The vital role core mathematics plays has been recognised and that is why in Ghana, core mathematics is a compulsory subject in both basic and secondary schools.

It is worth noting that, in Ghana, core mathematics is a prerequisite subject of study in all tertiary educational institutions that offer scientific and business courses and as a requirement for most employment opportunities. In this regard, a student must obtain a grade from A1 to C6 in West African Senior Secondary School Certificate Examination in order to satisfy the admission requirement in core mathematics into the tertiary institutions. This suggests that, there is the need for students who want to pursue their education in tertiary institutions and secure attractive employment opportunities to perform well in core mathematics. There is therefore the need to put in measures in boosting students' academic performance in mathematics and especially core mathematics.

Unfortunately, in all the priorities attached to core mathematics and the relevance placed on the subject in the academic lives of the students, it remains one of the core subjects in which students perform poorly especially in the West African Secondary School Certificate Examination, and thus, Senior High School students in the Kumasi Metropolis are of no difference (Chief Examiner's Report in Core Mathematics, 2016). As indicated in the Educational Sector Performance Report (2015), students achieve significantly

lower pass rates in core mathematics as compared to Social Studies, Integrated Science and English Language throughout the country of which the Kumasi Metropolis is included.

As indicated in the Educational Management Information System's Report from 2012 to 2016, comparing the pass rate of core mathematics to the pass rate of other core subjects like Social Studies, Integrated Science and English Language, students' academic performance in core mathematics has been very low over years. Specifically, the reports have shown an undesirable and low students' academic performance regarding core mathematics in Senior High Schools and instances where there are appreciations, they are not significant as compared to the other core subjects (EMIS, 2016).

Particularly, it was uncovered that students' performance in core mathematics was not encouraging in 2015 as compared to 2014 and the performance was very low in 2014 as compared to 2013 and this is applicable to years past (Chief Examiner's Report in Core Mathematics, 2016). In addition, in the Kumasi Metropolis, the pass rate of Senior High School students in core mathematics is low as compared to the other core subjects (EMIS, 2016). Specifically, Table 1 depicts the pass rates of Senior High School students in all the core subjects in WASSCE from 2012/2103 academic year to 2015/2016 academic year in the Kumasi Metropolis.

Table 1- *Statistics on the Pass Rates in Core Subjects form 2012/2013 Academic Year to 2015/2016 Academic Year in WASSCE in the Kumasi Metropolis*

Academic Year	Core Subjects	Total Candidates	Pass Rates (A1 – C6)
2012/2013	Core Mathematics	42,516	20,756 (49%)
	English Language	43,833	29,324 (67%)
	Social Studies	43,474	35,648 (82%)
	Integrated Science	42, 854	23,579 (55%)
2013/2014	Core Mathematics	35,660	25,554 (72%)
	English Language	35,660	31,001 (87%)
	Social Studies	35,660	27,337 (77%)
	Integrated Science	35, 660	31,144 (87%)
2014/2015	Core Mathematics	24,076	13, 773 (57%)
	English Language	24,135	17,786 (67%)
	Social Studies	24,909	16,666 (82%)
	Integrated Science	24,109	14,231 (59%)
2015/2016	Core Mathematics	33,355	11007 (48%)
	English Language	32,458	17203 (69%)
	Social Studies	33,122	23517 (70%)
	Integrated Science	33,467	16399 (66%)

Source: EMIS (2012-2016); Ashanti Regional Education Office (2018).

It can be observed from the Table 1 that, students' academic performance in core mathematics over the years has been low as compared to the other core subjects in the Kumasi Metropolis. The ultimate question to ask however, has to do with the causes of the low academic performance students have demonstrated regarding core mathematics in recent years.

It should be emphasised that, the academic performance of students in various subjects of which core mathematics plays a role has resulted in an increased attempt to identify the possible factors responsible for the low academic performance of students. For instance, Anamuah-Mensah (as cited in Adane, 2013) has indicated that the lack of effective supervision and monitoring in schools, lack of motivation for teachers as well as inadequate number of qualified teachers contribute to the poor academic performance of students. Similarly, Etsey (2005) and Baidoo-Anu (2018) stressed that factors relating to the environment of the school, teachers, students, and parents contribute to the low academic performance of students.

Furthermore, factors such as intellectual ability, poor study habit, lack of goals, low self-esteem, low socio-economic status of the family, anxiety, poor family structure, among others are responsible for the low students' academic performance in core mathematics (Enu et al., 2015; Diaz, 2003). With a critical look at the relevance of core mathematics in the lives of students and the economy of Ghana as a whole, and with the factors identified in literature, it is very likely that some of these factors might have caused Senior High School students in Kumasi Metropolis to perform low in core mathematics as compared to the other core subjects over the years. It is against this background that the study has become necessary to explore the perceived causes of the low academic performance of Senior High School students in core mathematics in the Kumasi Metropolis of the Ashanti Region of Ghana.

Statement of the Problem

Students' academic performance in WASSCE with regard to core mathematics in the Kumasi Metropolis of the Ashanti Region and Ghana as a whole is of great concern to all the stakeholders of education. The pass rates students have obtained in core mathematics over the years as indicated in the background have been very low as compared to the other core subjects like Social Studies, Integrated Science and English Language. It must be emphasised that in cases where there is an improvement, it is very insignificant as compared to the other core subjects. For example, the pass rate in core mathematics in 2013/2014 academic year was 72%, the pass rate decreased in 2014/2015 academic year to 57% and further decreased to 48% in 2015/2016 (EIMS, 2016). In actual fact, comparing the pass rates of the other core subjects like English, Integrated Science and Social Studies, Senior High School students in the Kumasi Metropolis have recorded consistently low performance in recent years in core mathematics which have created a lot of concerns.

Looking at the relevance of core mathematics in our educational systems and in the lives of individuals, the low academic performance of students in core mathematics in the metropolis raises critical questions. Prominent among these questions is whether the causes emanate from teachers, students, school environment or parents. These are critical issues which have created a lot of concerns for some time now in the Kumasi Metropolis that need to be addressed.

It must be noted that, numerous factors have been generally underscored as causes of low academic performance of students in core mathematics and

other core subjects especially at the Junior High School level in Ghana. Studies on the topic however are very limited with regard to the Senior High School level in Ghana and especially in the Kumasi Metropolis. For instance, Mefor (2014) has noted that teachers who do not possess the required academic and professional qualifications would consequently have a negative influence regarding the teaching and learning of their subjects. It was further stressed that, teachers who possess the required academic and professional qualification but work under unfavourable terms and conditions would be less dedicated to their work and become less productive than unqualified teachers who work under favourable conditions and terms of service which will consequently affect students' academic performance (Tshabalala & Ncube, 2013).

Similarly, effective supervision of instruction improves the quality of teaching and learning (Tshabalala & Ncube, 2013). This was justified by Etsey (2005) that students in private schools perform better academically than their counterparts in public schools due to effective supervision of work. Another factor that might be responsible for low academic performance of students is motivation. For example, it has been underscored that lack of motivation as well as professional commitment result in low or poor attendance and unprofessional attitudes toward students which consequently lead to low students' performance (Mefor, 2014).

In fact, factors such as availability and use of teaching and learning materials, class size, home-based factors, school environment and parental factors, among others, have been noted to affect students' academic performance (Mefor, 2014; Tshabalala & Ncube, 2013). It should be noted

that, the presence of all or some of the factors identified in literature above, might have caused the low academic performance of Senior High School students in core mathematics in the Kumasi Metropolis in the Ashanti Region of Ghana. Most importantly, it is appropriate to obtain evidence of the factors responsible for the low academic performance of students in core mathematics in the Kumasi Metropolis. It is in this regard that the study has become necessary to obtain evidence of the perceived causes of the low academic performance of Senior High School students in the Kumasi Metropolis of the Ashanti Region of Ghana.

Purpose of the Study

The main purpose of the study was to obtain evidence of the perceived factors that caused the low academic performance of Senior High School students in core mathematics in the Kumasi Metropolis of the Ashanti Region of Ghana. The specific objectives of the study were to explore the perceived:

1. school-environment factors that contribute to the low academic performance of Senior High School students in core mathematics in the Kumasi Metropolis;
2. teacher-related factors that cause the low academic performance of Senior High School students in core mathematics in the Kumasi Metropolis;
3. student-related factors responsible for the low academic performance of Senior High School students in core mathematics in the Kumasi Metropolis; and

4. home-based factors that contribute to the low academic performance of Senior High School students in core mathematics in the Kumasi Metropolis.

Research Questions

The following research questions were formulated in line with the specific objectives:

1. What are the perceived school-environment factors that contribute to the low academic performance of Senior High School students in core mathematics in the Kumasi Metropolis?
2. What are the perceived teacher-related factors that cause the low academic performance of Senior High School students in core mathematics in the Kumasi Metropolis?
3. What are the perceived student-related factors responsible for the low academic performance of Senior High School students in core mathematics in the Kumasi Metropolis?
4. What perceived home-based factors contribute to the low academic performance of Senior High School students in core mathematics in the Kumasi Metropolis?

Significance of the Study

Mathematics as a discipline is quintessential due to its presence in all scientific discoveries and the importance it has on the day-to-day activities of individuals. To achieve the results of high academic performance in core mathematics, there is a particular need to identify and address some possible causes of low academic performance of Senior High School students in core

mathematics. Therefore, the study of the causes of low students' academic performance in core mathematics is significant for several reasons.

In the first place, since the study explores variables like the school environment, teachers, students and home-related factors as well academic performance of students, the study is useful to the Senior High School in the Kumasi Metropolis and Ghana at large in the analysis of factors responsible for the causes of low academic performance of students in core mathematics. The findings of the study are beneficial to all stakeholders in education especially at the Senior High School level to come out with appropriate strategies and policies that will enhance students' academic performance in core mathematics.

In addition, the findings of the study are beneficial to the Ghana Education Service and the Ministry of Education as they provide some guidelines in policy formulation regarding teacher's employment, provision of adequate tools and equipment, supervision, qualifications, teachers' experiences, among others, especially in the field of core mathematics to boost students' academic performance.

Furthermore, the findings of the study are useful to stakeholders of education such as measurement experts, curriculum developers in core mathematics, teachers and learners of core mathematics, school administrators, and guidance and counselling personnel at the Senior High School level and beyond, to be in the know of the factors that are responsible for the low academic performance of students. This will direct the actions of these stakeholders and provide appropriate measures to improve students' academic performance since academic performance is a critical psychological

construct. The study is also useful in the sense that it adds to the body of knowledge regarding the causes of low academic performance of students especially in core mathematics.

Delimitation of the Study

The study was delimited to variables relating to school environment, student-related factors, teacher-related factors, home-related factors as causes of low students' academic performance in core mathematics. In essence, the scope of the study was delimited to the causes of low academic performance of students in core mathematics in public Senior High Schools in the Kumasi Metropolis of the Ashanti Region of Ghana but not private SHS. Furthermore, the scope of the study covered form 2 and 3 Senior High School students in the Kumasi Metropolis. Finally, the scope of this study covered single sex and mixed schools in the Kumasi Metropolis.

Limitations of the Study

A major limitation of the study was the use of questionnaire which does not give in-depth description on respondents' experiences and allow for follow-ups on respondents' responses. It should be indicated that some of the items demanded further probing but the use of the quantitative methodology did not allow that. Furthermore, the quantitative methodology that was used required a large sample size and due to lack of resources, the study was limited to some selected respondents in the four selected schools in the Kumasi metropolis in the Ashanti Region of Ghana. Lastly, the findings of the study resulted from a sample of only four (4) public single sexed and mixed Senior High Schools and thus, generalisation of the findings would be limited in this regard.

Definition of Terms

For the purpose of this study, the following terms were operationally defined:

Academic performance – this refers to a successful achievement of tasks in core mathematics. It particularly refers to the extent a student, teacher or institution has achieved both long term and short term educational goals. It is a strong desire to achieve good grades that would lead to a fulfillment of desired dreams in one's academic life.

Home-related factors – this emphasises how the family is able to provide a tranquil atmosphere or environment, availability of physical materials which encourage learning in the home, provision of textbooks, provision of basic needs, involvement in ensuring that children are monitored and are given the necessary support needed to encourage the academic performance of students.

School environmental factors – this refers to the characteristics, climate and the general atmosphere of the school. It includes the facilities and physical environment of the school that promote the teaching and learning of core mathematics as well as the perceptions students have about their school.

Student-related factors – this refers to the wellbeing of students and the perception students have regarding their school environment, parent support and involvement, efforts in co-curricular activities, incidence of lateness, absenteeism and regularity at school. It also describes language use, enjoyment of teachers' lessons and the help students receive in their studies.

Teacher-related factors – this refers to how committed a teacher is with respect to his or her teaching, experience, qualification, mastery of content knowledge and his or her pedagogical skills, incidence of lateness and

absenteeism, use of language in teaching, completion scheme of work and syllabus, interest in students' understanding, and the work habit of the teacher.

Organisation of the Study

The study was composed of five chapters. Chapter one involved the introduction which covered the background to the study, statement of the problem, purpose of the study as well as research questions. It also presented the significance of the study, delimitation and limitations of the study and definition of terms. The second chapter focused on the review of existing literature in relation to causes of low academic performance of Senior High School students in core mathematics. Specifically, the literature was reviewed in three main blocks namely: theoretical, conceptual and empirical review. The methodology that was used in the study was captured in the third chapter. The chapter provides a description of the research design, population, sample and sampling procedures and data collection instruments. The chapter also captures validity and reliability of the instruments, ethical considerations and field work as well as data processing and analysis. Chapter four presents the results and discussion of the study whereas the fifth chapter focused on the summary, conclusions and recommendations from the findings. The chapter also makes suggestions for further studies.

CHAPTER TWO

LITERATURE REVIEW

Overview

The study sought to explore the perceived causes of low academic performance of Senior High School students in core mathematics in the Kumasi Metropolis of the Ashanti Region of Ghana. The chapter therefore reviewed relevant literature on the topic indicated. The literature review of the study presented the findings, assertions and observations of several writers or authors on the perceived factors causing low academic performance of students in core mathematics. Specifically, the review covers the theoretical framework, relevance of core mathematics, attitudes towards core mathematics, concept of academic performance, academic performance at the basic level, perceived factors that affect students' academic performance in core mathematics and conceptual framework. In addition, empirical studies on the perceived causes of low academic performance of students in mathematics was also captured in this chapter.

Theoretical Framework

This study advances our understanding of the perceived causes of low academic performance of Senior High School students in core mathematics by applying Bronfenbrenner's (1989) and (1995) ecological systems theory and the Achievement Motivation Theory by McClelland, Atkinson, Clark and Lowell (1953) as the theoretical underpinnings of the study. It should be emphasised that these theories were particularly developed to define and

understand the concept of human development regarding the context of relationships that form the environment and the motivation of an individual in his or her academic life respectively.

Achievement Motivation Theory by Atkinson, McClelland, Clark and Lowell

Motivation is defined as the drive to achieve set goals and targets as well as the process to maintain the drive (Singh, 2011). As indicated by McClelland, Atkinson, Clark and Lowell (1953) the achievement motivation theory attempts to account for the determinants of the direction, magnitude and persistence of behaviour in a limited but very important domain of human activities. The concept of achievement motivation applies when a person knows that his or her performance will be evaluated by himself or others in accordance with a certain standard or criteria of excellence (Atkinson & Feather, 1966). In this regard, the consequences of his or her actions will either be favourable evaluation (success) or unfavourable evaluation (failure) and this makes the theory to be referred to as achievement-oriented performance (Atkinson, 1957).

The achievement motivation theory is determined by two opposing forces namely failure and success and thus, the tendency to achieve an activity is dependent on the motivation to undertake that activity (Atkinson & Feather, 1966). Particularly, the tendency to undertake an activity is defined as the product of motive, expectancy and incentive or motivation (Atkinson, 1957). There are two components of this tendency which are the tendency to achieve success (T_s) and the tendency to avoid failure (T_f).

According to Atkinson (1957), the former is explained as the product of the need to achieve success (M_s), strength of expectancy or subjective probability (P_s) and incentives value of success at the activity (I_s) and this is given by: $T_s = M_s \times P_s \times I_s$. Atkinson and Feather (1966) modified the equation as $T_s = P_s \times (M_s \times I_s)$ and emphasised that $(M_s \times I_s)$ is seen as the subject value of success or the utility success. On the other hand, the tendency to avoid failure (T_f) is defined as the product of the motive to avoid failure (M_{AF}), expectancy of failure (P_f) and incentive value of failure (I_f) and this is given mathematically as $T_f = M_{AF} \times P_f \times I_f$. When the two tendencies to achieve success and failure are merged, it results in a measure of resultant-oriented tendency or performance (T_A) which is given by: $T_A = T_s + T_f$ (McClelland et al., 1953).

It should be pointed out that, when the performance (that is, resultant achievement-oriented tendency) is negative, there will be no active interest to undertake a particular achievement-oriented activity (T_A), unless some positive extrinsic tendency to perform (T_{ext}) the activity is added and thus, the modified equation becomes $T_A = T_s + T_f + T_{ext}$ (Atkinson, 1957). In essence, achievement motivation theory describes the tendency to engage in achievement-oriented task which is influenced by motive, expectancy and incentive. It is a model that offers an explanation for the level of performance exhibited in a given task which underscores that performance level should be greatest when there is greatest uncertainty about the outcome (McClelland et al., 1953). This suggests that people with strong achievement motive prefer intermediate and difficult risk and are able to perform well academically while people who want to avoid failure prefer easy and safe undertakings.

Looking at the purpose of the study which seeks to uncover the perceived causes of low academic performance of Senior High School students in core mathematics, the achievement motivation theory is important to the study because, as students aim at passing their core mathematics examinations and improving their academic performance, there is a drive of motivation which determines their direction, magnitude and persistence of behavior towards the learning of core mathematics. It should be said that students are battled with the opposite forces of the tendencies to achieve success and avoid failure. In doing this, it is clear that motivation (both intrinsic and extrinsic) of students toward the teaching and learning of core mathematics is important. In cases where motivation is not properly addressed, it tends to affect the achievement and performance of students as well as teachers and thus, might serve as a considerable factor in affecting students' academic performance.

Bronfenbrenner's Ecological Systems Theory

As contended by Bronfenbrenner (1989), the immediate environment of an individual is made up of four layers of systems and thus, these systems interact in various ways which can affect the total development of that individual. The four layers as indicated by Bronfenbrenner (1989) included the microsystem, mesosystem, ecosystem and macrosystem. The chronosystem was later added which talks about the element of time and thus, the theory can be extended to the development of an organisation and specifically, the theory is appropriate for describing the complex systems of schools, districts or individuals.

Microsystem

The microsystem explains the patterns of activities, roles and interpersonal relationships a developing person experiences in a specific setting. As stipulated by Bronfenbrenner (1995), the microsystem comes with some physical and material characteristics of an individual such as temperament, personality and systems of beliefs. Particularly, the microsystem forms a set of structures which exposes the developing individual to a direct contact and the influences with these structures. In essence, an individual influences and is influenced by the microsystem and thus, the theory is extended from human development to organisational development such as an individual school (Bronfenbrenner, 1995). In this regard, the microsystem of a school includes students, family and parents, administration of the school, teachers and the community (Johnson, 2008).

Mesosystem

According to Bronfenbrenner (1995), this layer emphasises the linkages and relationships between the microsystems. The mesosystem therefore involves a bi-directional influence of the various structures that are located in the microsystems. For instance, the mesosystem of an individual school can be looked at from the perspective of an interaction and dynamics between students and parents (two structures of microsystems). In this sense, the expectations of parents with respect to the academic performance and success in extra-curricular activities of their children can have a direct or an indirect impact regarding the climate of the school.

In another sense, Johnson (2008) stressed that high expectations coupled with low tolerance for failure can result in a relationship of fear and tension

between the parent and the child. This therefore has a direct or indirect impact on the atmosphere or climate of the school due to the fact that, pressures that ensure children's success are bestowed on the school by parents and thus, the school tends to protect students from these pressures from parents by hiding the amount of information that pertains to students' academic performance.

Exosystem

This system specifically denotes the larger social system as well as events, decisions, policies and contingencies which the developing individual has no control or influence (Bronfenbrenner, 1995). It is worth noting that the exosystem places a unidirectional control or influence which indirectly or directly affects the developing individual. Gleaning from the school's situation, the exosystem of a school is made up of structures such as state regulations, local disasters, local economics, laws and district mandates which affect the students and the entire school positively or negatively (Johnson, 2008). In this regard, it can be inferred that factors that emanate from the teachers and the school as causing low academic performance can be considered in the exosystem since the students do not have any control of these factors as affecting their performance.

Macrosystem

The macrosystem depicts the social blueprint of the culture, subculture and the general social context which consists of the pattern of values, lifestyles, customs, beliefs, opportunities and resources of the individuals in the society (Bronfenbrenner, 1995). Just like the exosystem layer, the macrosystem also places unidirectional control or influence on the individual, the microsystem, mesosystem and the exosystem. In essence, the macrosystem

regarding a school is embedded not only in the cultural, political, economic or social climate of the school or the general community but it is embedded in the nation in totality (Bronfenbrenner, 1995). From the Macrosystem, it can be inferred that teacher-related factors, student factors, school environment and home-based factors encompass the macrosystem which are based on the cultural, political and economic systems of the school and the community as a whole.

Chronosystem

The chronosystem which was later discovered by Bronfenbrenner (1995) depicts a time-based dimension that influences the operation of the layers of the ecological systems (that is, microsystem, mesosystem, exosystem and macrosystem). As theorised by Bronfenbrenner (1995), the chronosystem can be short and long-term time dimensions of the individual regarding his or her lifespan in accordance with the socio-historical time dimensions of the macrosystems in which the individual resides. In this regard, the day-to-day and year-to-year activities and developmental changes of a school that relate to its students, teaching and non-teaching staff, content choices and years of operation of the school emphasises the chronosystem of that school.

With reference to the purpose of the study which sought to explore the perceived causes of low academic performance of Senior High School students in core mathematics, one ought to take into consideration the individual student and his or her immediate environment within which he or she lives. This theory is particularly quintessential in that it exposes the researcher to critically view the low academic performance of Senior High

School students in core mathematics as a phenomenon that is influenced by wider social systems.

The theory has carefully outlined that students or children are directly located in some of the social systems such as the household, school, immediate neighborhood and other social systems which they are not directly represented but impinges on their development as individuals. This includes social networks, siblings, parents, workplaces relationship, school environment, among others (Bronfenbrenner, 1995). Furthermore, the theory has emphasised the influence of culture, political systems, social institutions and values of societies as responsible for the educational upbringing of an individual.

It is therefore worth noting that the experiences and influences resulting from the various interactions among the social system as indicated by Bronfenbrenner (1989) and (1995) are quintessential in the determination of the extent to which students are able to perform academically in their respective schools and thus, regarding the construct of ecological theory, the low academic performance of students in core mathematics can be linked with the features of the social systems as identified in the Kumasi Metropolis.

In this sense, the ecological theory as stipulated by Bronfenbrenner (1989) and (1995) is most appropriate for studying the perceived causes of the low academic performance of students in core mathematics in the Kumasi Metropolis. The theory is specifically vital in the sense that it gives a holistic view of the social system and not just an aspect of the system.

With respect to this framework that seeks to explore the perceived causes of low academic performance of Senior High School students in core

mathematics in the Kumasi Metropolis, it is believed that learning outcomes are dependent on the way the teaching and learning processes are conducted and the entire environment in which learning takes place. It is therefore expected that the low academic performance of Senior High School students in core mathematics in the Kumasi Metropolis would be affected by factors emanating from the school environment, teachers, students and home.

The relevance of core mathematics

The competence an individual gains in the study of mathematics is generally used in all aspects of human life (Mensah et al., 2013). As indicated by Anthony and Walshaw (as cited in Mensah et al., 2013), mathematics plays a quintessential role when it comes to shaping how individuals deal with their private, social and civil lives. Mathematics is seen by every society as the basis of scientific and technological knowledge that is very important in the socio-economic development of every nation (Mbugua, Kibet, Muthaa & Nkonke, 2012).

Mathematics as a subject has a direct relationship with other subjects that are technical and scientific in nature and thus, mathematics is seen as the bedrock for scientific, technological and economic advancement of any country (Umameh, 2011; Tshabalala & Ncube, 2013). Mefor (2014) indicated that mathematics and especially core mathematics relates to everything in the universe which is connected to the daily life of the individual and thus, it is the subject humans cannot function meaningfully without. It must be pointed out that core knowledge in mathematics holds the key to Africa's industrialisation and poverty alleviation (UNESCO, 1999).

From the Ghanaian perspective, core mathematics has been accorded the needed importance in the curriculum and content in all educational policies from the basic to the secondary level (Mereku, 2012). This is particularly important because, core mathematics aids in the development of basic computational skills and knowledge which consequently fosters the ability to be accurate in solving problems as well as doing further mathematics (Sa'ad et al., 2014). A careful study of core mathematics develops logical and abstract thinking skills, solve problems with related mathematical knowledge and expose the individual to creativity and curiosity in discovering solutions to their day-to-day problems (Sa'ad et al., 2014).

According to Akinyi (2003), core mathematics is very important in the sense that people working in the public and other sectors require some basic knowledge of mathematics regarding their daily endeavours. It is in this regard that core mathematics is a prerequisite subject of study in all tertiary institutions that offer scientific and business courses as well as a requirement for most employment opportunities (Akinyi, 2003). Looking at the relevance of core mathematics in the educational and the personal lives of individuals, it becomes worrying when students' performance is low.

Attitudes toward core mathematics

Attitude refers to a psychological tendency that is expressed through the evaluation of a specific entity with some degree of favour or disfavour (Eagly & Chaiken, as cited in Mensah et al., 2014). It particularly measures an individual's tendency to respond either positively or negatively to a certain idea, object, person and situation and thus, attitudes are generally positive or negative views about a person, place, thing or event which are often referred

to as the attitude object which can influence individual's choice of action (Zelley, Marianne & Elaine, as cited in Mensah et al., 2014).

It must be pointed out that some authorities are of the view that attitude towards core mathematics are just a like or dislike for the subject (Neale, 1969; Morris & Maisto, 2001). Others have theorised the meaning of attitude towards core mathematics as the beliefs, ability and usefulness of core mathematics (Zan & Martino, 2007; Hart, 1989).

For instance, Zan and Martino (2007) have maintained that the attitude towards core mathematics can be seen as just the positive or negative emotional disposition towards core mathematics. On the other hand, Neale (as cited in Mensah et al., 2014) stressed that attitude towards core mathematics is seen as an aggregated measure of liking or disliking of core mathematics and thus, a tendency to engage in or avoid mathematical abilities, a belief that an individual is good or bad in mathematics, as well as a belief that mathematics is useful or useless influence a person's attitude.

The attitude towards mathematics and especially core mathematics is characterised by how an individual associates emotions with mathematics, his or her beliefs about mathematics and how he or she behaves towards mathematics, thereby making him or her to be anxious and fearful about core mathematics leading to low academic performance (Hart, as cited in Mensah et al., 2014). It is therefore evident that the attitude towards core mathematics has cognitive, affective and behavioural components and thus, a teacher or a student can develop positive attitude towards mathematics because he or she learns to associate positive experiences or events with it which can affect students' academic performance. Particularly, the attitude towards core

mathematics can be looked at from the perspectives of both the student and the teacher.

Students' attitude toward core mathematics

Studies have demonstrated that the attitudes, expectations, feelings and conceptions students exhibit with respect to the teaching and learning of core mathematics and mathematics in general play a significant role in their performance (Borasi, as cited in Mensah et al., 2014). Generally, the attitudes or concepts students have about core mathematics consequently determine how these students approach the learning of the subject.

Mensah et al (2014) have noted that students' attitude toward core mathematics and mathematics in general can be related to gender. For instance, Rhonda (1999) conducted a study on gender differences in students' attitudes towards mathematics in the Randolph County Public High School graders in rural southwest Georgia, United States of America. The sample size for the study was 1171 students who were selected through simple random sampling procedures. Mathematics attitude scale was used to measure the attitudes of students in mathematics and independent t-test was performed to know whether a difference exist in males and females attitude in mathematics. The result of the study revealed that, in all grades, except the second grade, females' attitudes in mathematics were better than males and thus females performed males.

On the other hand, Mutai (2011) conducted a study on gender differences in mathematics attitudes and performance among secondary school students in Bureti Sub-county in Kericho County in Kenya, with a sample size of 430 students and 18 teachers who were selected by using the stratified and

purposive sampling procedures respectively. The study used teachers questionnaire, mathematics attitude inventory and mathematics test to gather data. Pearson Product Moment and independent t-test were used to analyse the data that was gathered. The result of the study uncovered that boys had a stronger affinity, attitudes and interest towards mathematics.

From works of Rhonda (1999) and Mutai (2011), in cases where there is the idea that males perform better in terms of their attitudes than females or the vice versa, the performance of females or males who might want to do mathematics will be affected which will also influence their attitudes towards mathematics. A study was conducted by Farroq and Shah (2008) on students' attitude towards mathematics in high schools in Pakistan with a sample size of 685 private and public 10th grade students who were selected through convenience sampling. The data were analysed with t-test and it revealed that students' success in mathematics significantly depend on the attitude towards the subject. It was further revealed that as compared to males, females lacked the confidence in mathematics.

A study by Mensah et al. (2013) has shown that there is a positive correlation regarding students' attitude in mathematics and their academic performance. According to the work of Mensah et al. (2013) which focused on senior high school students' attitude towards mathematics and performance in Ghana with a sample of 100 students and 4 mathematics teachers who were randomly selected, it was revealed that a weak positive correlation existed between teachers and students' attitude toward mathematics. From the views of Mensah et al. (2013) and it can be observed that the kind of attitude that is

exhibited by both teachers and students is critical in students' academic performance in mathematics.

Teachers' attitude towards core mathematics

Teachers' attitude regarding the teaching of core mathematics tends to affect how well the students will perform in the subject. Positive attitude of teachers towards mathematics is significantly related to high academic performance (Mensah et al., 2013). From the work of Mensah et al. (2013) which focused on senior high school students' attitude towards mathematics and performance in Ghana with a sample of 100 students and 4 mathematics teachers who were randomly selected, it was revealed that if teachers exhibit positive behaviour and give good utterances about mathematics, students would imitate that behaviour and hence develop positive attitude towards the study of mathematics.

With respect to the attitude of teachers toward core mathematics, Clarke, Thomas and Vidakovic (2009) indicated that teachers' attitude towards mathematics can be measured in emotional and cognitive behaviours. In this regard, attitudes and practices of teaching core mathematics as a teacher are influenced by beliefs, emotions, content knowledge as well as social context.

According to Henderson and Rodrigues (as cited in Mensah et al., 2013), emotional responses toward mathematics that are found in teachers include like and dislike for mathematics, anxiety associated with mathematics and self-confidence regarding mathematics. In this sense, Burks, Heidenburg, Leoni and Ratliff (as cited in Mensah et al., 2013) stressed that teachers' exhibition of self-confidence during mathematical lessons motivates student to performance higher in mathematics. Specifically, students draw from the

teachers' disposition in forming their own attitude which may affect their learning outcomes in core mathematics.

In essence, attitude such as the usefulness of core mathematics, the way core mathematics is taught and learned, the difficulty or ease of core mathematics, as well as gender ability and beliefs also affect teachers' attitude towards the subject which impact on students' academic performance (Mensah et al., 2013). Notably, the teacher can develop positive attitudes towards core mathematics that can help to build students' confidence. In accordance with the Ontario's Ministry of Education (2004), this can be done by encouraging the belief that everyone can do core mathematics, addressing the learning styles of students by providing a variety of ways for students to gain an understanding of difficult concepts, helping students to appreciate the value of core mathematics in their lives and choosing activities carefully so that students can be challenged and successful.

Concept of academic performance

Academic performance can be viewed as a successful attainment or accomplishment in a specific subject area which include the assignment of grades, marks and scores aimed at describing a trait possessed by students (Dimbisso, 2009). As indicated by Ferla, Martin and Yonghong (2009), academic performance depicts an individual's knowledge and perception he or she possesses with respect to his or her academic capability in performing successfully a given academic task at a designated level. The concept of academic performance can therefore be likened to a stable judgment about an individual's perceived ability in a specific academic domain or a given academic task (Ferla et al., 2009).

Kobaland and Musek (as cited in Adane, 2013) emphasised that academic performance of students can be more objective due to the fact that numerous scores are assigned to students' learning outcomes. This is done to measure the degree of students' adaptability in the entire educational system. On the other hand, the fact that academic success depends on the students' attitudes towards their academic achievement and themselves and attitudes of significant others towards their success and themselves, academic performance can be subjective (Adane, 2013).

Academic performance of students in core mathematics can be high or low. For the purpose of this study, the emphasis is laid on low academic performance which has been shown to be demonstrated in the performance of students in core mathematics in the Kumasi Metropolis. As indicated by Diaz (2003), low academic performance refers to a situation where subjects are unable to accomplish the expected abilities regarding a chosen domain which consequently affects their personality and entire life. Similarly, Aremu (2005) noted that low academic performance specifically describes a situation where the performance of the examinee falls below the expected standard which is set by the evaluator of the performance.

Academic performance at the basic level

At the Junior High School level in Ghana, studies have indicated low academic performance of basic school pupils in mathematics (Mills & Mereku, 2016; Mereku, 2012). The low academic performance comes as a result of some difficulties which have been identified by various scholars. One of such difficulties can be attributed to the developments of school mathematics over the years (Mereku, 1999). It should be acknowledged that

the development of the canonical school curriculum for mathematics inhibits any teacher who is of the view that modern mathematics came to replace the old mathematics and as such, such teachers may continue to devote a considerable time in treating topics like sets, numeration system, integers and rational numbers to the neglect of those topics that involve real life applications. It has been established that teachers at the Junior High School level are likely to find it difficult to cope with the teaching of some of the modern syllabus for years II and III leading to the skipping of some of the topics in the syllabus (Mereku, 1999.)

Gleaning from above, in cases where some topics are skipped because teachers are unfamiliar with content at the basic level coupled with other factors, pupils are faced with a conceptual gap regarding their abilities to understand the concepts at the secondary level. This particularly affects the foundation of the students according to the rationale of the Senior High School core mathematics teaching syllabus. In actual fact, school mathematics is now being linked with the every life of the pupils, thus, they are to gain practical knowledge at the basic level and progress to the secondary level for better understanding of core mathematics (Curriculum Research and Development Division, 2010).

It is worth noting that, mathematics at the Junior High School level is very important. This is because, the knowledge pupils gain at the basic level in mathematics serves as the basis to develop the required mathematical understanding and competencies which consequently enhance their academic performance. This allows the pupils to use their knowledge in solving real life problems and become equipped to enter into further studies and associated

vocations in mathematics, science, commerce, industry and a variety of other professions (Curriculum Research and Development Division, 2010).

The issue of low academic performance at the Junior High School level in Ghana therefore becomes critical because of the assumption that the low academic performance creates the impression that the foundation of the pupils is weakened. In the case of the Ghanaian Junior High Schools, pupils' performance in mathematics as indicated by various reports from the Basic Education Certificate Examination show that the academic performance of pupils in numeracy over the years is quite low or leaves much to be desired (Mereku, as cited in Mills & Mereku, 2016).

As indicated by Anamuah-Mensah, Mereku and Asabere-Ameyaw (as cited in Mills & Mereku, 2016), the general performance of Ghanaian students on Trends in International Mathematics and Science Study (TIMSS) for mathematics test has been low. It was revealed that Ghana obtained low mean scores of 276 in mathematics thereby placing the nation last but one among 46 participating countries (Mills & Mereku, 2016). It must be stressed that, over the years, the performance of students and especially Junior High School students in Ghana has been the lowest as compared to other African countries (Mills & Mereku, 2016). It was brought to light that, pupils' inability to reach the higher benchmark necessitates the need to assist pupils to build a grounding in the mastery of fundamental knowledge and skills that are needed to solve demanding problems.

Considering the performance of Junior High School students in Ghana, Mills and Mereku (2016) explained that, in mathematical abilities, Ghanaian pupils normally obtain the lowest scale scores. Specifically, the scores are as

range from 130 and 430 which are below the average scale score of 500 and 800 in TIMSS examination (Mills & Mereku, 2016). This is not surprising because, it has been noticed at the basic level by Mereku (2012) that, mathematics lessons follow a similar pattern. The sequence of presentation generally followed was that teachers always led the class discussions that used familiar situations and examples, followed by pupils' examples and exercises. According to Mereku (2012), when teachers fail to use effective teaching materials but rely solely on textbooks and routine tasks, the interest of the students is minimised which hinders the conceptual and practical understanding of the pupils in mathematics. The end result of the lack of conceptual and practical understanding is low academic standards in pupils' performance.

Factors that affect students' academic performance

Numerous factors have been noted in literature as affecting negatively the academic performance of students. It must be pointed out that the concept of successful learning is not made possible solely by formal school experiences but also some factors which emanate from families, peers, societies, among others (Rothstein, as cited in Adane, 2013). Factors which relate to the home or family, school, teachers and students have been noted in literature as affecting students' academic performance and thus, this part of the chapter seeks to discuss in detail the factors identified.

School-environment factors

As indicated by Mwenda et al. (2013), school environmental factors denote how the quality of the physical environment and facilities as well as the perceptions students have about their school have an influence on their academic performance. The factors include the availability of teaching and

learning materials, location of the school, the quality of the physical facilities class size, teacher to student ratio, qualification of teachers, teachers' experience and supervision. The school environment factors also include preparation and vetting of lesson notes, organisation of in-service training and regular staff meetings, among others (Etsey 2005; Mwenda et al., 2013).

Lockheed and Verspoor (as cited in Adane, 2013) maintained that teaching and learning materials facilitate the instructional processes due to the fact that they provide information, help in the organisation of the scope and the sequence of the instruction and provide opportunities for the students to apply the concepts they have learned. This suggests that in cases where one or more of these factors identified is/are missing in the school environment, students' learning will be affected negatively and consequently affect students' academic performance. It is evident that students exhibit a good performance when they have adequate instructional materials or aids (such as textbooks, teachers' guides, pictures, etc.) that will facilitate their learning and teaching processes (Adane, 2013). In essence, the availability and adequacy of the use of these teaching and learning materials significantly affect the effectiveness and the efficiency of the teacher's lessons regarding the subject he or she teaches.

Adane (2013) and Mwenda et al. (2013) posited that the location of the school and the quality of the school tend to influence the performance of students. This is because, the location of a school specifically determines the patronage of students and the general attractiveness of physical facilities and structure of the school building can demotivate the learners which may lead to low patronage in school activities (Asikhia, 2010). It is in this sense that

Yinusa and Akanle (2008) stressed that good sitting arrangement and good building of the school result in high academic performance of students whereas dilapidated school plants lacking conducive environment as well as no sitting arrangements can be destructive.

A study was conducted by Engin-Demir (2009) on factors that influenced the academic achievement of poor urban primary school students in Turkey. The study used a sample size of 719 respondents which included sixth, seventh and eighth graders who were selected through simple random sampling procedures. The study revealed that attending a school with a good and better school environment or facility is positively related and associated with increased mathematics scores. It can therefore be concluded from the finding of Engin-Demir (2009) that academic performance can be attributed to good infrastructure and the quality of the school environment.

A study by Fabunmi, Brai-Abu and Adeniji (2007) which focused on classroom factors as determinants of secondary school students' academic performance in mathematics in Oyo State, Nigeria, with a sample of 200 out of 336 secondary schools who were randomly selected, revealed that schools with smaller class sizes which included classroom space and class utilization rate tended to perform better academically than schools with larger class sizes.

In addition, a study by Salfi and Saeed (2007) revealed a significant negative relationship between school size and students' academic performance. The study by Salfi and Saeed (2007) focused on relationship among school size, school culture and students' achievement at secondary school level in Pakistan. The sample for the study included 90 secondary school head teachers and 540 primary, elementary and high school teachers

who were working in government boys' secondary schools who were selected randomly. It was revealed that small class size performed better than medium and large class sizes and thus, concluded that class size is inversely related to student's academic performance. The assertion made by Salfi and Saeed (2007) and Fabunmi et al (2007) was emphasised by Kraft (as cited in Adane, 2013) who opined that class sizes above forty (40) relate negatively to the academic performance of students and further noted that large class sizes are not conducive for serious academic experiences.

Studies have shown that schools that possess effective and efficient supervision regarding the teaching and learning activities result in high performance rates of students. It should be pointed out that supervision being conducted by a school also form part of its atmosphere or climate (Usman, 2015). For instance, a study conducted by Usman (2015) on the impact of instructional supervision on academic performance of secondary school students in Nasarawa State, Nigeria has shown a significant positive relationship between instructional supervision and academic achievement. The study by Usman (2015) was a descriptive survey in which instructional supervision and students' academic performance questionnaire were used to obtain relevant information from 92 teachers and 37 secondary schools using the simple random sampling procedure.

The result of Usman's (2015) study showed that regular instructional supervision using robust supervision strategies such as checking of students' notebooks, classroom visitation and inspection by school administrators, checking teachers' lesson plans and inspection of teachers' record keeping have significant positive relationship with teacher and students' performance

in the secondary schools that were surveyed. It is in this regard that a study by Ghanney and Aniagyei (2014) which investigated the poor academic performance of students at public Junior Secondary School level in the Obuasi Municipality of the Ashanti Region of Ghana with sample of 60 students, 15 teachers and 15 parents who were selected through simple random and stratified sampling procedures, revealed that irregular supervision had a significant correlation ($p < .05$, $r = .075$) with performance in mathematics and that resulted in the poor performance of the schools.

Teacher-related factors

Several factors emanating from the teacher such as attendance in school, interest in students' understanding and motivation, effectiveness of teaching, methods of teaching, use of language, completion of syllabus, preparation of lesson notes, mastery of content, etc. affect the performance of students (Etsey, 2005; Mbugua et al., 2012; Mwenda et al, 2013).

From the work of Mwenda et al. (2013), teachers' absenteeism, lateness and poor teaching methods contribute to the low academic performance of students. The study by Mwenda et al. (2013) focused on factors contributing to students' poor performance in mathematics in public secondary schools in Tharaka South District, Kenya. The study used the descriptive survey design with a sample of 248 respondents who were selected through stratified and proportionate sampling procedures. The result of the study showed that teachers' absenteeism and lateness contributed to low academic performance of students. According to the World Bank (2004), teachers' lateness and absenteeism at the basic and secondary school levels in Ghana have been

worsened over the last years leading to low academic performance of students (World Bank, 2004).

The study by World Bank (2004) was a national survey across Ghana, which was conducted in collaboration with the Ghana Statistical Service and the Ministry of Education, Youth and Sports. It sought to evaluate school buildings, availability of books and learning outcomes. By using the mixed method approach, data were obtained from the central government, local governments, school management, teacher morale and methods, enrolment, learning outcomes and school building from over 50 secondary and basic schools for a period of 15 years. The results of the survey showed that absenteeism (both teachers and students) was worse in rural schools than in urban schools and worse in public schools compared to private schools and thus, affecting students' academic performance. It was further revealed that factors such as long distance, difficulty in accessing salaries, farming activities, poor working conditions, low morale and high students-teacher ratio, and transportation difficulties also lead to teacher absenteeism.

In addition, a study conducted by Wekesa (2010) which focused on assessment of factors affecting students' performance in mathematics at secondary school level in Kenya, with a sample size of 4500 students, 60 teachers and 150 principals who were selected through stratified sampling techniques revealed that teachers' experience, lateness and absenteeism affect students' academic performance in mathematics. The finding of Wekesa (2010) is obvious because, when teachers are late, the teaching and learning processes are also delayed which affect learning outcomes of students when they happen consistently. From a survey by Adane (2013) which sought to

identify factors that are responsible for the low academic achievement of pupils in Kemp Methodist Junior High School at Aburi in the Eastern region of Ghana, with a sample of 120 pupils, 31 teachers and 120 parents who were selected through multi-stage sampling procedures revealed that lateness ranging from five minutes to one and half hours affect pupils' academic performance.

The finding of Adane (2013) explains the findings of Etsey (2005) on causes of low academic performance of primary school pupils in the Shama Sub-Metro of Shama Ahanta East Metropolitan Assembly (SAEMA) in Ghana. The study by Etsey (2005) used a causal-comparative (ex post facto) in which 25 primary schools which included 15 Shama sub-metro schools and 10 SAEMA high achieving schools with a total of 495 pupils, 25 head teachers, 133 teachers who were randomly selected and 581 parents who were interviewed. The findings of the study showed that when syllabi are not completed, students usually find it very tedious to understand the content to be communicated especially in the next grade level because educational processes occur in a continuum.

A notable contribution to the lack of completion of the syllabus is adjusting the curriculum based on what is included in high stake test in order to improve test scores. As indicated by Anane (2015), teachers adjusted the sequence of their curriculum based on what is included in high stake tests like WASSCE in order to improve tests scores. In this sense, there is the likelihood that vital aspects in the syllabus that do not appear on test are ignored which contributes to lack of completion of the said syllabus (Anane, 2015). This results in most students' inability to follow and monitor the school's work due

to the fact that they do not have the understanding from previous work which is a prerequisite for the syllabus regarding higher grade levels.

Another perceived teacher's factor as affecting students' performance is motivation and interest. It is obvious that an individual who exhibits a high sense of motivation puts his or her maximum effort in the employment he or she finds him or herself. In this regard, Ofoegbu (2004) theorised poor academic performance of students as relating to poor teachers' motivation in accordance with teaching task, negative attitude toward work and poor teaching habits which lead to poor motivation. In this regard, lack of motivation and low professional commitment by teachers stand the chance of producing poor attendance and unprofessional attitudes regarding students, teaching and learning process which will consequently affect students' academic performance (Etsey, 2005).

Moreover, effective teaching and subject matter knowledge as demonstrated by the teacher have been underscored in literature as influencing students' academic performance (Enu et al., 2015). From the work of Enu et al. (2015) which focused on factors influencing students' mathematics performance in some selected colleges of education in Ghana in which a sample size of 50 students were selected randomly revealed that teachers' knowledge and bad method of instruction affect students' performance in mathematics. It must be pointed out that although the sample size for the study was small to have generalised the findings but it is very obvious that the quality of teachers and the commitment they portray are essential regarding the achieving of high students' academic performance. Agyeman (as cited in Adane, 2013) noted that teachers who do not possess both academic and

professional qualification in teaching would have a negative influence on the teaching and learning of their subject area. This suggests that teachers' knowledge of the content or subject matter as well as availability and adequacy of textbooks, time and other learning materials are influential regarding the learning of the students (Lockheed & Verspoor, as cited Adane, 2013).

Certain quality characteristics such as certification and qualifications in the subject to be communicated are very important and they positively relate with the outcomes of students especially in mathematics and science (Darling-Hammond, 2000). A survey was conducted by Darling-Hammond (2000) on teacher qualifications and other school inputs that were related to students' achievement in the United States of America. The study used a total of 50 schools between the years of 1993 and 1994 who were selected randomly. The study revealed that teacher preparation and certification were the strongest correlates of student achievement in mathematics. Similar to the finding of Darling-Hammond (2000), a study was conducted by Abuseji (2007) on student and teacher related variables as determinants of secondary school students' academic achievement in chemistry in Pakistan. The study used a sample size of 321 Form two senior high school students and 98 teachers who were selected through simple random and stratified sampling procedures. The results of the study showed that teachers with higher academic qualification possess more content and subject matter knowledge in high quality teaching skills such as feedback, questioning, explaining things clearly to students.

As part of the teacher-related factors, according to a study by Etsey (2005) which focused on causes of low academic performance of primary

school pupils in the Shama Sub-Metro of Shama Ahanta East Metropolitan Assembly (SAEMA) in Ghana with a sample of 495 pupils, 25 head teachers, 133 teachers who were randomly selected and 581 parents interviewed revealed that the use of language and especially the local language as a medium of instruction created deficiencies in the students which make them unable to understand the textbooks they needed to use. This is because, the text books that are used by the pupils are written in English and in cases where the local language is used as a medium of instruction, it creates deficiencies in student's understanding which consequently results in low academic performance. In addition, understanding of the lesson as well as completion of syllabi are linked with output and outcome and thus, in cases where the teacher is not interested in the understanding of concepts by students or inability of the teacher to complete the syllabi leads to low academic performance (Etsey, 2005).

Student-related factors

Numerous factors on the part of students have been uncovered as influencing their academic performance. Prominent among these factors particularly include time spent with books and homework, lateness and absenteeism, regularity at school, language use and enjoyment of lessons. Other factors include, students' perception about the subject, self-concept, motivation, health and nutritional status of the student (Engin-Demir, 2009; Adane, 2013).

As revealed in the study by Engin-Demir (2009) which focused on the factors influencing the academic achievement of poor urban primary school students in Turkey with a sample size of 719 sixth, seventh and eighth graders

who were selected through simple random sampling procedures, irrespective of how intelligent a student was, students who devoted more time regarding their assignment and homework tend to improve on their grades which boost their academic performance. Gleaning from the finding by Engin-Demir (2009), the amount of time students devotes in doing his or her assignments increases their motivation and interest. It is in this regard that a survey by Fraser and Kahle (2007) which focused on examining classroom, home and peer environment influences on student outcomes in science and mathematics in Tunisia, using a sample of 7000 students who were selected through simple random sampling procedures revealed that homework tends to depict a positive relationship with respect to learning outcomes of students and that there is the need to extend classroom learning to include giving homework to students.

An explanation to the positions of Fraser and Kahle (2007) is evident when the given assignment is relevant to learning objectives, measured regularly and the necessary feedback has been given. In this sense, a study was conducted by Alomar (2006) on the personal and family paths to pupils' achievement in the United States of America. A sample size of 751 eighth grade pupils who were selected through simple random sampling procedures. The results of the study showed that assignment served as an interaction between the school and home which plays a central role measuring the academic performance of the students

Moreover, students' attendance and regularity in class have the tendency of influencing their academic performance. As theorised by Allen-Meares, Washington and Welsh (2000), poor students' attendance and irregularity

resulting from avoiding classes by student, unexcused absence from school, leaving school premises without permission, tardiness, among others are major determinants of students' academic performance. An observation of the assertion by Allen-Meares et al. (2000) makes it clear that student's academic performance is negatively related to working during school hours. This is evident in the study conducted by Engin-Demir, Demir and Uygur (2006). The study by Engin-Demir et al. (2006) focused on examining the relationship between work, school performance and school attendance of primary school children in Turkey. A sample of 652 children who are engaged in menial jobs after school and 423 children who were not engaged in any job from 23 schools in urban areas of the capital-Ankara were selected through cluster sampling procedures. The study revealed a significant difference in the school performance and school attendance of the two categories of students as identified. It was further revealed that test scores and attendance of working children were lower than non-working children. From the findings of Engin-Demir et al. (2006), it can be inferred that an increase in the working hours in school tend to decrease the academic performance of students and the vice versa.

Students' attitude which include absenteeism, indiscipline and truancy among others, also influence their academic performance. For instance Farroq and Shah (2008) conducted a study on students' attitude towards mathematics in high schools in Pakistan. The study used a sample size of 685 private and public 10th grade students who were selected through convenience sampling procedures. It was revealed by the study that students' success in mathematics significantly depend on the attitude towards the subject. The study further

showed that attitudes such as students' absenteeism, lateness and indiscipline affect academic performance in mathematics. In addition, students' self-concept is very important in the academic performance of students. A study conducted by Diaz (2003) on the personal, family and academic factors affecting low achievement in secondary schools in Almeria, Spain, with a sample of 1178 students from four secondary schools, who were selected through stratified sampling procedures revealed that students' self-image about a specific subject facilitates his or her acceptance, rejection or interest and further motivates him or her do well in the subject and thus, self-image is a considerable factor in students' academic performance.

Help with studies at home affects students' academic performance and this was evident in Etsey's (2005) study on causes of low academic performance of primary school pupils in the Shama Sub-Metro of Shama Ahanta East Metropolitan Assembly (SAEMA) in Ghana. The study by Etsey (2005) showed that help with studies and homework supplement what is learnt in schools making those who are exposed to such aids perform high. In addition, Etsey (2005) asserted that students' academic performance tends to be high when they enjoy the teachers' lessons. It was revealed by Etsey (2005) in his study that students in high achieving schools enjoyed their teachers' lesson and factors accounting for this included commitment to teaching, adequate teaching and learning materials and teachers' professionalism.

It can be concluded that in situations where these attributes are low, students' performance is hindered and thus, the study seeks to find evident if some of these student-related factors are perceived to have caused the low performance in core mathematics over years in the Kumasi Metropolis.

Home-based factors

It is an undeniable fact that the way a student performs can be influenced by a variety of factors from the home. Prominent among these factors are the socio-economic status which include education, occupation and income, size of household, type of discipline at home, structure of family and parental involvement as well as interest in child's schooling (Adane, 2013; Engin-Demir, 2009). As indicated by Gorney (as cited in Adane, 2013), family and environmental factors affect students' academic performance. Specifically, parents' expectation and attribution, structure of learning, the environment of the home, discipline and involvement of parent in the child's studies affect the performance of the student.

Schiller, Khmelkov and Wang (2002) conducted a study on economic development and the effects of family characteristics on mathematics achievement in middle schools in 30 TIMSS nations. A sample of 219,402 students from 7th and 8th grades were selected through stratified, cluster and proportionate sampling procedures. The results of the study showed that parents who have better education tend to provide academic and social support to their children as compared to less educated parents and hence, boost their academic performance. A notable explanation to the findings of Schiller et al. (2002) in my view is that parents who are educated understand the need to educate their children because of the benefit they (parents) have had in their education. This was justified by Johnson and Kyle (2001) in their study. The survey by Johnson and Kyle (2001) used a sample of 3,192 households and 14,924 individuals as well as 6, 719 children who were selected through cluster sampling procedures across Ghana. The findings of the survey showed

that educational status of parents was a major factor as contributing to the students' academic performance. Specifically, mother's education has been justified in literature as having a significant influence on the students' academic performance (Johnson & Kyle, 2001).

In addition, parents' occupation have been noted to have substantial effect on reading and mathematics test scores (Fuchs & Woessmann, 2004). In the work of Fuchs and Woessmann (2004), a sample of 57 countries who participated in TIMSS and PISA examinations in mathematics were randomly selected. The study revealed that, parents' occupation and more specifically having a full-time employment significantly affect academic performance.

Furthermore, higher family income is related to higher academic performance. A study by Asikhia (2010) which examined the perception of students and teachers on the causes of poor academic performance among secondary school students in Ogun State, Nigeria, in which a sample of 135 students and 50 teachers were randomly selected from five secondary schools revealed that students from poor homes are often dropped out from school and consequently engaged in hawking, selling, etc. in order to save money for their educational expenses. This led to the inability of the student to afford instructional materials and other educational needs thereby affecting their academic performance. It is in this regard that Yinusa and Akanle (2008) in their study in Nigeria with a sample of 120 students who were selected through simple random sampling procedures concluded that insufficient parental income influences students' academic performance.

It should be indicated that the number of siblings of students tends to influence the academic performance of the student. Asikhia (2010) in his study

on the perception of students and teachers on the causes of poor academic performance among secondary school students in Ogun State, Nigeria, revealed that the larger the family size, the less the attention and devotion children receive from their parents. The findings of Asikhia (2010) confirm Downey's (1995) study on family size, parental resources and children's educational performance in Ohio, United States of America. The study by Downey (1995) was a national longitudinal survey which used a sample of 24,599 eighth graders who were selected through simple random sampling procedures. The study revealed that children who come from large family sizes have less favourable home environments leading to lower levels of educational performance and attainment and the finding confirm the position of Asikhia (2010).

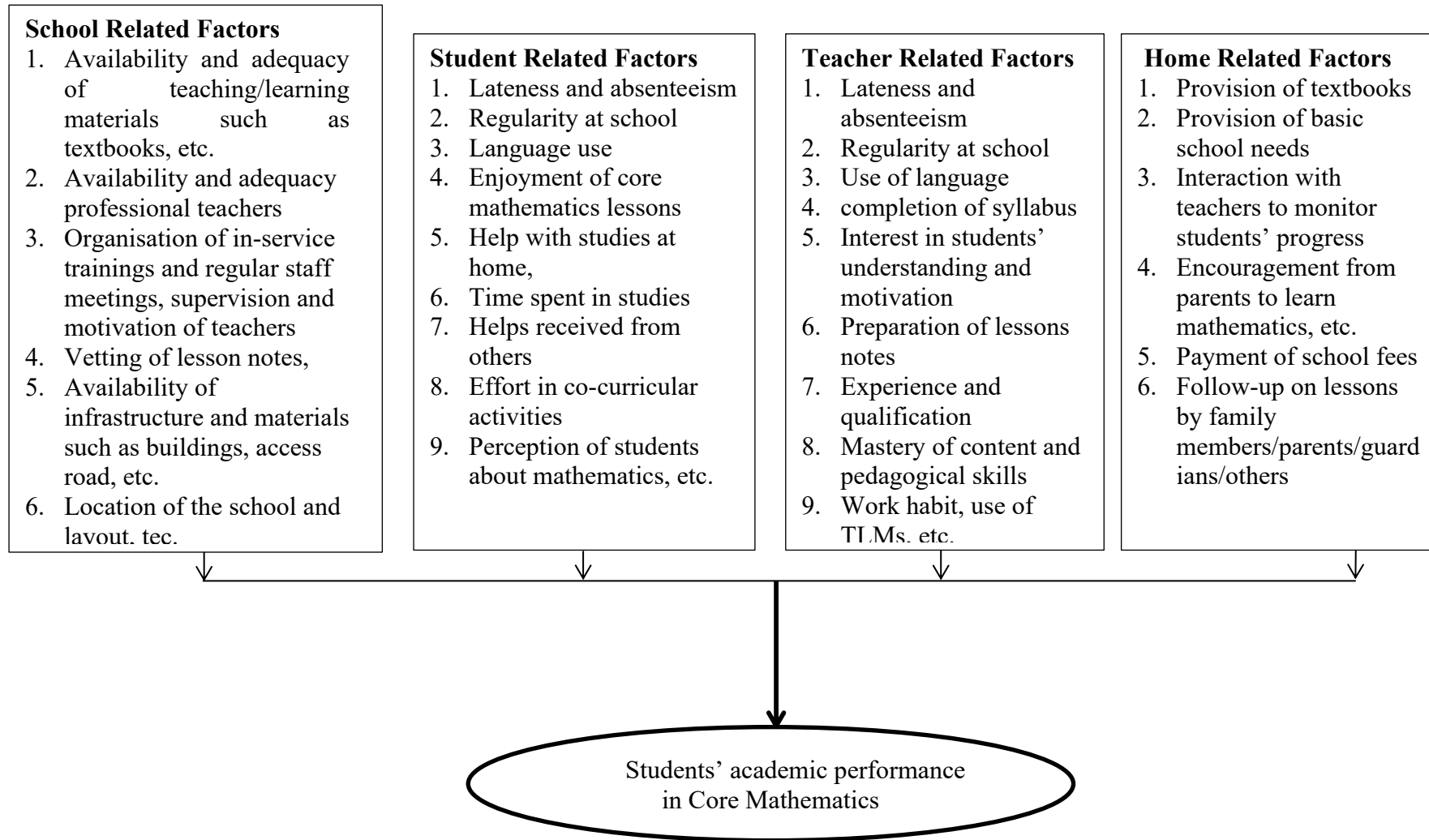
Moreover, parental discipline has been noted to affect the performance of students. A study was conducted by Steinberg, Lamborn, Dornbusch and Darling (1992) on the impact of authoritative parenting, parental involvement in schooling and parental encouragement to succeed on adolescents' school achievement in Mathematics and English at the high school level in Northern California. The sample for the study was made up of 6400 students who were selected through random sampling procedures. The findings of the study revealed that authoritative parenting leads to better adolescents' performance and strengthens school engagement while democratic style weakens the beneficial impact of parental involvement in schooling on adolescent achievement.

Conceptual Framework

The conceptual framework of the study was designed based on the concepts as well as the variables derived from the empirical studies reviewed. The rationale was to clarify the relationship between the independent variables (school-environment factors, teacher-related factors, school-related factors and home-based factors) and the dependent variable (students' academic performance in core mathematics). The relationships between the individual variables are shown in Figure 1.

Figure 1 depicts the relationship between the independent variables (students-related factors, school-environment factors, teacher-related factors and home-related factors) and the dependent variable (students' academic performance in core mathematics). It is evident that the independent variables which originate from the wider social systems are directly related to academic performance of students in core mathematics. When solutions are found to the perceived causes, the immediate resultant is an improvement in the teaching and learning of core mathematics which will lead to an increased in academic performance of students in core mathematics and the vice versa.

Figure 1- *Conceptual Framework on the Causes of Low Academic Performance of SHS students in Core Mathematics in the Kumasi Metropolis*



Source: Author's Own Construct, 2017.

Empirical studies on perceived causes of low academic performance of students in mathematics

Mbugua et al. (2012) conducted a study on the factors contributing to students' poor performance in mathematics at Kenya Certificate of Secondary Education in Kenya. The study focused on the school-based factors that affect students' performance in Mathematics in secondary schools, socio-cultural factors that affect them and their personal factors that affect performance in Mathematics. Descriptive survey research design was adopted for the study. The target population was 1876 respondents which comprised of form three (3) secondary school students in Koibatek District, 132 Mathematics teachers and 9 head teachers. Questionnaires for students and teachers were the data collection instruments used for the study. The data gathered for the study was analysed using frequencies and percentages.

The results of the study revealed that under-staffing, inadequate teaching and learning materials, lack of motivation and poor attitudes by both teachers and students as well as retrogressive practices affect students' academic performance in mathematics. It was further indicated in the study that improving on these factors and sensitisation of the local community to prevent practices which prohibit student's effective participation in learning mathematics could improve performance in Mathematics.

It is clear that the findings of the study conducted by Mbugua et al. (2012) are consistent with the factors in literature that are responsible for low academic performance of students in mathematics. As indicated above, teacher related factors such as poor attitudes of teachers toward mathematics and lack of motivation, students related factors such as poor attitudes of students

toward mathematics and school related factors such as under-staffing, inadequate teaching and learning materials contribute to low academic performance of students in mathematics (Mbugua et al., 2012).

A similar study was conducted by Mwenda et al. (2013) on the factors contributing to students' poor performance in Mathematics in public secondary schools in Tharaka South District, Kenya. The aim of the study was to find out the factors that led to students' poor performance in mathematics in the district. Descriptive survey research design was used in the study. The study was carried out in Tharaka South District, Kenya, which had a total of 14 public secondary schools with a target population of 2,332 respondents. Stratified sampling technique as well as proportionate sampling technique were used to select a sample of 248 respondents. The data collection instruments used for the study were questionnaires for head teachers, heads of department, teachers and students. Data collected was analysed by using frequencies and percentages. The findings of study showed that inadequate teachers, students' absenteeism, poor entry marks, poor assessment techniques and poor teaching methods were the main factors that accounted for the poor academic performance of students. It was suggested that completing the syllabus in time, provision of adequate and qualified teachers and organising in-service programmes would help to improve on the academic performance of students.

A critical look at the study conducted by Mwenda et al. (2013) indicates that, teacher related factors, school factors and student factors were key in contributing to the low academic performance of students in mathematics. It is evident because in their study, factors such as inadequate teachers, students'

absenteeism, poor assessment techniques and poor teaching methods were the main causes of low academic performance of students. The study is therefore in line with Mbugua et al. (2012) who opined that these factors are critical in predicting students' academic performance.

Another study was conducted by Sa'ad et al. (2014) which investigated the causes of poor performance in mathematics among public senior secondary school students in Azare Metropolis of Bauchi State, Nigeria. The research design used in the study was a descriptive survey design in which questionnaire was used in the collection of data. Through simple random sampling, 361 respondents were selected from a population of 5,545 for the study out of which 300 were students and 61 teachers. Frequency and simple percentage were used in the analysis of the data. The findings of the study revealed that students' negative attitude toward mathematics, anxiety and fear of mathematics, inadequate qualified teachers, poor teaching methods, inadequate teaching materials, overcrowded classes were some of the causes of poor performance in mathematics in the study area. The findings of the study further uncovered that developing positive attitude, motivation and proper guidance toward mathematics, using proper methods of teaching the subject, provision of relevant teaching materials, additional classrooms and furniture, provision of libraries and mathematical laboratories were some of the ways of improving performance in mathematics in the study area.

Enu et al. (2015) investigated factors influencing students' mathematics performance in selected colleges of education in Ghana. The main focus of the study was to investigate students' personal factors and school-based factors that affect students' academic performance in mathematics. The study adopted

the descriptive survey design in which three colleges of education were randomly selected out of ten colleges for the study. A total of 50 out of 150 students from these colleges participated in the study. Data for the study was collected through student's questionnaire whereas tables, frequencies, percentages and independent t-test were the statistical tools that were used for analysing the data collected. The findings of the study revealed that inadequate teaching and learning materials and bad method of teaching were some of the factors which affected students' performance in mathematics. The findings of the study further showed that teachers and students' self-motivation also influenced their performance in mathematics. It was recommended that interactive method of teaching which aims at improving students' holistic understanding of mathematical concepts needs to be used by mathematics teachers. It should be pointed out that the sample size of 50 as used in the study by Enu et al. (2015) in my view was too small for a descriptive survey. However, the findings of their study have a bearing for the purpose of this current study.

Nur (2006) explored the factors that influence secondary school students' performance in mathematics in Banadir Region, Somalia. The study was conducted in Banadir Region of Somalia, which had a total of 70 secondary schools with Form 4 students' population of 2500. The study used a survey research design where stratified sampling technique was used to select 12 secondary schools out of which a sample of 275 students and 16 mathematics teachers were selected. Three research instruments namely, mathematics teachers' questionnaire, Form 4 students' questionnaire and classroom observation schedule were employed for the study. Descriptive statistics such

as percentages, frequencies and tabulations were used in the data analysis. The study found that 37.5% (6) of the teachers felt that teaching methods played a major role in students' performance in mathematics. It was found that expository approaches of teaching mathematics were the only methods used in mathematics classes in Banadir Region and this led to students' poor performance coupled with lack of feedback.

Another study was conducted by Mensah et al. (2013) on students' attitude towards mathematics and performance. The descriptive survey design was used for the study with a sample of 100 students and 4 Mathematics teachers making a total of 104 respondents drawn from the 2nd and 3rd year classes of senior high schools in the Sunyani Municipality. The students were randomly selected while the teachers were purposively sampled. Two sets of questionnaires were used to gather data from the respondents. The study showed a significant weak positive correlation ($p < .05$, $r = 0.31$) relationship between teacher attitude and student attitude toward Mathematics. It was concluded that a good relationship between teachers and students bring to light positive attitude which radiated confidence in students hence made them develop positive attitude towards the learning of mathematics which boost students' academic performance in mathematics.

Chapter Summary

Based on the empirical studies that have been reviewed, it can be observed that a number of studies have been conducted both internationally and locally on what student factors, school environment factors, teacher factors and home-based factors contributes to low academic performance in mathematics. Form the empirical review, it can be observed that little

information can be obtained locally on the topic. However, majority of the studies conducted on the topic focused on Junior High School pupils and colleges of education students to the neglect of Senior High School Students. It can also be inferred from the literature that none of the local studies that was reviewed empirically investigated into the low academic performance in core mathematics at the Senior High School level especially in the Kumasi Metropolis. Looking at the low academic performance of Senior High School students in core mathematics in the Kumasi Metropolis and the research gap in literature on the topic, there is the need to find evidence of the availability of the factors that emanate from the school, teachers, students and home that are perceived to have caused Senior High School students in the Kumasi Metropolis to perform low in core mathematics and this makes a study of this nature extremely important.

CHAPTER THREE

RESEARCH METHODS

Overview

The methodology section describes the research design and the study area. Specifically, the section describes the population, sample and sampling procedures, data collection instrument as well as data collection and data analysis procedures. Ethical issues that were considered in the study were also discussed.

Research Design

Bless and Higson-Smith (2000) explained that it is mandatory for all research studies to have a study design in achieving the objectives of the study. In pursuance of this, the study used the descriptive survey research design with quantitative approach. Descriptive survey research design objectively allows for the accurate description of activities, objects, processes and persons. The purpose of descriptive survey is to observe, describe and document aspects of a situation as it naturally occurs (Amedahe, 2002). Descriptive survey research has the ability to obtain data regarding persons or groups of persons who possess some identified features, perceptions, behaviours, and beliefs with questioning and soliciting of responses concerning the current status of the subject of the study.

Williams (2007) maintains that descriptive research involves identification of attributes of a particular phenomenon based on an observational basis, or exploration of correlation between two or more

phenomena. In essence, the study employed the descriptive survey research design with quantitative approach in achieving the ultimate objectives of the study. Quantitative approach involves the process of employing objective measure to a numerical data with the view of demonstrating the relationships existing between variables (Cresswell, 2014). In quantitative approach, researchers employ quantitative methods to assess the magnitude and frequency of constructs to explore meaning and understanding of constructs (Creswell & Plano-Clark, 2011). The core assumption of the quantitative approach as a characteristic of descriptive research involves the use of numerical analysis of hypothesis formulation and testing or formulation of research questions and seeking answers to them (Cresswell, 2014).

The methodology of a quantitative research maintains the assumption of an empiricist paradigm, which makes it possible to use data to objectively measure reality (Creswell, 2012). Quantitative research therefore, responds to relational questions of variables within the research. The intent is to establish, confirm or validate relationships and to develop generalisations that contribute to theory (Leedy & Ormrod, 2005). The emphasis therefore is to bring to light both posteriori and priori knowledge regarding variables such as teacher factors, school environment factors, student factors and home factors that are perceived as causes of low academic performance of Senior High School students in core mathematics through quantitative approach which is the main theoretical underpinning of the study.

Rationale for the Design

It must be pointed out that, descriptive surveys seek to gather data at a particular point in time with the intention of describing the nature of existing

conditions or identifying standards against which existing conditions can be compared (Creswell, 2012). Surveys are also capable of providing descriptive, inferential and explanatory information that can be used to ascertain correlations between items and the themes of the survey (Cohen, Manion & Morrison, 2007).

With regard to the ultimate aim of the study that seeks to explore the perceived causes of low academic performance of Senior High School students in core mathematics in the Kumasi Metropolis of the Ashanti Region of Ghana, the use of quantitative approach is quintessential. This is because, there is the need to gather data from a wide population of respondents in order to make generalisations. In addition, there is the need to provide a descriptive measure on the perceived causes of low performance of Senior High School students in core mathematics. This therefore calls for the gathering of standardised information by using the same instruments and questions for all sampled respondents.

The design involves collecting data from all sampled respondents through the administration of a questionnaire on the perceived causes of low academic performance in core mathematics and analysing the responses (Leedy & Ormrod, 2010). This study is descriptive because, as indicated by Cohen et al. (2007), it sought to describe and explore a phenomenon in real life situation and to generate new knowledge about the topic. Punch (2005) has indicated that descriptive survey is basic to all types of research in assessing the situation as a pre-requisite for conclusions and generalisations.

Fraenkel and Wallen (2006) opined that the purpose of descriptive survey research design is to observe, describe and document aspects of a phenomenon

as it naturally occurs. As indicated by Polit and Beck (2008), descriptive surveys gather information to represent what is going on at only one point in time. Moreover, with regards to the quantitative approach, Dudwick, Kuehnast, Jones and Woolcock (2006) asserted that quantitative approach aids others to make informed decisions and validations regarding the authenticity of the findings without repeating the analysis necessarily. On the other hand, as suggested by Neuman (2000), quantitative approach fails to provide an in-depth description of participants' experiences regarding a study which tends to be a major demerit of adopting the quantitative approach.

It must be pointed out that, descriptive survey research design with quantitative approach fails to ask probing questions as well as inability to seek clarifications especially when structured or close ended questionnaires are used as data collection instruments. Despite the deficiencies, the descriptive survey design was chosen for the study because judging from the main thrust of the study where data was collected at just one point in time on samples from the selected schools it was deemed the most appropriate design.

Study Area

The Kumasi Metropolis is one of the thirty (30) administrative districts in the Ashanti Region. The Kumasi Metropolis was established by Legislative Instrument 1614 of 1995 under Local Government Law 1988, NDPC Law 207, which replaced the Local Government Act 462, 1993 (Ghana Statistical, 2014). It is located between latitude 6.35°N and 6.40°S and longitude 1.30°W and 1.35°E which is elevated 250 to 300 meters above sea level. The Metropolis particularly shares boundaries to the north with Kwabre East and Afigya Kwabre Districts, to the west with Atwima Kwanwoma and Atwima

Nwabiagya Districts, to the east with Asokore Mampong and Ejisu-Juaben Municipality and to south with Bosomtwe District (Ghana Statistical Service, 2014).

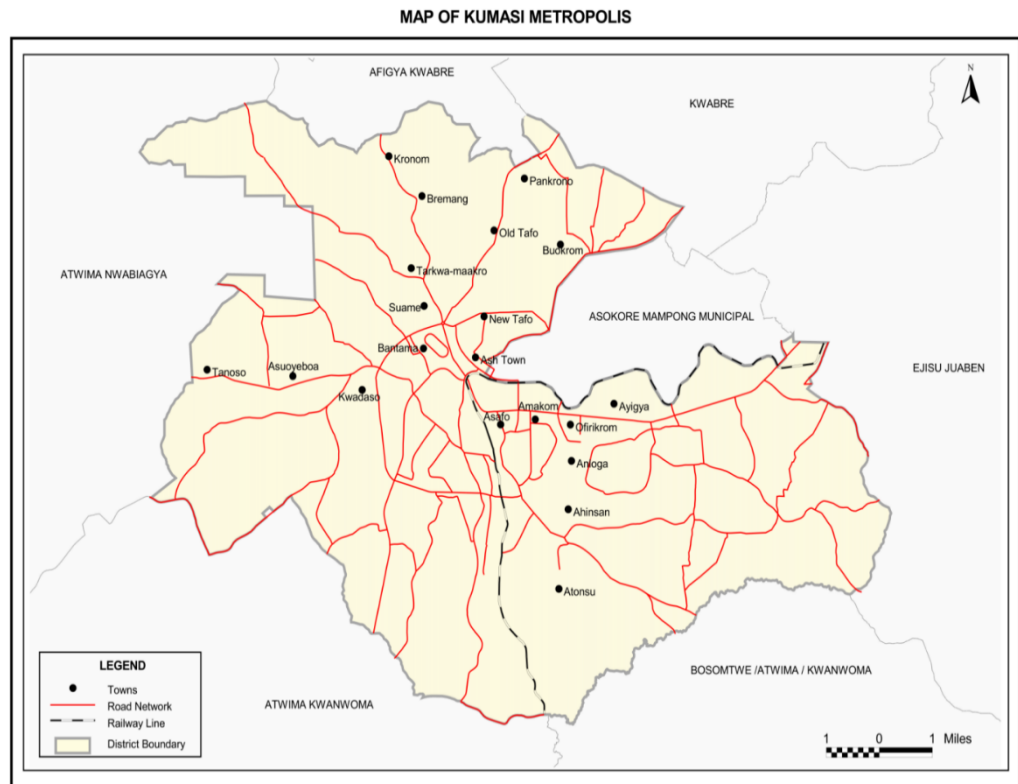
The Kumasi Metropolis is approximately 270km north of the national capital, Accra with a surface area of approximately 214.3 square kilometers which is about 0.9 percent of the region's land area accommodating about 36.2 percent of the region's population (Ghana Statistical Service, 2104). This makes the Metropolis the second largest most populous city in the country (Ghana Statistical Service, 2014).

As at 2014, the Metropolis was divided into ten (10) Sub-Metropolitan District Councils which are Asokwa, Suame, Bantama, Kwadaso, Manhyia, Oforikrom, Subin, Asawase, Tafo and Nhyiaso (Ghana Statistical Service, 2014). According to the Ghana Statistical Service (2014), the Kumasi Metropolis can boast of numerous infrastructure and facilities such as healthcare delivery, teaching and learning, water supply, electricity transmission, information and communications technology, transport services, tourism and security services which are all available to residents. Particularly, Kumasi Metropolis has 136 health facilities providing healthcare services to its residents with the Komfo Anokye Teaching Hospital (KATH) being the largest.

In education, the Metropolis has 19 accredited Public Senior High School, 35 private Senior High School and tertiary institutions such the Kwame Nkrumah University of Science and Technology, University of Education, and Kumasi Technical University (Ghana Statistical Service, 2014). The

geographical map of the Kumasi Metropolis showing all the sub-districts are shown in Figure 2.

Figure 2- Geographical map of the Kumasi Metropolis showing all the Sub-Districts



Source: Ghana Statistical Service (2014).

Population

Gorard (2001) explained that a population refers to a group of subjects out of which a sample is selected to generate results of a study. The target population for the study involves all second and third year public Senior High School students as well as all Senior High School core mathematics teachers in the Kumasi Metropolis of the Ashanti Region of Ghana. Currently, there are nineteen (19) accredited public Senior High School in the metropolis, with total Senior High School Form 2 and 3 population of 124,808 out of which five (5) are single sex girls’ Senior High Schools, four (4) are single sex boys’

Senior High School and ten (10) are mixed Senior High School and three hundred and twenty-two (322) core mathematics teachers (Ashanti Regional Education Office, 2018).

The accessible population for the study consisted of Senior High School Form 2 and 3 students as well as Senior High School core mathematics teachers in the four selected schools namely Adventist Senior High School, Serwaa Nyarko Girls Senior High School, Kumasi High School and Asanteman Senior High School. The schools were selected through multi-staged sampling procedure and the four schools were used for the study because looking at the number of single sex and mixed schools, selecting one single sex boys' school, one single sex girls' school and two mixed schools ensured fairness in gender representation in the study. In this regard, the four schools were appropriate for a better generalisation of the study results.

The second and third year students were used for the study because their long stay on campus might have exposed them to various experiences and knowledge regarding what they perceived to be responsible for the low academic performance of students in core mathematics. As at 2018, the total population of Senior High School Form 2 and 3 students in the four selected schools was 6,448 with 58 core mathematics teachers (Adventist Senior High School, Asanteman Senior High School, Kumasi High School, Serwaa Nyarko Girls Senior High School, 2018). As indicated by Kothari (2004), it is from the accessible population that a sample is selected for a study. The distribution of the population among the four selected SHS is shown in Table 2.

Table 2- *Distribution of Population Based on Students and Core Mathematics**Teachers*

School	Population Students	Population Core mathematics teachers
<i>Adventist SHS</i>		
SHS 2	1053	14
SHS 3	813	
<i>Asanteman SHS</i>		
SHS 2	992	16
SHS 3	1015	
<i>Serwaa Nyarko Girls SHS</i>		
SHS 2		
SHS 3	442	11
	447	
<i>Kumasi High SHS</i>		
SHS 2		
SHS 3	895	17
	791	
Total	6,448	58

Source: Adventist SHS, Asanteman SHS, Kumasi High School, Serwaa Nyarko Girls SHS (2018)

Sample and Sampling Procedures

A sample refers to a sub-group of the population that is studied in order to make a generalisation regarding the target population (Creswell, 2014). As maintained by Fowler (2009), the need for sampling in research is to select a portion of the population that is most representative of the population. It should be stressed that multi-stage sampling which involved the use of probability sampling was used to select the students for the study whereas purposive sampling (non-probability sampling) was used to select the Senior

High School core mathematics teachers. The selection of the schools was done taking into cognisance the class of schools (either high, middle or low achieving). This was done to give a clearer picture of what the students perceived as causing low academic performance in core mathematics. The various stages of the multi-staged sampling procedures are described below:

Stage 1

To be able to select the schools for the study, the stratified sampling procedure was used. In this regard, all the public Senior High Schools were put into strata. Particularly, all boys' schools, girls' schools and mixed schools were put in different strata. After the schools were put into the various strata, the table of random numbers for a simple random sampling procedure was used to select one category of Senior High School from each stratum. The study used the table of random numbers for a simple random sampling because each stratum represents a homogeneous group of students, that is, a group with similar characteristics (Ary, Jacobs, Razavieh & Sorensen, 2006). For example, in the first stratum which consisted of single sex boys' schools, the names of all the 4 single sex boys' Senior High Schools which formed the sampling frame were written on a piece of paper and numbered serially from 1 to 4.

From the table of random numbers, since the number of digits under consideration, that is 4, was a single digit ranging from 1 to 4, in a vertical direction of any point in the table of random numbers, one school was selected. It must be noted that in cases where the digit arrived at did not fall within 1 to 4 inclusive, as indicated, such a digit was ignored. The name of the school that was selected was recorded on a separate sheet of paper. The same

approach was used in selecting a single sex girls' school as well as two mixed schools. The selection was done with replacement in order to ensure objectivity.

As indicated above, in simple random sampling, the sampling units, apart from having an equal chance of being selected, are also independent of each other (Creswell, 2012). The simple random sampling method is also appropriate when the population of study is similar in characteristics of interest. In essence, although the study used both probability and non-probability sampling procedures, in selecting the schools, probability sampling procedures, particularly, the stratified and simple random sampling. It must be stressed that, in stratified sampling, the population is categorised into a number of strata and thus, a sample is drawn from each stratum (Fowler, 2009).

Stage 2

After selecting the schools and in accordance with Krejcie & Morgan (1970) sample size determination, for a population of 7000, it is recommended that a sample size of 381 is selected. As suggested by Krejcie and Morgan (1970), for an accessible Senior High School students' population of 6,448 and 58 core mathematics teachers, I saw it necessary to use 439 which was made up of 381 students and all the 58 core mathematics teachers as the sample for a meaningful generalisation for the study. Based on the sample size for the study (that is 439), and specifically for the students' sample size of 381, proportionate sampling was then used to distribute the respondents (students) based on the selected schools. For example, in Adventist Senior

High School, proportionate sampling was used to determine the number respondents needed from Form 2 and 3 as shown below:

For Senior High School Form 2, the proportion was given by the number of students in Senior High School Form 2 (1053) divided by the total number of students of the population (6448) multiplied by the sample (381) which gave a value of 62. Similarly, for Senior High School Form 3, the proportion was given by the number of students in Senior High School Form 3 (813) divided by the total number of students of the population (6448) multiplied by the sample (381) and that gave a value of 48. The samples were recorded and hence, the rest of the samples for each of the grade levels regarding each of the four schools were computed and recorded as shown in Table 3.

Table 3- *Distribution of Samples Based on Students and Core Mathematics Teachers among the Schools*

School	Population (P)	Sample (S)	
		Students	Teachers
Adventist SHS			
SHS 2	1053	62	14
SHS 3	813	48	
Asanteman SHS			
SHS 2	992	58	16
SHS 3	1015	60	
Serwaa Nyarko Girls SHS			
SHS 2			
SHS 3	442	26	11
	447	27	
Kumasi High SHS			
SHS 2	895	53	17
SHS 3	791	47	
Total	6,448	381	58

Source: Field survey (2018)

Stage 3

At the third stage of the sampling procedures and having identified the sample needed from the grade levels of each of the sampled schools, simple random sampling was used once again to select a programme for the single sex boys' and girls' schools as well as two programmes for the mixed schools. It should be stressed that all the sampled schools offered four programmes namely Business, General Arts, Science, Home Economics and Visual Arts. By using the lottery method of the simple random sampling, and for example in selecting a programme for Serwaa Nyarko Girls' Senior High School, each programme was written on pieces of paper, folded and put in a bowl. After a thorough stirring, one piece of the folded paper was picked and the name of the programme was written on a separate sheet for that school. The same approach was used in selecting one programme for the other single sex boy's school and two programmes for the mixed schools. Notably, when a programme is selected for a particular school, the same programme would not be selected again for the other school.

Stage 4

At the fourth stage of sampling procedures and based on the proportions of students needed in each school as indicated above, students were selected using the table of random numbers of the simple random sampling with the class registers of each grade level as the sampling frame.

For example for Kumasi High School, in order to select of 53 Senior High Schools Form 2 respondents, the class register was labelled form 1 to 53. Moving in a vertical direction on table of random numbers, all the numbers ranging from 1 to 53 were selected and in accordance with the corresponding

numbers in the class register, the names of the respondents were written until all the 53 respondents were exhausted. The same approach was used for selecting the rest of the respondents in the rest of the sampled schools.

Sampling Procedures for Core Mathematics Teachers

After the students have been selected, purposive sampling was used to select all the 58 core mathematics teachers in the four schools to participate in the study.

In essence, multi-staged sampling which involved stratified sampling procedure and table of random numbers for a simple random sampling were used in stage one. Proportionate sampling and the lottery method for a simple random sampling were used to select the programmes of study at the second stage. The table of random numbers for simple random sampling was further used in the third and fourth stages. In addition, purposive sampling was used to select all the core mathematics teachers. Thus, the study used both probability (stratified sampling, simple random sampling and proportionate sampling) and non-probability sampling (purposive sampling) procedures to select a sample of 439 which included 381 students and 58 Senior High School core mathematics teachers to participate in the study.

Data Collection Instrument

A survey questionnaire was developed to collect data on the perceived causes of low academic performance of Senior High School students in core mathematics in the Kumasi Metropolis. Questionnaire is an effective means of measuring the behaviour, attitudes, preferences, opinions and intentions of relatively large numbers of subjects conveniently than other methods (Paralov, 2006). I used questionnaire since the focus of the study was on students' and

teachers' behaviour, attitudes, preferences, opinions and intentions they had regarding the perceived causes of low academic performance in core mathematics.

Knowles (as cited in Adane, 2013) has indicated that questionnaires are easy to administer, friendly to complete and fast to score and thus, take relatively less time from responding to them. Sidelineing the numerous advantages of the use of questionnaires, there are various setbacks. The use of questionnaires does not encourage probing which allows respondents to give shallow responses (Payne & Payne, 2004). In addition, respondents may not give 100 percent truthfulness to their responses due to issues of privacy and social desirability bias. This often leads to skipping of complicated questions which can affect the results of the study. This notwithstanding, respondents were assured of their anonymity and confidentiality regarding their participation in the study.

After a thorough reading on the perceived causes of low academic performance in core mathematics, two questionnaires were developed to collect data for the study in accordance with the suggestions and recommendations by my supervisors. The questionnaires were particularly developed for Senior High School students and core mathematics teachers to elicit responses on the perceived causes of the low academic performance of Senior High School students in core mathematics.

The students' questionnaire was made up of four (4) sections, (A to D). Section 'A' elicited responses regarding the demographic data of students whereas section 'B' composed of ten (10) items sought responses on the perceived student-related factors contributing to low academic performance of

students in core mathematics. Section 'C' contained two (2) items which elicited responses on the perceived home-related factors contributing to low academic performance of students in core mathematics. Section 'D' contained four (4) items which elicited responses on the perceived teacher-related factors contributing to low academic performance of students. All the items in the various sections were measured on a four-point Likert scale; Strongly Disagree (SD), Disagree (D), Agree (A) and Strongly Agree (SA) with one (1) indicating the least agreement to the issues while four (4) representing the strongest agreement to the items.

The teachers' questionnaire was composed of four (4) sections, (A to D). Section 'A' sought to elicit responses regarding the demographic data of teachers. Section 'B' comprised of ten (10) items and sought to elicit responses on the perceived teacher-related factors contributing to low academic performance of students in core mathematics. Section 'C' contained five (5) items which sought to elicit responses on the perceived school-related factors contributing to low academic performance of students in core mathematics. Section 'D' was made up of seven (7) items which elicited responses on the perceived student-related factors as contributing to the low academic performance of students in core mathematics. It must be pointed out that all the items in the various sections were measured on a four-point Likert scale; Strongly Disagree (SD), Disagree (D), Agree (A) and Strongly Agree (SA) with one (1) indicating the least agreement to the issues while four (4) representing the strongest agreement to the items.

Validity and Reliability of the Instruments

The content validity of the survey questionnaires on the perceived causes of low academic performance in core mathematics were assessed by my supervisors who are experts and well-grounded in the area of measurement and evaluation in line with the objectives of the study, the research questions and the variables of interest of the study. The instruments were given to my supervisors to assess the quality of each item in the context of clarity, ambiguity and generality for the necessary corrections and suggestions to be made.

Pilot Testing

The pilot test was conducted on 40 Senior High School students and 15 core mathematics teachers. The pilot-testing was conducted in the University Practice Senior High School and Adisadel College in the Central Region of Ghana in January 2018. Before the pilot-testing, a letter was taken from the Head of Department of Education and Psychology, University of Cape Coast. Copies of the letters were sent to the authorities of the schools to seek for permission to conduct the pilot-testing. The students and the core mathematics teachers were randomly selected to participate in the pilot-testing of the instruments.

After the main data collection, a post reliability test was conducted on the instruments and reliability coefficients of 0.67 and 0.79 for the students and core mathematics teachers' questionnaires respectively were ascertained. As indicated by Pallant (2010), a reliability coefficient (alpha) of 0.60 or higher is considered moderately appropriate. This indicates that the reliability coefficients of 0.79 and 0.67 for the core mathematics teachers and students'

questionnaires show that the items on each of the questionnaires were appropriate in measuring the construct under consideration.

Ethical Issues that were considered in the Study

In pursuance of ethical issues, the right to privacy, voluntary participation, no harm to participants, anonymity and confidentiality were held in high esteem.

It should be emphasised that students and teachers have rights to privacy and as a result, these rights must be respected at every point in time. In this light, the rights of privacy of respondents in the study was respected and under no circumstances were respondents studied without their knowledge or consent. In addition, one of the key components regarding ethical issues in research has to do with respondents' voluntary participation. Responding to questionnaires in the study of this nature demanded a lot of time and energy which can lead to the disruption of the regular activities of respondents. It is for this motive that I explained the objectives and significance of the study to the respondents and therefore, allowed respondents to exercise their voluntary right in their participation of the study.

Another ethical issue in educational research has to do with the fact that, the exercise should not cause an injury to the participants under study irrespective of whether they volunteer or not to participate in the study. The concept of harm as used in this regard can be physical, psychological or emotional. In pursuance of this, questions were framed in a way that gave the respondents several alternatives and freedom in selecting the answers that were most appropriate to them.

Furthermore, as part of the ethical issues in research, the ultimate goal is to protect and safeguard the well-being, interest and the identity of the respondents. In pursuance of this, I adopted anonymity and confidentiality techniques such as disclosure of respondents' names in ensuring the protection of respondents. The respondents were therefore assured that the information they provided would be kept confidential.

In addition, it should be said that in research, unethical behaviour which include plagiarism is not welcomed. This normally originates when a researcher falsifies, distorts data or plagiarises other peoples' works. In this study, I followed strictly the prescribed standard of scientific behaviour to avoid plagiarism. I therefore gathered information from the right respondents and subjected the information gathered in proper analyses before writing the research report. Notably, ideas, works and writings were duly acknowledged by way of providing appropriate references in the in-text referencing and the main referencing as adopted by the University of Cape Coast.

Data Collection Procedures

Prior to the administration of the questionnaire, the headmasters and headmistresses of the various senior high schools selected for the study were written to for permission to conduct the study in their schools. With an introductory letter from the Head of Department of Education and Psychology of the University of Cape Coast, I visited the four selected senior high schools. Upon arrival at the senior high schools selected for the study, the authorities of the various schools were informed about the study. Having sought the consent of the management of the senior high schools, the students and the teachers that were selected to participate in the study were contacted. The purpose of

the study was explained to the participants (students and teachers) and the questionnaires were given out to the selected participants to complete.

It must be emphasised that, I administered the questionnaires personally to the 439 respondents out of which 381 respondents were students and 58 were senior high school core mathematics teachers with the support of three (3) field assistants who I had trained before the field work. The training programme included explaining the objectives of the study to the field assistants, how to identify respondents as well as data management. It should be pointed out that, the questionnaires were administered and collected within a period of three weeks in February and March 2018 with more than two days devoted to each school. The trained assistants and I moved from school to school to administer and collect the data until all the four schools were exhausted. In all, 25 minutes was given to the respondents to respond to the items on the instruments.

For the Senior High School students, a 100% response rate was attained whereas for the core mathematics teachers, the response rate stood at 86%.

Data Processing and Analysis

The data analysis phase consisted of editing, coding and statistical computation. Specifically, right after data collection, the items on each of the questionnaires were labelled serially to ensure easy identification, errors and easy coding. Frequencies were run to check for all errors such as outliers and missing values. The data gathered was then analysed with the aid of Statistical Packages for Social Sciences (SPSS, version 21) after the data had been collated and edited in order to address questions that were answered partially or not answered at all. It must be pointed out that, percentages and

frequencies as well as tables were used to analyse the background information of the respondents.

For research question one which sought to explore the perceived school environment factors that contribute to the low academic performance of Senior High School students in core mathematics, descriptive statistics such as mean and standard deviations were used to analyse the data.

For research question two which sought to explore the perceived teacher-related factors responsible for the low academic performance of Senior High School students in core mathematics in the Kumasi Metropolis, descriptive statistics such as mean and standard deviations were used to analyse the data.

In addition, for research question three which emphasised the perceived student-related factors that cause low academic performance of Senior High School students in core mathematics in the Kumasi Metropolis, descriptive statistics such as mean and standard deviations were also used to analyse the data.

For the last research question which sought to explore the home-related factors that contribute to the low academic performance of Senior High School students in core mathematics in the Kumasi Metropolis, descriptive statistics such as mean and standard deviations were used to analyse the data.

Confirmatory factor analysis was conducted to know the factor loadings and the correlations of each of the factors that emerged from the students' questionnaires that were perceived as the causes of low academic performance in core mathematics in the metropolis. This was done to ascertain which of the perceived factors were highly ranked in contributing to the low academic performance in core mathematics.

Chapter Summary

This study focused on the perceived causes of low academic performance of senior high school students in core mathematics in the Kumasi Metropolis. The chapter discussed the methods and procedures that were used to accomplish the objectives of the study. A review of the research design, population and sample, data collection instruments, data collection and analysis procedures as well as validity and reliability of the instruments have been described. As indicated above, descriptive research design with quantitative approach was most appropriate for the study. The use of the design came with some limitations such as introduction of bias into data collection procedures, inability of the quantitative methodology to allow for follow-ups on respondents' responses and failure of the methodology to give in-depth description on respondents' experiences as well as the large sample size as required by quantitative methodology which in actual fact was limited to some respondents in this study. Amidst the pitfalls of the design, since the study focused on obtaining information on the current status of respondents on what they perceived as causing low academic performance of students in core mathematics, the design was deemed appropriate.

CHAPTER FOUR

RESULTS AND DISCUSSION

Overview

The purpose of the study was to explore the perceived causes of low academic performance of senior high school students in core mathematics in the Kumasi Metropolis. For the purpose of the study, the descriptive survey with quantitative approach was deemed appropriate. Questionnaires for Senior High School students and core mathematics teachers were used to collect data for the study. Descriptive statistics such as means and standard deviations were used to analyse the gathered data in exploring the factors that are perceived to have caused students to perform low in core mathematics in the metropolis. A confirmatory factors analysis was conducted to show the factor loadings and the correlations of each of the factors.

The sample size for the study was 439 which was made of 381 Senior High School students and 58 core mathematics teachers. For the Senior High School students, a 100% response rate was attained. For the core mathematics teachers, the response rate stood at 86% because only 50 out of the 58 core mathematics teachers successfully returned the questionnaires. Hence, a sample size of 431 (That is, 381+ 50) was used in the analysis.

Results

Demographic characteristics of Senior High School students

This section surveyed students' responses on their demographic characteristics including gender, grade level, and programme of study. A summary of the responses on the demographic characteristics is presented in Tables 4 to 6.

Gender of students

The gender of students is presented in Table 4.

Table 4- *Gender of Students*

Students	Frequency	Percentage
Male	216	56.7
Female	165	43.3
Total	381	100.0

Source: Field survey (2018)

From Table 4, 56.7% (216) of the respondents were males while 43.3% (165) of the rest of the respondents were females. This indicates that, there were more males than females regarding the responses surveyed.

Students' grade level

The grade level of students is presented to Table 5.

Table 5- *Students' Grade Level*

Grade Level	Frequency	Percentage
SHS 2	199	52.2
SHS 3	182	47.8
Total	381	100.0

Source: Field survey (2018)

From Table 5, 52.2% (199) of the respondents were in SHS 2 while 47.8% (182) of the rest of the respondents were in SHS 3. This indicates that, the SHS 2 students outnumbered the SHS 3 students.

Students' programme of study

The programme of study of students is presented in Table 6.

Table 6- *Students' Programme of Study*

Programme of study	Frequency	Percentage
Business	76	19.9
General Arts	95	24.9
Home Economics	51	13.4
Science	112	29.4
Visual Arts	47	12.3
Total	381	100.0

Source: Field survey (2018)

From Table 6, 19.9% (76) of the students read Business, 24.9% (95) read General Arts, 13.4% (51) read Home Economics, 29.4% (112) read Science and 12.3% (47) read Visual Arts. The results show that majority of the students were Science students, followed by General Arts students, Business students, Home Economics and Visual Arts student being the minority.

Demographic characteristics of Senior High School core mathematics teachers

The section surveyed teachers' responses on their demographic characteristics including gender, academic qualification and length of service.

A summary of the responses on the demographic characteristics is presented in Tables 7 to 9.

Gender of Senior High School core mathematics teachers

The gender of Senior High School core mathematics teachers is presented in Table 7.

Table 7- *Gender of Senior High School Core Mathematics Teachers*

Gender	Frequency	Percentage
Male	45	90.0
Female	5	10.0
Total	50	100.0

Source: Field survey (2018)

From Table 7, 90% (45) of the respondents were males while 10% (5) of the rest of the respondents were females. This indicates that, there were more male teachers than female teachers regarding the responses surveyed.

Academic qualification of Senior High School core mathematics teachers

The academic qualification of Senior High School core mathematics teachers is presented in Table 8.

Table 8- *Academic Qualification of Senior High School Core Mathematics Teachers*

Academic Qualification	Frequency	Percentage
Frist Degree	36	72.0
Maters	14	28.0
Total	50	100.0

Source: Field survey (2018)

As indicated in Table 8, 72.0% (36) of the teachers had first degree while 28.0% (14) had their master's degree. This indicates that the number of teachers having their first degrees outnumbered those who had their masters' degrees.

Length of service as a core mathematics teacher

Senior High School core mathematics teachers' length of service is presented in Table 9.

Table 9- *Length of Service as a Core Mathematics Teacher*

Length of Service	Frequency	Percentage
Below 5 years	14	28.0
5 to 10 years	14	28.0
Above 10 years	22	44.0
Total	50	100.0

Source: Field survey (2018)

Form Table 9, 28.0% (14) of the teachers sampled have served below 5 years, another 28.0% (14) of the teachers sampled have served for 5 to 10 years and 44.0% (22) of the teachers indicated that they have served above 10 years. This shows that majority of teachers have served above 10 years.

Research Question One

What are the perceived school environment factors that cause low academic performance of Senior High School students in core mathematics in the Kumasi Metropolis?

The goal of this research question was to explore the factors which relate to the school environment that are perceived to have caused students to perform low in core mathematics in the Kumasi Metropolis. Factors that were

included are adequacy of teaching and learning materials, availability and use of core mathematics textbooks, adequacy of professional core mathematics teachers, regular organisation of in-service training, seminars and workshops and availability of conducive environment. It should be stressed that teachers were asked some questions relating to these factors because I believed that the teachers had a good understanding regarding these factors since they worked directly with the school and had access to these materials.

To achieve the objective of this research question, items were crafted and measured on a four-point Likert scale with 1- strongly disagree, 2- disagree, 3- agree and 4- strongly agree where 1 indicates the least agreement to the statement and 4 indicating the strongest agreement to the statements. Means and standard deviation were used to analyse the responses of respondents. In the analysis, mean values above 2.5 ($(1+2+3+4)/4 = 2.5$) shows that majority of the respondents agreed with the statement while a mean value below 2.5 shows that majority of the respondents disagreed with the statement. A summary of the responses is presented in Table 10.

Table 10- *Perceived School Environment Factors that Cause Low Academic Performance in Core Mathematics*

Statements	Freq.	Mean	Std. Dev
My school does not have adequate teaching and learning materials to support core mathematics lessons	50	2.72	.81
Core mathematics textbooks are not made available to students and teachers to enhance students' learning in my schools	50	2.74	.97
There are inadequate professional core mathematics teachers in my school	50	1.74	1.0
My school does not regularly organise in-service training, seminars and workshops for core mathematics teachers	50	3.22	.71
My school lacks a conducive environment for teaching and learning core mathematics	50	1.98	.89

Source: Field survey (2018)

From Table 10, it is evident that majority of the teachers agreed to the statements “My school does not have adequate teaching and learning materials to support core mathematics lessons” (Mean = 2.72, Std. Dev. = .81), “Core mathematics textbooks are not made available to students and teachers to enhance students' learning in my schools” (Mean = 2.74, Std. Dev. = .97) and “My school does not regularly organise in-service training, seminars and workshops for core mathematics teachers” (Mean = 3.22, Std. Dev. = .71).

It can however be inferred from the result that, the perceived school environment factors that might have caused the low academic performance in the Kumasi Metropolis included inadequate TLMs to support the teaching and learning of core mathematics, unavailability of core mathematics textbooks

and lack of in-service training, seminars and workshops organised by the school for core mathematics teachers.

Research Question Two

What are the perceived teacher-related factors that contribute to the low academic performance of Senior High School students in core mathematics in the Kumasi Metropolis?

The goal of this research question was to explore the factors that relate to teachers that were perceived to have caused students to perform low in core mathematics in the Kumasi Metropolis. Factors that were included were the use of poor teaching methods, teacher-student relationship, teachers' interest in students' progress, lateness, teacher absenteeism, completion of scheme of work and syllabus, attitude towards core mathematics, in-service training and seminars for teachers, preparation of lessons notes as well as teachers' pedagogical and content knowledge in core mathematics. Teachers were asked some questions relating to these factors because I believed that the teachers had a good understanding about themselves and their responses would reveal the difficulty they encountered in their profession.

To achieve the goal of this research question, items were crafted and measured on a four-point Likert scale with 1- strongly disagree, 2- disagree, 3- agree and 4- strongly agree where 1 indicates the least agreement to the statement and 4 indicating the strongest agreement to the statements. Means and standard deviations were used to analyse the responses of respondents. Mean values above 2.5 ($(1+2+3+4)/4 = 2.5$) shows that majority of the respondents agreed with the statement while a mean value below 2.5 shows

that majority of the respondents disagreed with the statement. A summary of the responses is presented in Table 11.

Table 11- *Perceived Teacher-related Factors that Cause Low Academic Performance in Core Mathematics*

Statements	Freq.	Mean	Std. Dev
Core mathematics teachers use poor teaching methods	50	1.58	.73
The relationship between core mathematics teachers and their students is poor	50	1.60	.64
Core mathematics teachers are not concerned about students' interest and progress	50	1.40	.64
Core mathematics teachers are often late in core mathematics lessons	50	2.52	.87
Core mathematics teachers' absenteeism is common in my school	50	1.46	.65
Core mathematics teachers most often do not complete their syllabus	50	2.98	.71
Core mathematics teachers show poor attitudes towards core mathematics	50	1.46	.68
In-service training, seminars and workshops are not organised regularly for core mathematics teachers in my school	50	3.28	.70
Core mathematics teachers in my school most often do not prepare their lesson notes	50	2.58	.88
Core mathematics teachers lack the pedagogical and content knowledge in teaching core mathematics	50	1.40	.67

Source: Field survey (2018)

From Table 11, it is depicted that a greater percentage of the respondents agreed that core mathematics teachers were often late in core mathematics

classes (Mean = 2.52, Std. Dev = .87) and that core mathematics teachers most often did not complete their syllabus (Mean = 2.98, Std. Dev = .71). From Table 11, majority of the sampled respondents agreed that in-service training, seminars and workshops were not organised regularly for core mathematics teachers in their school (Mean = 3.28, std. Dev = .70) and that core mathematics teachers in their school most often did not prepare their lesson notes (2.58, Std. Dev = .88).

The results of the research question have revealed that lateness of core mathematics teachers, inability of core mathematics teachers to complete their syllabus and lack of training, seminars and workshops as well as inability of teachers to prepare their lesson notes were perceived by core mathematics teachers as contributing to the low academic performance of SHS students.

Students were also asked some questions about their core mathematics teachers. The summary of result is presented in Table 12.

Table 12- *Students' Perceived Teacher-related Factors that Cause Low Academic Performance in Core Mathematics*

Statements	Freq.	Mean	Std. Dev
The relationship between core mathematics teachers and their students is poor	381	2.88	1.0
Core Mathematics teachers do not show interest in students' understanding	381	3.15	.95
Core mathematics teachers are often late in core mathematics lessons	381	2.65	.99
Core mathematics teachers' absenteeism is common in my school	381	2.86	1.0

Source: Field survey (2018)

The results from Table 12 indicate that majority of the students agreed to the statements “The relationship between core mathematics teachers and their students is poor” (Mean = 2.88, Std. Dev = 1.0), “Core mathematics teachers do not show interest in students’ understanding” (Mean = 3.15, Std. Dev = .95), “Core mathematics teachers are often late in core mathematics lessons” (Mean = 2.65, Std. Dev = .99) and “Core mathematics teachers’ absenteeism is common in my school” (Mean = 2.86, Std. Dev = 1.0). The results show that students believed that their relationship with core mathematics teachers was poor, teachers were often late in class, absenteeism of their teachers was common in their schools as well as teachers were not concerned about their interest and progress and these factors might have caused students to perform low academically in core mathematics.

Confirmatory factor analysis on students’ perceived teacher-related factors that cause low academic performance in core mathematics

Having explored the perceived teacher-related factors by students that might have caused low academic performance in core mathematics, a confirmatory factor analysis using Maximum Likelihood Method was conducted to know the factor loadings and the correlations of each item. Specifically, items that resulted from students’ questionnaire about their teachers as perceived as causing low academic performance in core mathematics were used in the analysis. This was due to the sample size that was required before a confirmatory factory analysis could be run, which in the view of Young and Pearce (2013) should be at least 300 and thus, since the sample size for students was 381 as against that of the teachers, 50, teacher-

related factors that originated from the students' questionnaire as contributing to the low academic performance were used.

The factors included poor relationship between core mathematics teachers and students, teachers' absenteeism, lateness of teachers in class and teachers' lack of interest in students' understanding. In the conduct of the analysis, all assumptions regarding confirmatory factors analysis were adhered to. Table 13 presents the summary of the assumptions.

Table 13- *KMO and Bartlett's Test*

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.715
Approx. Chi-Square	620.022
Bartlett's Test of Sphericity Df	105
Sig.	.000

Source: Field survey (2018)

From Table 13, the Kaiser-Meyer-Olkin Measure of Sampling Adequacy ($KMO > 0.5$) and Bartlett's Test of Sphericity were significant ($p = .000$). This meant the analysis could be conducted on the sample size that was used for the study.

In addition, in the conduct of the analysis, all items with factor loadings and correlations below 0.32 were rejected. The decision was made in accordance with Tabachnick and Fidell (as cited in Yong & Pearce, 2013) recommendation that, a rotated factor loading for a sample of 300 and more would need at least 0.32 to be considered statistically meaningful. The summary of the confirmatory factor analysis is presented in Table 14.

Table 14- *Results of Confirmatory Factor Analysis on Students' Perceived Teacher-related Factors that Cause Low Academic Performance in Core Mathematics*

Statements	Factor 1
The relationship between core mathematics teachers and their students is poor	.201
Core mathematics students do not show interest in students' understanding	.281
Core mathematics teachers are often late in core mathematics lessons	.391
Core mathematics teachers' absenteeism is common in my school	.913

1 = students' perceived teacher-related factors
Source: Field survey (2018)

The results from Table 14 show that “Core mathematics teachers' absenteeism is common in my school” had the highest factor of .913 and thus it was highly correlated to the low academic performance of students in core mathematics. This was followed by “Core mathematics teachers are often late in core mathematics lessons” with a factor loading of .391.

Research Question Three

What are the perceived student-related factors responsible for the low academic performance of Senior High School students in core mathematics in the Kumasi Metropolis?

The aim of this research question was to explore the factors which related to the SHS students that were perceived to have caused students to perform low in core mathematics in the Kumasi Metropolis. In answering this research question, students were asked some factors which included lateness of students in core mathematics lessons, students' absenteeism, failure of

students to do core mathematics assignments and class exercises, students are unhappy during core mathematics lessons, students' low self-esteem in core mathematics, peer group influence, attitude toward core mathematics, students' motivation in core mathematics, students spending limited time in studying core mathematics and core mathematics being abstract.

To achieve the objective of this research question, items were crafted and measured on a four-point Likert scale with 1- strongly disagree, 2- disagree, 3- agree and 4- strongly agree with 1 indicating the least agreement to the statements and 4 indicating the strongest agreement to the statements. Means and standard deviations were used to analyse the responses of respondents. In the conduct of the analysis, mean values above 2.5 ($(1+2+3+4)/4 = 2.5$) shows that majority of the respondents agreed with the statement while a mean value below 2.5 shows that majority of the respondents disagreed with the statement. A summary of the responses is presented in Table 15.

Table 15- *Perceived Student-related Factors that Cause Low Academic Performance in Core Mathematics*

Statements	Freq.	Mean	Std. Dev
Lateness of students in core mathematics lessons is common in my school	381	2.22	1.0
Students' absenteeism in core mathematics lessons is common in my school	381	2.51	1.1
Students most often fail to do core mathematics assignments and class exercises in my school	381	2.81	1.1
Students are unhappy during core mathematics lessons in my school	381	2.90	1.1

Students have low self-esteem in core mathematics in my school	381	3.15	.96
Peer group influence does not promote the learning of core mathematics in my school	381	2.82	1.1
Students exhibit poor attitude towards core mathematics in my school	381	2.89	1.1
Students are not motivated in learning core mathematics in my school	381	2.71	1.1
Students spend limited time in learning core mathematics in my school	381	2.87	1.0
Core mathematics is abstract due to the way it is taught in my school	381	2.79	1.1

Source: Field survey (2018)

With reference to Table 15, a greater percentage of the respondents agreed to the statements “Students’ absenteeism in core mathematics lessons is common in my school” (Mean = 2.51, Std. Dev = 1.1), “Students most often fail to do core mathematics assignments and class exercises in my school” (Mean = 2.81, Std. Dev = 1.1), “Students are unhappy during core mathematics lessons in my school” (Mean = 2.90, Std. Dev = 1.1) and “Students have low self-esteem in core mathematics in my school” (Mean = 3.15, Std. Dev = 1.0).

The results in Table 15 further indicate that majority of the respondents agreed to the statements, “Peer group influence does not promote the learning of core mathematics in my school” (Mean = 2.82, Std. Dev = 1.1), “Students exhibit poor attitude towards core mathematics in my school” (Mean = 2.89, Std. Dev = 1.1), “Students are not motivated in learning core mathematics in my school” (Mean = 2.71, Std. Dev = 1.1), “Students spend limited time in

learning core mathematics in my school” (Mean = 2.87, Std. Dev = 1.0) and “Core mathematics is abstract due to the way it is taught in my school” (Mean = 2.79, Std. Dev = 1.1).

The results in Table 15 show that student-related factors as perceived by students in causing low academic performance in core mathematics were students’ absenteeism in core mathematics lessons and failure of students to do core mathematics assignments and class exercises. It can be observed from Table 15 that students were unhappy during core mathematics classes, students had low self-esteem in core mathematics, and the inability of peer group influence to promote the teaching and learning of core mathematics were perceived by students as contributing to low academic performance in core mathematics. The results in Table 15 further show that students exhibited poor attitude toward core mathematics, students were not motivated to learn core mathematics, student spent limited time in studying core mathematics and core mathematics was abstract due to the way it was taught and might have caused students to perform low academically in core mathematics.

Core mathematics teachers were also asked about some factors they perceived on the part of students as causing low academic performance in core mathematics. These factors included students’ absenteeism, lateness of students, failure to do assignments and home works, lack of participation in class, lack of motivation, self-esteem of students and difficulty in understanding core mathematics lessons. A summary of result is presented in Table 16.

Table 16- *Teachers' Perceived Student-related Factors that Cause Low Academic Performance in Core Mathematics*

Statements	Freq.	Mean	Std. Dev
Students' absenteeism in core mathematics lessons is common in my school	50	2.64	.83
Lateness of students in core mathematics lessons is common in my school	50	2.66	.80
Students are unable to participate actively in core mathematics lessons	50	2.74	.60
Students are not motivated to study core mathematics	50	2.66	.82
Students in my school have low self-esteem in core mathematics	50	2.88	.82
Students in my school find it difficult to understand core mathematics lesson	50	2.54	.81

Source: Field survey (2018)

From Table 16, majority of respondents agreed to the statements "Students' absenteeism in core mathematics lessons is common in my school" (Mean = 2.64, Std. Dev = .83), "Lateness of students in core mathematics lessons is common in my school" (Mean = 2.66, Std. Dev = .80), and "Students are unable to participate actively in core mathematics lessons" (Mean = 2.74, Std. Dev = .60). In addition, a greater percentage of the respondents agreed further to the statements "Students are not motivated to study core mathematics" (Mean = 2.66, Std. Dev = .82), "Students in my school have low self-esteem in core mathematics" (Mean = 2.88, Std. Dev = .82) and "Students in my school find it difficult to understand core mathematics lesson" (Mean = 2.54, Std. Dev = .81).

The results in Table 16 show that from the perspective of the core mathematics teachers, students' absenteeism, lateness of students, inability of students to participate actively in core mathematics classes, lack of motivation, low self-esteem and difficulty of students in understanding core mathematics lessons might have caused students to perform low in core mathematics.

Confirmatory factor analysis on student-related factors

Having explored the student-related factors that might have caused low academic performance in core mathematics, a confirmatory factors analysis using Maximum Likelihood Method was conducted to know the factor loadings and the correlations of each item. Specifically, items that resulted from the various factors of the students' questionnaire were used in the analysis. This was due to the sample size that is required before confirmatory factory analysis can be run, which in the view of Young and Pearce (2013) should be at least 300 and thus, since the sample for students was 381 as against that of the teachers, 50, students-related factors that originated from the students' questionnaire as contributing to the low academic performance were used.

The factors included students' absenteeism in core mathematics lessons, failure of students to do core mathematics assignments and class exercises, students were unhappy during core mathematics classes, low self-esteem of students in core mathematics, inability of peer group influence to promote teaching and learning of core mathematics, students exhibited poor attitude toward core mathematics, students were not motivated to learn core mathematics, student spent limited time in studying core mathematics and core mathematics was abstract due to the way it is taught.

In the conduct of the analysis, all assumptions regarding confirmatory factors analysis were adhered to. Table 17 presents the summary of the assumptions.

Table 17- *KMO and Bartlett's Test*

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.715
Approx. Chi-Square	620.022
Bartlett's Test of Sphericity Df	105
Sig.	.000

Source: Field survey (2018)

From Table 17, the Kaiser-Meyer-Olkin Measure of Sampling Adequacy ($KMO > 0.5$) and Bartlett's Test of Sphericity were significant ($p = .000$). This means the analysis could be conducted on the sample size that was used for the study.

In addition, in the conduct of the analysis, all items with factor loadings and correlations below 0.32 were rejected. The decision was made in accordance with Tabachnick and Fidell (as cited in Yong & Pearce, 2013) recommendation that, a rotated factor loading for a sample of 300 and more would need at least 0.32 to be considered statistically meaningful. The summary of the confirmatory factor analysis is presented in Table 18.

Table 18- *Results of Confirmatory Factor Analysis for Student-related Factors*

Statements	Factor 1
Students' absenteeism in Core Mathematics lessons is common in my school	.479
Students most often fail to do Core Mathematics assignments and class exercise my in school	.474
Students are unhappy during Core Mathematics lessons in my school	.594
Students have low self-esteem in Core Mathematics in my school	.467
Students exhibit poor attitude toward Core Mathematics in my school	.562
Students are not motivated in learning Core Mathematics in my school	.434
Students spend limited time in studying Core Mathematics in my school	.289
Core Mathematics is abstract due to the way it is taught in my school	.451

1= Perceived student-related factors

Source: Field survey (2018)

The results from the confirmatory factor analysis in Table 18 indicate that “Students are unhappy during core mathematics lessons in my school” loads more (.594) and thus had a higher correlation in contributing to the low academic performance of students in core mathematics. This was followed by “Students exhibit poor attitude toward core mathematics in my school” (.562), “Students’ absenteeism in core mathematics lessons is common in my school” (.479), “Students most often fail to do core mathematics assignments and class exercise my in school” (.474), “Students have low self-esteem in core mathematics in my school” (.467), “Core mathematics is abstract due to the

way it is taught in my school” (.451), “Students are not motivated in learning core mathematics in my school” had the least factor loading (.434).

Research Question Four

What perceived home-related factors contribute to the low academic performance of Senior High School students in core mathematics in the Kumasi Metropolis?

The aim of this research question was to explore the home-based factors that contributed to the low academic performance of Senior High School students in core mathematics in the Kumasi Metropolis. In answering this research question, students were asked some factors that related to their home environments which included encouragement students received at home and provision of basic needs by their parents.

To achieve the objective of this research question, items were crafted and measured on a four-point Likert scale with 1- strongly disagree, 2- disagree, 3- agree and 4- strongly agree with 1 indicating the least agreement to the statements and 4 indicating the strongest agreement to the statements. Means and standard deviations were used to analyse the responses of respondents. It should be noted that, mean values above 2.5 ($(1+2+3+4)/4 = 2.5$) shows that majority of the respondents agreed with the statement while a mean value below 2.5 shows that majority of the respondents disagreed with the statement. A summary of the responses is presented in Table 19.

Table 19- *Perceived Home-related Factors that Contribute to Low Academic Performance in Core Mathematics*

Statements	Freq.	Mean	Std. Dev
My parents do not encourage me to learn core mathematics	381	1.70	1.0
My parents do not provide me with core mathematics textbooks and other basic needs to study core mathematics studying core mathematics	381	1.91	1.1

Source: Field survey (2018)

The results in Table 19 show that none of the home-based factors were perceived by students as causing low academic performance in core mathematics.

Discussion

It can be observed that a number of factors which relate to students, school environment, teachers and home have been explored as causing low academic performance of Senior High School students in core mathematics in the Kumasi Metropolis. The various factors in accordance with the results of study are discussed below:

School-environment factors

The perceived school-environment factors that were revealed as contributing to the low academic performance of Senior High School students in core mathematics in the Kumasi Metropolis were inadequacy of teaching and learning materials, unavailability of core mathematics textbooks to both teachers and students and lack of in-service training, seminars and workshops organised for core mathematics teachers.

Inadequacy of teaching and learning materials

The results of the study revealed that the schools in the Kumasi Metropolis have inadequate teaching and learning materials to support teaching and learning of core mathematics. As indicated by Lockheed and Verspoor (as cited in Adane, 2013), teaching and learning materials facilitate the instructional processes due to the fact that they provide information, help in the organisation of the scope and the sequence of the instruction and provide opportunities for the students to apply the concepts they have learned.

In essence, according to Adane (2013), the availability of teaching and learning material enhances the effectiveness and efficiency of the teachers' lessons which consequently improves the performance of students. The finding re-emphasises the studies conducted by Sa'ad et al. (2014), Etsey (2005), Mensah et al. (2013) and Mbugua et al. (2012) who opined that inadequate teaching and learning materials cause poor performance in mathematics by students. On this score, a situation where there is the absence of teaching and learning materials makes teaching and learning more abstract which consequently affect students' performance and that was what might have happened in the Kumasi Metropolis.

Unavailability of core mathematics textbooks to both teachers and students

It has been observed that core mathematics textbooks were not made available to both teachers and students. It should be noted that core mathematics textbooks are needed because they are the basic textbooks which are to be used by students and teachers (Etsey, 2005). In actual fact, exercises

are given from the textbooks and the use of the textbooks enables students to understand and learn further what they have been taught.

The lack of textbooks or the unavailability of them as justified in the Kumasi Metropolis implied that the students were unable to do further studies to understand and gain efficient knowledge in mathematics which will consequently affect their academic performance in core mathematics. The finding is therefore in line with Etsey (2005) who posited that lack of textbooks makes students unable to do a lot of exercises which make them receive little or no attention and feedback to enhance their knowledge and improve their academic performance.

Lack of in-service training, seminars and workshops organised by schools

The result of the study revealed that Senior High Schools in the Kumasi Metropolis did not regularly organise in-service training, seminars and workshops for core mathematics teachers. As contended by Mwenda et al. (2013), the ability of a school to organise regular in-service training programmes for teachers would enhance teachers' understanding about the current trends in their profession which when done, would boost students' academic performance.

The fact that in-service training, seminars and workshops were not organised regularly for teachers in the Kumasi Metropolis suggests that core mathematics teachers in the metropolis lacked the knowledge of the current trends in practice of their profession which might contribute to the low academic performance of students. The finding is therefore in line with Mwenda et al. (2013) in that, when schools organise regular in-service training programmes, seminars and workshops for teachers, their knowledge of the

current trends in their profession would improve and this positively affect the academic performance of students.

Teacher-related factors

The study revealed the following perceived teacher-related factors as contributing to low academic performance of students in core mathematics. These were, lateness of core mathematics teachers, inability of core mathematics teachers to complete their syllabus, lack of training, seminars and workshops, and inability of teachers to prepare their lesson notes. Further factors revealed by students on their teachers were poor relationship between core mathematics teachers and students, lateness of teachers in class, teachers' absenteeism and teachers being not concerned about students' interest and progress.

Incidence of lateness and absenteeism

The results of the study showed that core mathematics teachers were often late to core mathematics classes. Etsey (2005) stressed that when teachers get to school late, they are unable to take part in the morning assembly and commence classes on time. Notably, lateness and absenteeism reduce the amount of instructional time which lead to the inability of teachers to complete their syllabi (Etsey, 2005). Fobih et al. (as cited in Adane, 2013) explained that lateness ranges from five minutes to one and half hours and thus, teachers taught fewer school subjects any time they were late and absent in their schools.

The finding is in line with studies of Mwenda et al. (2013), Etsey (2005), Sa'ad et al. (2014) and World Bank (2004) who were of the view that lateness and absenteeism of teacher are critical in determining the academic

performance of students. On this score, core mathematics teachers in the metropolis were therefore not able to cover a lot more of the syllabus before final exams because of the incidence of lateness and absenteeism which might have resulted in a lower output of work by the students.

Inability of core mathematics teachers to complete their syllabus

The results of the study revealed that core mathematics teachers were not able to complete their syllabus. The completion of syllabus provides the foundation for the next grade level to be built upon. In this regard, when syllabuses are not completed, content that should be taught in the next class which is based on the previous class could not be taught thereby leaving a backlog in content which affects academic performance (Mefor, 2014). The finding specifically confirms the finding of Etsey (2005) who was of the view that non-completion of a syllabus or scheme of work could have a cumulative effect on students such that as they progress to different grade levels, they encounter materials they did not have the foundation to study and thus, poor academic performance is the result.

Gleaning from the findings of Anane (2015), teachers adjust the sequence of their curriculum based on what is included in high stake tests like WASSCE in order to improve tests scores. In this regard, from the view of Anane (2015), there is the likelihood that core mathematics teachers might have ignored some vital aspects in the syllabus that did not appear on high stake tests leading to the incompleteness of the syllabus thereby affecting students' academic performance negatively in core mathematics.

Inability of teachers to prepare their lesson notes

The result of the study indicates that, in the Kumasi Metropolis, SHS core mathematics teachers failed to prepare their lesson notes. Enu et al. (2015) have indicated that teachers' work habit including how they prepare for their lesson by preparing their lesson notes significantly contributes to how well they would be focused and directed in their delivery in class. A situation where this is prevalent will result to lack of focus, direction and systematic delivery of lessons in enhancing students' understanding and better their (students) learning outcomes and this would affect their academic performance negatively.

Poor relationship between core mathematics teachers and students

The result of this study as indicated by students uncovered that core mathematics teachers' relationship with their students is poor. Mensah et al. (2013) have emphasised that a good relationship between teachers and students bring to light positive attitude which radiate confidence in students and make them develop positive attitudes toward the learning of core mathematics which boost students' academic performance positively.

From the views of Mensah et al. (2013), when teachers have bad relationship with their students, the students may find it very difficult to express themselves about the content they may find problems with. When solutions are not found with students' problems, they are likely to be repeated and therefore affect their performance. In confirming the views of Mensah et al. (2013), the fact that the relationship between core mathematics teachers and their students is poor, it is likely that some misconceptions and problems

on the part of students in core mathematics were not addressed which might have contributed to the low academic performance of students.

Lack of interest in students' understanding of core mathematics lessons

According to the students, the study uncovered that core mathematics teachers were not concerned about their interest and progress. Etsey (2005) has stressed that understanding the lesson is likened to students' output and outcome and as a result, the greater the understanding of the lesson, the higher the output of students with regard to exercises, assignments and tests. In particular, the finding is in line with Etsey (2005) who stressed that when the teacher shows less concern and interest about students' understanding of lesson, it leads to low academic performance and might have happened in the case of the students in the Kumasi Metropolis.

In this sense, since core mathematics teachers in the Kumasi Metropolis exhibited less concern of their students' understanding of the concepts taught, the outcome was that their academic output in terms of their academic performance in core mathematics was low and it is in this regard that Aggarwal (as cited in Estey, 2005) maintained that best learning takes place when the teacher is successful in arousing the interest of the students.

Lack of in-service training, seminars and workshops organised for core mathematics teachers

The study revealed that core mathematics teachers lacked in-service training, seminars and workshops. The findings of this study showed that the schools were unable to organise training programmes for their teachers. In the view of Mwenda et al. (2013), when in-service training, seminars and workshops are not organised regularly for teachers, they may lack the

necessary training and the current trends in practice of their profession which would affect students' academic performance negatively and this has been justified in the case of the teachers in the Kumasi Metropolis.

Results of the confirmatory factor analyses of teacher-related factors

The results from the confirmatory factor analysis on the teacher-related factors showed that, teachers' absenteeism loads more followed by lateness of teachers and they are highly correlated in contributing to the causes of low academic performance in core mathematics. The factors that are revealed by the analysis confirm the positions of Mwenda et al. (2013), Enu et al. (2015), and Sa'ad et al. (2014) as being the highest contributors of low academic performance.

Student-related factors

The student-related factors were students' absenteeism in core mathematics lessons, failure of students to do core mathematics assignments and class exercises, students were unhappy during core mathematics classes, low self-esteem of students in core mathematics, inability of peer group influence to promote teaching and learning of core mathematics, students exhibited poor attitude toward core mathematics, students were not motivated to learn core mathematics, students spent limited time in studying core mathematics and core mathematics was abstract due to the way it was taught. Additional factors were inability of students to participate actively in core mathematics classes, and difficulty of students in understanding core mathematics lessons.

Incidence of lateness and absenteeism

Lateness and absenteeism of students were the common problems in the Kumasi Metropolis. The results of the study revealed that students were often absent and late in core mathematics classes. Etsey (2005) suggested that the effect of lateness and absenteeism is that concepts taught becomes difficult for a student to understand on his or her own and thus, continue missing of classes could lead to loss of content taught and knowledge.

The finding confirms the findings of Mwenda et al. (2013), Allen-Meares et al. (2000) and Etsey (2005) who indicated that students' absenteeism and lateness accounted for the poor academic performance of students. In actual fact, the result of incidence of lateness and absenteeism is that students in the metropolis might not grasp in totality the concepts that were taught, which might have resulted in their inability to do class exercises and assignments thereby resulting in low academic performance.

Failure of students to do core mathematics assignments and class exercises

The results of the study showed that students did not do core mathematics assignments and class exercises. It is evident that students' absenteeism, lateness, lack of interest and lack of understanding would lead to their inability to do class exercises and assignments (Mwenda et al., 2013). The end result is that students were unable to practice regularly the concepts taught and thus, might repeat problems they encountered in similar situations which might have affected their academic performance.

In addition, Engin-Demir (2009) noted that when students devote more time in studying and do their assignment and homework, their grades are

boosted which boosts their academic performance. This was emphasised by Butler (as cited in Etsey, 2005) that homework tends to depict a positive relationship with respect to learning outcomes of students when the given assignment is relevant to learning objectives.

According to Alomar (2006), assignments serve as an interaction between the school and home which plays a central role in measuring the academic performance of the students. Although students who are in the boarding house do not go home and do their assignments, their dormitories serve as their immediate homes. This finding is in line with the views of Engin-Demir (2009) and Mwenda et al. (2013) who emphasised that failure to do assignments and class exercises leads to low academic performance of students. Although most of the respondents that were sampled for the study were borders, the finding still applies because they are given assignments to be done in their dormitories.

Students were unhappy and demotivated during core mathematics classes

In the Kumasi Metropolis, it was noted that students were not motivated and were unhappy during core mathematics lessons. Sa'ad et al. (2014) stressed that students' motivation is a necessary tool to enhance their understanding and performance. The finding also re-emphasises the positions of Enu et al. (2015) who were of the view that self-motivation also influences performance in mathematics.

Etsey (2005) revealed that when students do not show interest in what they learn, understanding of the lesson and the desire to learn are reduced which consequently affect their academic performance and drawing from the views of Etsey (2005) and Enu et al. (2015), the fact that students were

unhappy and demotivated hindered their understanding and participation in the teaching and learning of core mathematics and that lowered their academic performance in the subject.

Low self-esteem of students in core mathematics

The results of the study revealed that students in the Kumasi Metropolis had low self-esteem in core mathematics. As indicated by Diaz (2003), a student's self-image about a specific subject facilitates his or her acceptance, rejection or interest and further motivates him or her in the subject. The finding is supported Diaz (2003) who posited that, when students become demotivated and show no interest in what they do, their self-concept and esteem are lowered which later affect their academic performance. The fact that students in the Kumasi Metropolis exhibited low self-esteem in core mathematics could be that they were demotivated, uninterested and rejected which affected their performance in core mathematics.

Inability of peer group influence to promote teaching and learning of core mathematics

The results of the study showed that peer group influence did not promote the teaching and learning of core mathematics in the Kumasi Metropolis. It is evident that students spent a lot of time with their peers especially when they are in school. To a very large extent, the actions of peers affect students because they see them as their own (Adane, 2015). In situations where peers of a particular student exhibit negative attitude toward core mathematics, such a student would also follow suit which would affect their academic performance and the vice versa.

Poor attitude toward core mathematics and limited time spent in studying core mathematics

It is evident in the results of the study that students in Kumasi Metropolis exhibited poor attitude toward core mathematics and spent limited time in studying core mathematics. Mbugua et al. (2012) theorised that poor attitudes by both teachers and students as well as retrogressive practices affect students' academic performance in mathematics. In addition, Engin-Demir (2009) noted that irrespective of how intelligent a student is, if he or she devotes more time regarding their study, it tends to improve on their grades which boost their academic performance. In this sense, the amount of time a student devotes in studying is strongly related to motivation and interest of the student.

Conclusively, the findings confirm the positions of Mbugua et al. (2012) and Engin-Demir (2009) that, when students develop poor attitude towards core mathematics, they would not be motivated and show interest in learning it. This would prevent the students from spending enough time in studying core mathematics because of lack of interest which causes them to perform poorly and this might have happened in the case of the students in the Kumasi Metropolis.

Core mathematics lessons was abstract and student had difficulty in understanding core mathematics lesson

The result of the study indicated that core mathematics lessons was abstract and that students found it difficult to understand core mathematics. Etsey (2005) noted that understanding of lesson is strongly associated with academic performance. A major pre-requisite for lack of understanding could

be attributed to the abstractness of core mathematics because of the way it is taught.

In confirming the position of Etsey (2005), when concepts taught are not applied to and linked with the real life situations of students, and supported by effective teaching and learning materials, students find it very difficult to understand the lessons which would lead to low academic performance and this might have happened in the case of the students in the Kumasi Metropolis.

Lack of participation of students in core mathematics classes

The result of the study revealed that students did not actively participate in core mathematics classes. From the studies of Etsey (2005), Mwenda et al. (2013), Mbugua et al. (2012) and Sa'ad et al. (2014), when students do not understand mathematical concepts, have low self-esteem, are demotivated and exhibit poor attitude toward mathematics, they would not be able to participate actively in core mathematics classes and that was what might have happened to the students in the Kumasi Metropolis.

Results of the Confirmatory Factors Analyses of student-related factors

The results from the confirmatory factor analysis on the student-related factors showed that, students were unhappy during core mathematics lessons loads more which had a higher correlation than the rest of the student-related factors. The end results of students' unhappiness would lead to poor attitude as exhibited by students towards core mathematics. It was however not surprising that students exhibited poor attitudes towards core mathematics had the second highest factor loading and correlation.

The factors that are revealed by the analysis confirm the positions of Etsey (2005), Mwenda et al. (2013), Enu et al. (2015), Mbugua et al. (2012),

Sa'ad et al. (2014) and Wali (2016) that these factors relating from students affect academic performance. As indicated by Yong and Pearce (2013), since factors loadings can be interpreted like standardised regression coefficients, it can be said that these factors might have contributed to the low academic performance of Senior High School students in core mathematics.

Home-related factors

The result of the study did not indicate any home-related factors that were perceived by Senior High School students as causing low academic performance in core mathematics. A notable reason could be that, since majority of the students who were sampled were in boarding schools, the factors did not apply directly to their situations.

Chapter Summary

The chapter has presented the results and discussion of the study. The findings of the study have revealed factors that relate to the school environment, teachers and students as possible contributory factors to the low academic performance of students in core mathematics. The school-environment factors are, inadequate teaching and learning materials to support core mathematics, unavailability of core mathematics textbooks and lack of regular in-service training, seminars and workshops by the schools to support the teaching and learning of core mathematics. The findings of the study also revealed teacher-related factors to include lateness and absenteeism in core mathematics classes, inability of teachers to complete their syllabus and prepare their lesson notes, poor relationship between teachers and students, lack of interest in students' understanding, and lack of in-service training, seminars and workshops for core mathematics teachers.

The student-related factors were lateness and absenteeism in core mathematics classes, failure of students to do assignments and class exercises, students were unhappy and demotivated in core mathematics classes, low self-esteem, poor attitude toward core mathematics, students spent limited time in studying core mathematics and core mathematics was abstract due to the way it was taught. The study also revealed lack of understanding by students, lack of active participation of students in classes and inability of peer group influence to promote the teaching and learning of core mathematics. However, the findings of the study did not show any home-based factors that were perceived by students as causing low academic performance in core mathematics.

The confirmatory factor analysis further revealed that students were unhappy in core mathematics classes and teachers' absenteeism had the highest factor loadings.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

The chapter presents a summary of the key findings, the conclusions drawn as well as recommendations made in the study. The chapter also presents the contributions of the study to knowledge and suggestions for further research.

Overview of the Study

The study sought to obtain evidence of the perceived factors that cause low academic performance of Senior High School students in core mathematics in the Kumasi Metropolis of the Ashanti Region of Ghana. In pursuance of the purpose, the following research questions guided the study:

1. What are the perceived school-environment factors that contribute to the low academic performance of Senior High School students in core mathematics in the Kumasi Metropolis?
2. What are the perceived teacher-related factors that cause the low academic performance of Senior High School students in core mathematics in the Kumasi Metropolis?
3. What are the perceived student-related factors responsible for the low academic performance of Senior High School students in core mathematics in the Kumasi Metropolis?

4. What perceived home-based factors contribute to the low academic performance of Senior High School students in core mathematics in the Kumasi Metropolis?

The descriptive research design with quantitative approach was used. Senior High School students and core mathematics teachers' questionnaires were used to collect data from a sample of 439 respondents (which included 381 students and 58 core mathematics teachers) who were selected through multi-staged sampling procedures. The statistical tools that were used in the analysis included frequencies, percentages, means and standard deviations. Further analysis was conducted by running a confirmatory factor analysis.

Summary of Key Findings

The key findings are presented in accordance with the objectives of the study as follows:

The first objective of the study was to explore the perceived school environment factors that might have contributed to the low academic performance of Senior High School students in core mathematics in the Kumasi Metropolis. The key findings that emerged were inadequate teaching and learning materials, unavailability of core mathematics textbooks and lack of regular in-service training, seminars and workshops.

The second objective of the study was to explore the perceived teacher-related factors that might have caused the low academic performance of Senior High School students in core mathematics in the Kumasi Metropolis. The key findings that emerged were lateness and absenteeism in core mathematics classes, inability of teachers to complete their syllabus and

prepare their lesson notes, poor relationship between teachers and students, lack of interest in students' understanding of core mathematics.

The third objective of the study was to explore the perceived student-related factors responsible for the low academic performance of Senior High School students in core mathematics in the Kumasi Metropolis. The key findings that emerged were lateness and absenteeism in core mathematics classes, failure of students to do assignments and class exercises, students being unhappy and demotivated in core mathematics classes, low self-esteem and poor attitude toward core mathematics. Further findings revealed that, Senior High School students spent limited time in studying core mathematics, core mathematics was abstract due to the way it was taught, lack of understanding and lack of active participation of students in core mathematics classes.

The last objective of the study was to explore the home-based factors that contributed to the low academic performance of School High School students in core mathematics in the Kumasi Metropolis. The findings did not show any home-related factor that was perceived by students as causing low academic performance.

Further analysis revealed that students were unhappy in core mathematics classes and teachers' absenteeism had the highest factor loadings in a confirmatory factor analysis.

Conclusions

From the findings of the study, the following conclusions are drawn:

First and foremost, it can be concluded from the findings that, the perceived factors that result from students, teachers and the school

environment that have been revealed in this study do not operate in isolation. For instance, when teachers absent themselves and are late in core mathematics classes, it would result in incompleteness of the syllabus which would also affect students' motivation, enthusiasm, commitment and understanding of core mathematics. In addition when the school fails to organise in-service training, seminars and workshops or fails to provide teaching and learning materials, teaching becomes problematic, which consequently affect the academic performance of students.

Secondly, it can be concluded from the findings that both the teachers and students did not put in their best when it comes to students' academic performance in core mathematics. Since teachers work directly with students, the presence of the factors that have been revealed as a result of the actions of the teachers and students hinder effective teaching and learning of core mathematics. It can therefore be concluded that both teachers and students failed to do their best regarding the teaching and learning of core mathematics in the Kumasi Metropolis and that might have resulted in the low performance.

Furthermore, since the study did not reveal any factors from home as causing low academic performance in core mathematics, it can be concluded that the low academic performance of Senior High School students in the metropolis could not be attributed to factors from the home.

Finally, it should be stressed that when an individual lacks the happiness to execute a task, naturally, that individual faces problems such as lack of zeal, and motivation in executing the task. The fact that students were unhappy and teachers' absenteeism had the highest factor loadings, it can therefore be

concluded from the findings that teachers' absenteeism and students being unhappy in core mathematics classes might have contributed most to the low academic performance of Senior High School students in the Kumasi Metropolis.

Recommendations

The findings from this study have the under listed recommendations for policy and programme interventions in the Senior High School schools in the Kumasi Metropolis in the following key areas:

1. The Ministry of Education as well as the Ashanti Regional Educational Directorate must enforce the necessary laws and actions to curb the menace of lateness and absenteeism of students and core mathematics teachers. Teachers and students must be appropriately monitored and the necessary sanctions must be duly applied to teachers and students when found guilty of being late and absent from school hours. This will serve as a deterrent to others and also uphold discipline to boost the academic performance of students in core mathematics.
2. Core mathematics teachers should be encouraged by all stakeholders of education such as parents, school authorities, educational authorities and government agencies in education to exhibit good and appropriate academic relationship with their students. This will pave the way and encourage students to approach their teachers whenever they have problems with their studies in core mathematics. By so doing, students' doubts and misconceptions will be addressed thereby enhancing their understanding which will consequently improve their academic performance.

3. Students should also be encouraged by their parents, teachers, peers and other stakeholders in education to exhibit good attitude toward mathematics, be happy and increase their enthusiasm to do mathematics. Students must develop the interest and the motivation to study core mathematics by constantly practicing what they are taught. Constant practice in mathematics would help develop their zeal and see core mathematics as a relevant subject in their academic and daily lives.
4. Core mathematics teachers should also communicate the relevance of core mathematics to students, link the teaching and learning of core mathematics to the daily and real life situations of students, find and use appropriate teaching and learning materials to enhance students' understanding. When this is done, students will feel part and parcel of the teaching and learning processes and also participate actively in whatever that goes on in core mathematics classrooms.
5. Core mathematics teachers should develop appropriate strategies to complete their scheme of work and the syllabus as well as prepare adequate lesson notes and ensure that they cover all the relevant aspects of the syllabus to improve students' learning and performance.
6. The study recommends further that the Senior High School in the Kumasi Metropolis should make efforts to provide the necessary teaching and learning material that are needed to enhance the teaching and learning of core mathematics. Regular and appropriate in-service training, seminars and workshop should be organised for core mathematics teachers so that they will be in the know of the current

trends in their profession. In addition, core mathematics textbooks should be made available for use to both teachers and students by the school and other stakeholders in education so that they can refer, practice and read from these textbooks to enhance their understanding.

7. In addition, the study recommends that students should associate themselves with peers who will guide them to develop the zeal and interest to study core mathematics. Students must avoid bad peers and companies who prevent them from studying. Students should make sure that the influence they receive from their peers is the one that will promote effective learning especially in core mathematics.
8. Lastly, the study recommends that, for an improvement in the low academic performance of students in core mathematics, attention should not be given to the individual factors but rather, it should involve all the factors.

Contribution to Knowledge

It must be pointed out that within the context of educational research, an original contribution to knowledge is very important. Silverman (2007) maintains that the ability of any research to contribute to knowledge could be displayed in four key areas which include developing a concept, thinking through the methodology, building on an existing study and being able to change directions. In this sense, this study can be seen as generally building on existing studies to add to knowledge in the field of the perceived causes of low academic performance of Senior High Senior students in core mathematics.

The modest contributions made by this study are that, factors that relate to the school environment, teachers and students have been revealed as

possible contributors to the low academic performance of students in core mathematics especially at the Senior High School level. Since majority of the studies conducted on the topic focused on the basic schools, the factors as indicated from the findings of this study have added up to body of knowledge in literature on the topic. The study has particularly revealed and added additional factors from teachers which include, inability of teachers to prepare their lesson notes and inability to complete their syllabus as causing low academic performance in core mathematics.

In addition, the study has contributed to knowledge by adding additional student-related factors which are, core mathematics being abstract due to the way it is taught and inability of peer group influence to promote the teaching and learning of core mathematics as contributing to the low academic performance in core mathematics. Lastly, the confirmatory factors analysis that was conducted revealed that students being unhappy during core mathematics lessons and teachers' absenteeism had the highest factor loadings for students and teachers' factors.

Suggestions for Further Research

With reference to the present scope of the study, it is suggested that future research work should extend beyond the Kumasi Metropolis of Ashanti Region of Ghana to involve other metropolis, assemblies and districts throughout the country. In addition, it is suggested that a study is carried out by future researchers to find out the relationship among school-related factors, teacher factors, school environment factors and home-based factors in predicting Senior High School students' academic performance in core mathematics and other core subjects like Integrated Science and English.

Finally, it is suggested that a similar study be conducted using private Senior High School in the Kumasi Metropolis and other metropolis, assemblies and districts in Ghana.

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APPENDICES

APPENDIX A

UNIVERSITY OF CAPE COAST

DEPARTMENT OF EDUCATION AND PSYCHOLOGY

QUESTIONNAIRE FOR SHS STUDENTS

Dear Respondent,

I am a student of the University of Cape Coast conducting research on the perceived causes of low academic performance of Senior High School students in Core Mathematics in the Kumasi Metropolis of the Ashanti Region of Ghana. I humbly seek for your permission for you to participate in this study. The information you will provide shall be used for academic purpose only without revealing your identity. Please try your best to give truthful responses because there are no right or wrong responses.

Kindly indicate your choice by ticking (✓) or writing your responses in the spaces provided

SECTION A

BACKGROUND INFORMATION

1. Gender:
Male [] Female []

2. Grade Level:
SHS 2 [] SHS 3 []

3. Programme of Study:
Business []
General Arts []
Home Economics []
Science []
Visual Arts []
Others (Specify)

SECTION B

Perceived student-related factors that contribute to low academic performance of students in core mathematics

Kindly tick (√) the appropriate column to indicate the extent to which you agree to the following statements that relate to the perceived student-related factors that contribute to low academic performance of SHS students in Core Mathematics. Ratings: 1- Strongly Disagree, 2- Disagree, 3- Agree and 4- Strongly Agree.

Statements	1	2	3	4
4. Lateness of students in core mathematics lessons is common in my school				
5. Students' absenteeism in core mathematics lessons is common in my school				
6. Students most often fail to do core mathematics assignments and class exercise my in school				
7. Students are unhappy during core mathematics lessons in my school				
8. Students have low self-esteem in core mathematics in my school				
9. Peer group influence does not promote the learning of core mathematics in my school				
10. Students exhibit poor attitude toward core mathematics in my school				
11. Students are not motivated in learning core mathematics in my school				
12. Students spend limited time in studying core mathematics in my school				
13. Core Mathematics is abstract due to the way it is taught in my school				

SECTION C

Perceived home-related factors that contribute to the low academic performance of SHS students in core mathematics

Kindly tick (√) the appropriate column to indicate the extent to which you agree to the following statements that relate to the perceived home-related factors that contribute to low academic performance of SHS students in Core Mathematics. Ratings: 1- Strongly Disagree, 2- Disagree, 3- Agree and 4- Strongly Agree.

Statements	1	2	3	4
14. My parents do not encourage me to learn Core Mathematics				
15. My parents do not provide me with core mathematics textbooks and other basic needs to study core mathematics				

SECTION D

Perceived teacher-related factors that contribute to the low academic performance of SHS students in core mathematics

Please indicate your level of agreement by ticking the statements that relate to the perceived teacher-related factors contributing to low academic performance of SHS students. Ratings: 1- Strongly Disagree, 2- Disagree, 3- Agree and 4- Strongly Agree.

Statements	1	2	3	4
16. The relationship between core mathematics teachers and their students is poor				
17. Core mathematics teachers do not show interest in students' understanding				

18. Core mathematics teachers are often late in Core Mathematics lessons				
19. Core mathematics teachers' absenteeism is common in my school				

THANK YOU!

APPENDIX B

UNIVERSITY OF CAPE COAST

DEPARTMENT OF EDUCATION AND PSYCHOLOGY

QUESTIONNAIRE FOR SHS CORE MATHEMATICS TEACHERS

Dear Respondent,

I am a student of the University of Cape Coast conducting research on the perceived causes of low academic performance of Senior High School students in Core Mathematics in the Kumasi Metropolis of the Ashanti Region of Ghana. I therefore seek for your co-operation and consent to participate in this study. The data shall be used for academic purpose only and it will be treated with all the confidentiality it deserves. You are encouraged to respond to the statements in this questionnaire in the most truthful and objective way as possible. There is no right or wrong response, so kindly feel free to tick (where appropriate) the responses that express your views.

Please indicate your choice by ticking (✓) or writing your responses where applicable

SECTION A

BACKGROUND INFORMATION

1. Gender:
Male [] Female []

2. Academic Qualification:
Certificate A []
Diploma []
First Degree []
Masters []
Others (Specify)

3. Length of service as teacher:
Below 5 years []
5 – 10 years []
Above 10 years []

SECTION B

Perceived teacher-related factors contributing to the low academic performance of SHS students in core mathematics

Please indicate your level of agreement by ticking the statements that relate to the perceived teacher-related factors contributing to low academic performance of SHS students. Ratings: 1- Strongly Disagree, 2- Disagree, 3- Agree and 4- Strongly Agree.

Statements	1	2	3	4
4. Core mathematics teachers use poor teaching methods				
5. The relationship between core mathematics teachers and their students is poor				
6. Core mathematics teachers are not concerned about students interest and progress				
7. Core mathematics teachers are often late in Core Mathematics lessons				
8. Core mathematics teachers' absenteeism is common in my school				
9. Core mathematics teachers most often do not complete their scheme of work				
10. Core mathematics teachers show poor attitudes towards Core Mathematics				
11. In-service training, seminars and workshops are not organised regularly for core mathematics teachers in my school				
12. Core mathematics teachers in my school most often do not prepare their lesson notes				
13. Core mathematics teachers lack the pedagogical and content knowledge in teaching Core Mathematics				

SECTION C

Perceived school-related factors that contribute to the low academic performance of SHS students in core mathematics

Please indicate your level of agreement to the following statements that relate to the perceived school-related factors that contribute to the low academic performance of students in Core Mathematics by ticking the appropriate response. Ratings: 1- Strongly Disagree, 2- Disagree, 3- Agree and 4- Strongly agree.

Statements	1	2	3	4
14. My school does not have adequate teaching and learning material (TMLs) to support core mathematics lessons				
15. Core mathematics textbooks are not made available to students and teachers to enhance students' learning in my school				
16. There are inadequate professional core mathematics teachers in my school				
17. My school does not regularly organise in-service training, seminars and workshops for core mathematics teachers				
18. My school lacks a conducive environment for teaching core mathematics				

SECTION D

Perceived student-related factors that contribute to the low academic performance of SHS students in core mathematics

Please indicate your level of agreement to the following statements that relate to the perceived student-related factors that contribute to the low academic performance of students in Core Mathematics by ticking the appropriate

response. Ratings: 1- Strongly Disagree, 2- Disagree, 3- Agree and 4- Strongly agree.

Statements	1	2	3	4
19. Students' absenteeism in core mathematics lessons is common in my school				
20. Lateness among students in core mathematics lessons is common in my school				
21. Students do not do core mathematics class exercises and assignments				
22. Students are unable to participate actively in core mathematics lessons				
23. Students are not motivated to study core mathematics				
24. Students in my school have low self-esteem in core mathematics				
25. Students in my school find it difficult to understand core mathematics lessons				

THANK YOU!

APPENDIX C

INTRODUCTORY LETTER

UNIVERSITY OF CAPE COAST
COLLEGE OF EDUCATION STUDIES
FACULTY OF EDUCATIONAL FOUNDATIONS

DEPARTMENT OF EDUCATION AND PSYCHOLOGY

Telephone: 233-3321-32440/4 & 32480/3
Direct: 033 20 91697
Fax: 03321-30184
Telex: 2552, UCC, GH.
Telegram & Cables: University, Cape Coast
Email: edufound@ucc.edu.gh



UNIVERSITY POST OFFICE
CAPE COAST, GHANA

27th February, 2018

Our Ref:

Your Ref:

The Regional Director
Ghana Education Service
Ashanti Region

Dear Sir/Madam,

THESIS WORK

LETTER OF INTRODUCTION: MR. DANIEL ASAMOAH

We introduce to you Mr. Asamoah, a student from the University of Cape Coast, Department of Education and Psychology. He is pursuing Master of Philosophy degree in Measurement and Evaluation and is currently at the thesis stage.

Mr. Asamoah is researching on the topic:

“Perceived Causes of Low Academic Performance of Senior High School Students in Core Mathematics in the Kumasi Metropolis of the Ashanti Region of Ghana”.

Mr. Asamoah needs the following data:

- i. The total number of SHS students in the Ashanti Region and the Kumasi Metropolis.
- ii. The total number of Mathematics Teachers in the Ashanti Region and the Kumasi Metropolis
- iii. The Pass Rates in core subjects of SHS students in WASSCE in the Kumasi Metropolis from the 2012/2013 to 2015/2016 academic year indicating the number of students who sat for the WASSCE and those who passed.

We would be grateful if he is given all the needed assistance toward this necessary academic exercise. Please, any information provided will be treated as strictly confidential.

Thank you.

Yours faithfully,

Theophilus Amuzu Fiadzomor (Mr.)
Senior Administrative Assistant
For: **HEAD**

APPENDIX D

ETHICAL CLEARANCE
UNIVERSITY OF CAPE COAST
COLLEGE OF EDUCATION STUDIES
ETHICAL REVIEW BOARD

UNIVERSITY POST OFFICE
CAPE COAST, GHANA



Our Ref: CES-ERB/UCC.edu/12/18-27
Your Ref:

Date: Jan. 21, 2018

Dear Sir/Madam,

ETHICAL REQUIREMENTS CLEARANCE FOR RESEARCH STUDY

Chairman, CES-ERB
Prof. J. A. Omotosho
jomotosho@ucc.edu.gh
0243784739

Vice-Chairman, CES-ERB
Prof. K. Edjah
kedjah@ucc.edu.gh
0244742357

Secretary, CES-ERB
Prof. Linda Dzama Forde
lforde@ucc.edu.gh
0244786680

The bearer, Daniel Kwameah Reg. No. ED/MEP/16/0008 is an M.Phil. / Ph.D. student in the Department of Education and Psychology..... in the College of Education Studies, University of Cape Coast, Cape Coast, Ghana. He ~~He~~ ^{She} wishes to undertake a research study on the topic:

Perceived causes of low academic performance of senior high school students in core Mathematics in the Kumasi Metropolis

The Ethical Review Board (ERB) of the College of Education Studies (CES) has assessed his~~her~~ proposal and confirm that the proposal satisfies the College's ethical requirements for the conduct of the study.

In view of the above, the researcher has been cleared and given approval to commence his~~her~~ study. The ERB would be grateful if you would give him~~her~~ the necessary assistance to facilitate the conduct of the said research.

Thank you.
Yours faithfully,

Prof. Linda Dzama Forde
(Secretary, CES-ERB)

APPENDIX E
POST RELIABILITY ANALYSIS

Reliability Statistics for Students

Cronbach's Alpha	Number of Items
.668	16

Reliability Statistics for Teachers

Cronbach's Alpha	Number of Items
.788	22