

Promoting Pupil's Participation in the Study of Mathematics
A case study of selected junior high school pupils in Maakro
Methodist church of Ghana; Ashanti region of Ghana

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Abstract

Described as basic requirement and a compulsory subject, Mathematics has been the biggest challenge for most pupils in the African countries and to be more precise Ghana as a country. Continuous research shows/ proves pupils' poor performance in Mathematics as compared with other subjects.

This study aims to answer the question 'How has the Methodist church at Maakro Circuit, in Kumasi, Ghana, used their after-school programme to promote pupils' interest and abilities in Mathematics?'. The research explores the impact and nature of after-school programme on pupils' performance in Mathematics and how the Methodist church is an instrument to empowering pupils.

Diakonia and Empowerment in Mathematics, Motivation and sociocultural theory are three theoretical frameworks for this thesis. Some related concepts like teaching methods are also used in this thesis. These theories and related concepts explore how the Methodist church at Maakro is responding to pupils' interest and abilities in Mathematics in the Ghanaian context. The research was conducted with the help of interviews with nine (9) participants; Methodist church leaders (Ministers), facilitators as well as earlier pupils who were privileged to be part of the after-school programme. Also, observation was done by the researcher for more information on the grounds.

The findings gathered were grouped into three themes: Importance of Mathematics, teaching methods and attitudes of teachers, and teaching materials and equipment. These were analysed thematically, interpreted, and discussed in relation to the theoretical framework. The study reveals that the themes were the basis for promoting pupils' interest, participation, and improvement in Mathematics. The study has emphasized that activity method of teaching which serve to engage pupils' full participation was ensured to increase pupils' interest in mathematics.

From a diaconal perspective one can say that the professionals in the church are doing diaconal work; showing extra love, care, and selfless services to meet both their academic and social needs among all the pupils. The support been given is backed by their faith as Christians.

Also, the extra love, care and patience demonstrated by professional teachers in the church inspired and motivate some pupils to improve in mathematics and continued their education in mathematics.

The study concludes with recommendations, for example the church should extend the after-school programme to all basic school pupils in the church and to the community.

Keywords: Diakonia, empowerment, motivation, church, mathematics, afterschool programme, sociocultural theory, Ghana.

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To God be the glory for the great things he has done

Dedication

I dedicate this thesis to my nuclear (immediate) family for their support and prayers throughout this journey and to everyone who believes in the success of the youth and children (younger generation) especially all stakeholders to education who believes in the youth of tomorrow. This thesis dedicated to children and youth all over the world.

The future is brighter.

TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION TO THE STUDY	1
1.0 Introduction	1
1.1 Mathematics as a Compulsory Subject.....	1
1.2. Research question	2
1.3 Inspiration.....	2
1.4 Scope and limitation of the study	3
1.5 Review of existing Literature (after-school programs)	4
1.6 The term teaching	5
1.7 Teaching methods / strategies.....	6
1.8 Thesis outline.....	6
CHAPTER 2: BACKGROUND AND CONTEXT	8
2.0 Chapter introduction.....	8
2.1 Background to the study	8
2.2 The Methodist Church and Education in Ghana.	8
2.3 About Ghana and Education in Ghana	9
2.4 Ghana’s Education System and Junior High School Education.....	11
2.5 Mathematics Education	12
2.6 Ghana’s future aim in Education (vision 2020).....	12
CHAPTER 3: METHODOLOGY	13
3.0 Introduction	13
3.1 Research design	13
3.2 Study Site.....	13
3.3 Sampling.....	13
3.4 Recruitment of participants	14

3.4.1 Church (Reverend minister/ education committee)	15
3.4.2 Facilitators.....	15
3.4.3 Earlier pupils	15
3.5 Data collection methods	16
3.5.1 Interviews.....	16
3.5.2 Observation	17
3.6 Data analysis and interpretation	17
3.6.1 Coding/ thematic strategy	18
3.7 Validity and reliability.....	18
3.8 Ethical considerations.....	19
3.9 Challenges during data collection.....	19
CHAPTER 4: THEORIES	21
4.0 Chapter introduction.....	21
4.1 Diakonia and Empowerment	21
4.1.1 Diakonia.....	21
4.1.2 Empowerment.....	22
4.2 Vygotsky's theory.....	25
4.2.1 Sociocultural theory	26
4.2.1 Contextual learning process	29
4.3 Motivational theory	30
4.4 Approaches for teaching mathematics.....	33
4.4.1 Methods of teaching and learning Mathematics	34
4.4.2 Assessment.....	35
4.4.3 Learner centred approach.....	35
4.4.4 Practical activity work	36
4.5 Summary.....	37

CHAPTER 5: PRESENTATION OF FINDINGS	39
5.0 Chapter introduction.....	39
5.1 An understanding of after school program	40
5.2 Presentation on the importance of mathematics	40
5.2.1 Views on the importance of mathematics (EP1, EP2 EP3)	40
5.2.2 Facilitators (teachers) view on the importance of mathematics.....	41
5.2.3 Minister’s view on the importance mathematics	42
5.3 Presentation on teacher’s attitude and teaching methods	43
5.3.1 Participants view on the attitude of teachers (earlier pupils).....	43
5.3.2 Presentation of teaching methods	45
5.4 Teaching and learning material equipment	48
5.4.1 Pupils view on teaching and learning materials.....	48
5.4.2 Teachers view on teaching and learning material	50
5.4.3 Ministers view on teaching and learning materials.....	51
5.5 Summary.....	51
CHAPTER 6: DISCUSSION OF FINDINGS	53
6.0 Introduction	53
6.1 Importance of mathematics	53
6.2 Teacher’s attitude and teaching methods.....	56
6.3 Teaching learning materials and equipment.....	61
6.4 Summary of Discussions	62
CHAPTER 7: CONCLUSION AND RECOMMENDATIONS	64
7.0 Introduction	64
7.1 Conclusion.....	64
7.2 Recommendations	65
BIBLIOGRAPHY	Error! Bookmark not defined.

APPENDICES.....	72
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LIST OF TABLES

Table 1: Table of Participants	14
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LIST OF FIGURES

Figure 1 Map of Ghana	10
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List of Acronyms and Abbreviations

GES	Ghana Education Service
ICT	Information and Communication Technology
MOE	Ministry of Education
NCTM	National Council of Teachers of Mathematics
RME	Religious and Moral Education
SBA	Student Based Assessment
TLMs	Teaching and Learning Materials
STEM	Science Technology Engineering and Mathematics

CHAPTER 1: INTRODUCTION TO THE STUDY

1.0 Introduction

Faith-based organisations have been major stakeholders in education in Ghana from the arrival of the early missionaries to date (Sarbah & Ebo, 2010). Their roles have been providing infrastructure such as schools buildings, tables, and chairs, teaching learning materials and training of teachers, among others. (Obeng-Mireku, 2017), Sarbah 2010). Their contributions in education is not limited to the school environment but also to the community. The aim of this study is to find out the contribution of the Maakro Methodist Church in my community, Kumasi the Ashanti region of Ghana, to their members and the entire community. The specific aim is to investigate and find out the teaching methods, strategies and resources used in the after-school programme of the church.

The focus is to explore and find out how the after-school programme help pupils who perform poorly in Mathematics improve in their performances and develop interest in the study of Mathematics.

1.1 Mathematics as a Compulsory Subject

Mathematics is one of the compulsory subjects in Ghanaian Education System. Pupils at the Junior High School are expected to pass before entering the Senior High School. However, this all-important subject is a major challenge to many pupils. The performance in Mathematics as compared to other disciplines such as Social Studies, Information Communication and Technology (I.C.T) is rather low. The Methodist Church of Ghana in the Maakro Circuit have identified that the final year pupils in the church finds it difficult to pass Mathematics examination in the Junior High School. This as a result has affected placement in their choice of programme into the Senior High Schools in their preferred choice of school. The Methodist Church of Ghana in my local district, has identified this challenge and have therefore organised weekends and remedial classes as part of their social responsibilities for interested pupils without a fee. The aim is to help build and increase pupils' interest, understanding and participation in the study of Mathematics at the Senior High Level. Human and material resources have been provided by the church for smooth running of the program at the church's premises.

Afterschool Program is designed to help improve academic and behavioural outcomes for low-income and middle school pupils. All young pupils, including those living in poverty, have capacities to make healthy, positive choices if given the opportunity. As representatives of God, the church has been called out and given the mandate ‘to serve humanity’ and for that has an important role to play in the lives of pupils. I intend to do this research project to gain a deeper insight of how the church (Methodist) at Maakro, Ghana, is using their afterschool programme to promote pupils’ interest and abilities in Mathematics. The focus of this master’s thesis will be on how the professional teachers in the church community organise the after-school programme and its impact on pupils educational and social life. This research explores how the Methodist church is working to instil in pupils the interest and improvement in Mathematics.

1.2. Research question

This research is attempting to answer the question:

How and why has the Methodist Church at Maakro in Kumasi, Ghana, used their after-school programme to promote pupils’ interest, abilities and improvement in Mathematics?

1.3 Inspiration

As a female Mathematics teacher for the past eight years, I realised that many pupils had negative perception and attitude towards Mathematics. My goal has been how to use creative ways that captures and sustain the interest of pupils in studying Mathematics. The subject is a challenge in my context meanwhile pupils must pass to move further in the educational ladder. Mathematics in my own opinion is not a difficult subject as perceived but rather, the teaching methods, time allocation on the timetable, pupils’ and teachers’ attitude and overcrowding are some of the challenges. Arthur, Oduro and Boadi (2014) in their study on statistical Analysis of Ghanaian Students attitude and interest towards Mathematics also confirmed that poor teaching methods is one of the major causes of pupils’ poor performance in mathematics. Pupils think the mainstream school teaching methods and strategies for teaching mathematics are not inclusive. Professionals in the church see their calling as one beyond the church and mainstream and combine faith with works. They use innovative ways and methods to help pupils develop interest in mathematics.

My concern has always been how individuals and stakeholders in education will come in to augment the effort of the school to help address this challenge of low participation in Mathematics. I think pupils do not just need Mathematics to move further in their educational ladder, they also need it in their daily lives. The everyday live activities involve lot of calculations. To take a step forward involve calculation, to be part of any business, marketing, or any other activity, one must have acquired some basic Mathematics. This is to say that, with or without education, Mathematics is necessary in the lives of every individual and to make them more confident in their daily life activities. The Methodist church in Ghana is one of the major stakeholders in Education. Their role is not limited to mainstream school programs but also extended to after school programs.

I therefore see the need to contribute in my own small way to help arouse and sustain the interest of pupils and this has motivated me to do this research.

1.4 Scope and limitation of the study

Though after-school program covers wide range of subjects for studies, the focus of the research, is not on all subjects but to concentrate primarily on the poor performance of pupils in Mathematics. The research is not addressing poor performance on gender bases but in general terms. Unlike other studies and literature that centres on government's response and contribution to poor performance in Mathematics, this master's thesis is not concentrated on the contribution of the government but rather how the church is assisting pupils in the church community and its environs to sustain pupils' interest in Mathematics.

The intention of this study is not to assess or map what the church thinks of the work of the government. Basically, the interviews are not for comparison but to give an opinion on what is or not being done. The response from representatives does not represent the views of all churches generally in the Ghanaian context.

Lastly, the inclusion of two or three other churches could have given a wider view of the church community in the context for another perspective to the study.

1.5 Review of existing Literature (after-school programs)

Mathematics in one way or the other can be considered as an exceedingly difficult subject. The learning of Mathematics involves understanding the theories, concepts, and visualising pictures for applying the formulae. In a typical classroom the challenge for the pupil is to explore the complex problem. I believe with the advancement of different methods of teaching, approaches and multimedia technology; the difficulty can be overcome. To learn a mathematics course, technology is increasingly becoming a critical tool. Moreover, the advancement in information and communication technology (ICT) has improved the education system. Most after-school programs have not neglected the area of technology to help pupils study mathematics.

There are a lot of literatures or articles on the introduction of after-school programs. These programs have been carried out by social institution for years. Characterised as a social system, religious organisations are operating in a complex and changing environment. This means that the church as a social institution has taken active part in after-school programs long before these contemporary years.

The church, the family and the school have historically been the three most critical institutions whose interactions have been responsible for the viability of the African American community (Roberts, 1980).

The three aggregations- the church, the school, and the family- operate within the domain of the larger society as socialising agents and are shaped by their own historical foundations. Parents and other family members, before the 1970's provided care for their children during after-school hours (Hofferth, Brayfield, Deich, & Holcomb, 1991; Sanacore 2002). The church's role will be assisting families in need and supporting educational institutions through sponsorship to assist those in need. Social, educational, and recreational activities are provided for children during after-school programmes in a way protecting them from unhealthy environments.

In the journal article 'After-school programmes for low-income children', Halpern (1999), The article provides a profile of after-school programmes for low-income children focusing on supply and demand, as in who is giving the service and who is receiving the services given. Who sponsors the program and organisations supporting? There is a discussion on major challenges facing the field in the areas of facilities, staffing and financing. He also mentions four factors he thinks is driving the growing of the program or interest. One of the factors is

that many children need more time and individual attention than schools can provide to master academic skills. Another is the belief that public spaces are no longer safe for children's out-of-school time. Also, it is stressful and unproductive for children to be left on their own after school and finally, a conviction that low-income children deserve the same opportunity as their more advantaged peers.

In another research report by Protheroe (2006), "Successful after-school programmes" She says, the idea of establishing an after-school program, is that many children need additional time and attention if they are to thrive in school and a well-designed after-school program, is an effective way to address these children's needs. She mentions in brief that, academically oriented after-school programs can be an effective way to provide extra help to students who need it.

Both studies point to the fact that, after-school programme is a need for children and must be effective to mould pupil's life in all life aspects such as academically, socially, and personally.

1.6 The term teaching

Teaching is the art and science of 'imparting' knowledge, skills attitudes, and values to learners by means of dialogue and interaction (E.K. Tamakloe, F. K. Amedahe & E.T. Atta, 1996). This implies that, as teachers teach learners from different backgrounds, they interact with individuals to find out their expectations, strengths, weaknesses and needs. Therefore, it is an imperative for teachers to be observant, creative and explorative in the teaching process to meet individual needs in the classroom. Also, it implies that teaching is an art and science. It intends to involve learners during instructional processes and emphasis on learners' ability to actively participate. For instance, asking questions and reasons accordingly in the teaching learning process.

'Teaching also involves creating situations that facilitate learning and motivating learners to develop interest in what is being "imparted and transmitted" to them (E.T. Tamakloe et. al. 1996 p. 22). The varying ways to teaching mathematics help arouse the interest and attention of learners during teaching.

1.7 Teaching methods / strategies

Teaching strategies are the useful ways of helping learners not only in Mathematics education, also in general education. This study focuses on how the after- school program moderated by professional teachers in Maakro Methodist Church uses teaching methods/strategies and resources to teach Mathematics to help pupils who performs poorly in the subject. Also, help them to develop interest and improve on their performance and pass the final year exams at the public Junior High school to enter the Senior High School.

According to Bashinski, (2002), teaching strategies refer to a change in the way that a teacher teaches. This comprise of the methodologies or procedures that the teacher uses to provide information to learners in a class. The teaching strategies used by teachers during teaching instructions play vital role in the lives of learners. Therefore, it is important for teachers to possess and demonstrate positive teaching strategies to help meet the educational and social needs of all learners.

1.8 Thesis outline

Chapter one deals with the overview of the study which present the topic of the study in relation to the one faith -based organisation. Also present the research question, inspiration and limitation of the study.

Chapter two gives a background information on the Ghanaian context relevant for the study, a general overview of churches in Ghana and the Methodist churches in Ghana to be precise.

Chapter three presents detailed discussion on methodology. It also gives deliberation on research design, sampling of participants, data collection and analysis.

Chapter four provides the theoretical framework. The empowerment(diakonia), motivation theories and sociocultural theory are explored.

The thesis continues with a presentation of the data collected with a focus on responses from participants/respondents from the church, facilitators, and earlier students. in **chapter five**.

Aspects of chapters four and five are linked together in **chapter six** in a discussion which interpret how they interrelate.

Chapter seven spells out major observations with possible recommendations and suggestions for ongoing research to conclude this master's thesis.

CHAPTER 2: BACKGROUND AND CONTEXT

2.0 Chapter introduction

The aim of this chapter is to set the research in context with short introduction to the Ghanaian landscape and history relevant for the study, an overview of churches in Ghana, and the Methodist church to be specific. Religion and its role will be discussed to locate the importance it plays in daily living and education to be precise.

2.1 Background to the study

Studies conducted in Science Technology Engineering and Mathematics (STEM) in the United States of America revealed students exhibit low level of performance in mathematics (Adiguzel, Ayar, & Sahin, 2014). Again, there has been a decline in graduate with Mathematics and science background (NRC, 2011; Schmidt, 2011). Similarly, Awanta (2009) noted that several pupils' in the Junior High School do not have interest in the study of mathematics. The lack of interest and meaningful participation in the study of mathematics, Acheampong (2010), is not limited to the Junior High School but seem to have roots from the primary school and affect pupils at the Senior High School and choice of subjects leading to career path (Addae-Mensah, 2000). Many factors have been identified as responsible for pupils' lack of interest and hence poor performance in mathematics (Adiguzel, Ayar, & Sahin, 2014). Among some of the factors as indicated by Geo-JaJa (2013) and some few others are poor teaching methods/strategies and delivery, resources, fear, and lack of courage, just to mention few. These factors indicated makes pupils uncomfortable and as a matter finding it difficult to understand basic concepts being taught at school level (Addae-Mensah, 2000). The Methodist church has seen the need to empower pupils, focusing on helping them to develop interest in the study of Mathematics. This is in view of helping pupils study Mathematics at the Senior High Level.

2.2 The Methodist Church and Education in Ghana.

The Methodist church has been involved in Ghana's education system for many decades. As the church grows and spread the gospel to all the nooks and crannies of the nation so they

establish educational institutions and innovative programs to support education in Ghana (Sarbah & Ebo, 2010). The Churches aim in education is to see a nation in which every child receives quality education to highest level possible. In terms of policy, education received through the Methodist church will be based on academic excellence and development of productive skills which will lead to the development of individuals involved with honesty, integrity, Christian values, professional and work ethics (Ghanaian Chronicles,2010). It is no surprise that the late United Nation Secretary general was a product of the Methodist premier senior high school at the central region of Ghana. With these aims they have established over 700 kindergartens, 1017 primary schools, 480 junior high schools, 20 senior high schools, three teacher education colleges, a university throughout with a host of innovative programs to further support education throughout the nation. It is worth noting that their commitment towards education is not limited to the classroom setting, it goes beyond the classroom to the church where professional educators in the church have initiated an after-school programmes to help students or pupils with low interest in Science, Technology, Engineering and Mathematics.

2.3 About Ghana and Education in Ghana

According to Ghana country profile by the British Broadcasting Corporation, on Saturday May 2, 2020, the current population of Ghana was 30,961,235 based on World barometer elaboration of the United Nations data. According to the United Nation data, the people at mid-year is estimated at 31,072,940 as Ghana 2020 population. In equivalent, the population of Ghana is 0.4% of the total world population (BBC,2020). The nation is religiously pluralistic with Christianity and Islam as the two main dominant religions. Christianity is the largest religion in Ghana, with approximately 71.2% of the population of Ghanaians being members of various Christian denominations (Ammah,2010; BBC,2020). Statistically, it is evident that the church as an organization forms part of the major stakeholders in education. Initially, there were ten (10) regions but close to the end of the last decade, the number of the regions were increased to sixteen (16) for effective administrative reasons. Ashanti region the focus area for this study with a population of 4,780,380 with a percentage of 19.39% is the region with the highest population in Ghana. Within the republic of Ghana, the regions of Ghana constitute the first level of subnational government administration. The sixteen regions have further been divided for administrative purposes into 216 local districts. The sixteen regions are listed as follows:

Ashanti, Greater Accra, Eastern, Northern, Western, Bono, Volta, Central, Upper East, Upper West, Oti, Bono East, Ahafo Savannah, Western North and North East.

The Map of Ghana



Figure 1 Map of Ghana

The nation Ghana is considered as one of the stable countries in the West Africa sub region since its transition to multi-party democracy in the 1992. In African history contemporary, Ghana admittedly holds a special place. Prior to independence, modern Ghana was known as Gold. Ghana was the first British territory in Africa to achieve a real measure of internal self-government in 1951. The nation was the first in sub-Saharan to break free from colonial rule. It became a symbol for Africans still under colonial rule and led the way to independence for many African countries.

In education, Ghana has long been considered as one of the icons in Africa. Like other African countries, developments in terms of education in Ghana have often followed similar patterns.

The country embarked on a massive program of educational expansion and change 6 years before independence in 1951, when a measure of internal self-government was granted (George, 1976). The nation attained full independence in 1957.

2.4 Ghana's Education System and Junior High School Education

After the independence, Ghana's education system has undergone several reforms to wean it from purely academic system handed over by the British to one that will serve the manpower needs of the nations. The structure of education changed from seventeen years to sixteen years in the 1980's due to the reforms. The structure and content of education from 1987 has led to significant reduction in the number of years of pre-tertiary education from seventeen (17) years to sixteen (16) years with two years of early childhood schooling.

The present structure of education starts with six years made up of six years primary education, three years junior high school, three years senior high school and four years of tertiary (university, polytechnic and colleges) education. Throughout the various levels of education mathematics as a subject is one of the cores and compulsory subject the learner needs to pass to progress to the next level. As one of the major groups of education system, the basic education is Free Compulsory Universal Basic Education which gives every child the opportunity to be in school as their educational right. Students who graduate successfully from senior high schools enter either university, colleges of education or polytechnic. Others also enter diploma awarding institutions such as the teacher education currently a degree awarding institution for four years or nursing institutions for three years (GES, 2003).

Basic education in Ghana consist of primary school level and the junior high school level that is free and compulsory. It designed to expose all learners to a wide range of skills, ideas and knowledge that will inculcate in them creative abilities that will aid them harness resources in the environment for their well-being and that of the society and becoming an asset to their country. Therefore, the primary school curriculum is geared towards work and consist of subjects such as English language, Mathematics, Creative Art, Ghanaian Language and Culture and Religious and Moral Education. Additional subjects like Social Studies, Pre-technical and Vocational Skills (BDT), Information and Communication Skills and Science for the junior high schools (the second part of basic education). In conclusion, the basic school run a forty-week academic year. Pupils are examined using the Student based assessment (SBA) of thirty

(30) percent of final score and an external examination conducted by the West Africa Examination Council which forms seventy percent of the final score (GES, 2003).

2.5 Mathematics Education

According to Education strategic plan on policy, target and strategies review, mathematics education in Ghana have not improved in terms of teaching and instruction. Mathematics education has been handled improperly due to lack of inadequate facilities such as laboratory for mathematics and technology, textbooks and relevant teaching and learning materials (TLMs) for the teaching and learning of mathematics in the various or most schools in Ghana. Addae Mensah (2000) in agreement with the assertion mentioned that only 18 out 504 senior high schools as well as junior high schools in Ghana are well equipped with the necessary facilities and qualified teacher for the implementation of effective teaching of mathematics programmes at the junior and senior high schools to feed the tertiary institutions. The poor teaching of mathematics has affected performance at the national certificate examinations.

2.6 Ghana's future aim in Education (vision 2020)

Ghana aims to reach the middle-income country status by the year 2020. For this reason, a road map known as Vision 2020 is developed. The basic objectives of the Vision 2020 document are to: reduce poverty, increase employment opportunities, and average incomes, and to reduce inequalities to improve the general welfare and the material well-being of all Ghanaians. The vision contains an education policy with the objectives to ensure all citizens regardless of gender, age, or social status, are functionally literate and productive to the maximum. For each sector of within the education system, the Vision 2020 education policy has an objective. All sectors must embrace an increase in scientific technological and mathematics education as well as making education more accessible to all for a balance besides the objectives for each sector.

CHAPTER 3: METHODOLOGY

3.0 Introduction

An overview of the process undertaken in carrying out the study is given in this chapter. The design, sampling, data collection and analysis, validity and reliability, ethical considerations and other limitations is presented to provide insight into the process.

3.1 Research design

Qualitative research explores how groups and individuals understand a particular social or human problem according to Creswell (Creswell & Creswell, 2018, s. p.4). Qualitative approach is therefore relevant for this research as it explores the social phenomena of the poor participation and performance of pupils in Mathematics. Therefore, a qualitative interview guide was used with open ended questions to gather information and experiences from the participants. Close observation was done during the teaching process to get more insight what goes on in the teaching environment or class setting. The intention of the interview and observation were to understand the dynamics of what really existed on the field and what the Methodist church is doing to help promote and develop the interest and abilities of pupils in Mathematics.

3.2 Study Site

The study was conducted in Ghana, in Ashanti region of Kumasi. Precisely, on Methodist Church in Suame district in Kumasi. The reason for the selected research site is the accessibility, time and it is within the district I have resided before.

3.3 Sampling

A cross section of individuals were thought best to be interviewed to get a fair knowledge and assessment of the situation, upon reflecting on the research question. Interviews were conducted

with 9 persons from different categories namely, the reverend ministers (education committee in the church), the facilitators and the earlier pupils. Three from each category. Also, facilitators were observed throughout their teaching process to better know and understand the situation on grounds. With the use of purposive sampling, persons interviewed were chosen based on their positions within the organisation and institution. Who possessed reliable information and experience was also a factor to the study (Bryman, 2012, s. p.418).

For the three categories of interviewees, separate questions were prepared and administered. To ensure the use of accurate and reliable data, a recording instrument was used in collecting the responses for the interviews. The interview questions were focused and guided on how the Methodist Church is helping to develop the interest and abilities of pupils in the study of Mathematics and the impact of the after- school program in pupils' participation in Mathematics and also in their daily life activities.

3.4 Recruitment of participants

The consent of the participants was accorded indicating what the research entails and how their participation would be treated. Participants were informed verbally before conduction of the interviews and observations that they have the liberty to withdraw from the process at any given time.

Table 1: Table of Participants

Participants	Number
Reverend Minister	3
Facilitators	3
Earlier Pupils	3
Total	9

Participants are made anonymous in this research, and the real names of individual participants are not mentioned. M1, M2, M3 represent Reverend Ministers, F1, F2 F3 for Facilitators and EP1, EP2, EP3 represent Earlier pupils, respectively.

3.4.1 Church (Reverend minister/ education committee)

Persons from the Methodist church were selected based on their knowledge and position. As a Methodist myself, I was able to get through to the education committee as a directive from the reverend minister. There are channels in the Methodist church and so every question relating to education is channelled to the education committee for better response. Though the reverend minister has a fair idea, it is the education committee that gives reports, guidelines, and recommendations. Among the three persons interviewed, 2 of them were males and 1 a female.

3.4.2 Facilitators

The facilitators were all members of the church. They were graduates who have passed through the church since childhood and saw the need to help the younger ones who would take over the positions in the church in time to come (future) but have challenges in their studies especially in Mathematics. Persons were selected for this study based on their experience and position in the after- school program. It was therefore necessary to interview them to share their experience and their thoughts on how the church is helping to develop pupils' interest and abilities in Mathematics. Three facilitators were interviewed. Of the three facilitators interviewed, there were no female since the females were on churches assignment.

3.4.3 Earlier pupils

Three earlier pupils were selected and used as a sample. The sample was selected using sampling like the snowball effect as described by (Bryman, 2012). He states that the sample can be built through asking interviewees for suggestions about others who may have a perspective on the focus of inquiry. With my interview with the earlier pupils, one of the facilitators directed me to two of the earlier pupils. One was a nurse and the other an accountant in the church. The other participant, who happen to be the third, was a Muslim. She was introduced to me by the accountant. I asked how a Muslim ended up in a program organised by the church, and the answer was that, the program was opened to everyone in the community and that she was not the only Muslim who took part in the after-school organised by the church. She happens to be a Mathematics teacher as a profession now. In all there were two females and a male interviewed. I was purposeful and ensured that the units of analysis possessed the

needed knowledge and experience in keeping with the research question (Creswell & Creswell, 2018) unlike random sampling.

3.5 Data collection methods

Interviews were used as the primary method of data collection while observation was used as a supplement to collect data. I was in direct contact with participants and research was conducted to bring together and examined to evaluate relevant information useful to the research.

3.5.1 Interviews

A conversation between two or more persons with the intent to gather information or unearth data is an interview. It is believed to be one of the mostly used method in qualitative research (Bryman, 2012). During this study, interviews were used to attain the subjective views of the participants. The interviews were intended to identify the views and opinions from participants through some guided questions. To ensure that the interviews were brief enough but provided the information needed for the study, much attention was paid by informing the interviewees the purpose of the interview, their role in the conversation and the use of recording instrument (Brinkmann & Kvale, 2015, s. p. 154) The interviews lasted for 35 to 45mins for each participant and were conducted in Ghana during December 2019.

An ideal interview may be face to face, but there are other acceptable ways of conducting interviews such as through online, telephone calls or in written form (Creswell & Creswell, 2018, s. p.188). One of the interviews was conducted through telephone conversation. The remaining eight were conducted face to face. For a more interactive and expressive conversation, the live face to face interview has an advantage. The interviewer can identify body reactions and expressions in the face of the interviewee which is good to really understand a conversation. Interview guide is used to direct the conversation. The open-ended questions in the interviews allowed for better interaction with the interviewees and the opportunity to present follow up questions for any clarifications. An answer provided by interviewees were further probed with follow up questions where necessary. Interviews conducted were recorded while interviewing as well as written in a book to capture every detailed response which could not be written down and to serve as a backup information. Information gathered was written

immediately after the interview. Great efforts were made not to dominate in the conversation by any exercise of power. Participants were freely given the opportunity to express themselves.

3.5.2 Observation

Face to face observation was used as a supplement to the interviews obtained from the participants. This was direct observation where I got the opportunity to obtain data `live` (Cohen, Manion, & Morrison, 2007). This means I got the information of every activity that took place as first-hand information than secondary source. This was done to observe what goes on during the teaching and learning activities and 30 to 40 minutes observation was used to in each lesson observed. The observational guide helped me to observe the facilitators how they engage and interact with pupils, the methods they use, the learning environment. In order not for me to be limited and restricted in the observation I observed all features relevant for this study with the time frame. I ensured that participants were informed about my presence and purpose and told them to feel free during the observation process. I am aware of the weakness of observation as observers may pretend to behave differently since they are aware there is an observer (Patton Q. M., 1990), mention people can behave quite differently when they know they are being observed. Therefore, data gathered with only observational source may give enough information and this could misrepresent the findings of the study during analysis. So, I used interview as main source of data to ensure both validity and reliability of this study.

3.6 Data analysis and interpretation

The process of breaking down the collected data into patterns, trends and themes that are manageable and help guide the researcher to identify relationships between theories or concepts is punctuated by Mouton (2001, s. p. 108) as data analysis. Interpretation seeks to find the meaning that explains the observed themes, applying theories to the data and bringing new insights. Thematic organisation is method of pattern recognition, use of emergent themes and categories for the analysis is used for data relevant for the study.

In analysis the qualitative data, the initial task was to find the concepts that help in `making sense` of what went on (Hammersley & Atkinson, 1995). Themes and categories were formed without preconceived ideas. Raw data could not be analysed. So, I went through all data and

grouped different themes from both interviews and observation and reflected through and related theme to the theories and concepts and finally interpreted them based on participant responses.

3.6.1 Coding/ thematic strategy

To interpret an exceptionally large data, coding is recommended. Coding is the process of placing data into organised segments that seem related and assigning labels or themes (Creswell & Creswell, 2018, s. p.193). The process is grouped into categories and gradually narrowed down. This approach was used for the three sets of interviews. It was done after interviews were transcribed, read, and reviewed. The findings were summarised taking note of similarities, differences, trends, new and some over-looked at discoveries which were then discussed in relation to the theories proposed in the study as part of the interpretation of the coded data.

3.7 Validity and reliability

Reliability and validity are particularly important in any research. Validity is how accurate and credible a research is while reliability on the other hand is how consist a data presented is in relation to similar study. Participants were quite honest and open in the conversation because the purpose of the research was made transparent to them. Responses gathered from the various participants kept revealing itself to show how consistent the information received was. The responses were credible and accurate enough to test for validity. I felt participants clearly understood the research questions with the consistency of the responses. The use of a recorder and process of crosschecking helps to ensure that the data collected is reliable (Creswell & Creswell, 2018, s. p.200). One other was to test for the reliability of the recorded data is through the transcription of data. These were used during and after data collection, respectively.

As mentioned earlier, being a part and member of the Methodist church, made it easier in the process of collecting data. Some of the individuals selected for the interview, knew me and were not going to respond otherwise because I was a little aware of the structures and some measures put in place. This provided a level of confidence that the responses received were reliable. Accuracy and credibility were not affected in any way. Participants appreciated and felt there was the need for the research. This was evident in sometimes the remarks made by participants. Some also mentioned the research has made them realised how important

Mathematics is in the life of every individual and that there should be more awareness on the topic of Mathematics. Another also declared in his statement that, Mathematics is the heart of education.

3.8 Ethical considerations

Though this research is not considered too sensitive one, confidentiality was important. Participants privacy was protected. In the first place, questions were designed not to involve any unnecessary personal information of participants. Secondly, approval was sought and received from the Norwegian Centre for Research data (NSD) as a regulation of the university (VID). A letter from the university (VID) and a consent form was prepared and sent to participants to show that the interview would be anonymous and that they only choose to participate in the research. To protect informants and in keeping with ethical issues in research, the interviewees were anonymised as follows: F1,F2,F3 to represent facilitators/teachers, EP1,EP2, EP3 to represent the earlier pupils and M1,M2,M3 to represent the education committee members who stood in for the reverend minister.

3.9 Challenges during data collection

There are factors possible to have effect in the process of conducting a study and this is important to note in any research. Since the research data was conducted in December, it was not an easy one. There was Christmas break and so I had to wait until the break was over and that school has resumed. There were several delays to initiate contact with the many meetings that had to go on before any serious class could begin. At the time there was also an ongoing national exercise of which some of my participants were involved. Setting date and time for interviews was a bit challenge.

It may also be possible that knowing me as a member of the Methodist church, prevented participants from given more details since the research was not to stay in the country but outside the country.

There were times the interviews were interrupted due to other interferences. For instance, one of my participants (an earlier pupil) with her profession as a nurse, at a point had to stop the

interview and attend to patient before getting back to the conversation. This made the whole process took some time.

Most of my respondents had to switch to speaking the local dialect (Twi) to express themselves in more detail and this gave me much work with the transcription. For the purposes of the interpretation of data, interviews done in local dialect were translated. To better understand, some quotes provided in the findings may be rephased (Kvale, 2007, s. p.132).

CHAPTER 4: THEORIES

4.0 Chapter introduction

A framework of the theories and concepts employed in this master's thesis is presented in this chapter. Three theories have been implored to understand the phenomenon for the study thus "*promoting students' interest and participation in the study of mathematics*". Diakonia and Empowerment, Sociocultural and Motivational theories and some concepts on teaching are relevant to aid in the analysis of the data collected. Empowerment and diakonia theory explained how various learning methods and strategies can be used to *empower* pupils to overcome the challenges in learning Mathematics. Sociocultural theory as advanced by Vygotsky also explained how cultural environment can enhance pupils' participation in teaching learning process. Finally, Motivational theory of learning indicate how teacher choice of word, rewards and attitudes can serve as a catalyst to increase pupils 'participation in Mathematics. These theories some concepts of teaching approaches were chosen as they complement each other and help in understanding the "*How the Methodist teachers at Maakro after school programme increase pupils' interest and participation in mathematics*". These theories have been discussed in detailed in this chapter.

4.1 Diakonia and Empowerment

Diakonia and empowerment will not be looked at as equal concepts. Diakonia is here will be looked at as or defined as how the church is supposed to promote the gospel in action. The gospel in action is presented considering how the churches after school should serve to help the needy and the weaker pupils in the study of Mathematics. Diakonia is first presented. Empowerment will here be presented as a tool which is inspired from the action of diakonia.

4.1.1 Diakonia

The term diakonia is fundamentally a theological concept. It points to the very identity and mission of the church (Angell, 2014). Diakonia is oriented towards practice, meaning that

diakonia involves “a call to action, as a response to challenges of human injustice, suffering and care for creation” as spelt out by Nordstokke (2014).

Dietrich (2014) points on mutuality, thus helping each other because we are a part of the community of humans called to share with each other. She also stresses on the autonomy of an individual and how to empower people. Diakonia must ‘talk the walk’ and ‘walk the talk’. When a rational individual has the capacity to make an informed decision then he/she becomes autonomous. World Council of Churches (2012) affirms diakonia is a way of living out faith and hope as a community. The Lutheran World Federation (LWF) share a similar position. On a general perspective, diakonia is a service to mankind or humanity. It is described as a caring ministry of the church. ‘Diakonia is gospel in action and it is expressed through loving your neighbour, creating inclusive communities, caring for creation, and struggling for justice’ (Church of Norway, National Council, 2008). The World Council of Churches also views diakonia ‘as a responsible service of the gospel by deeds and by words performed by Christians in response to the needs of people’ (The World Council of Churches, 2018).

The definition by the World Council of Churches is in line with the statement made by the Lord Jesus Himself in the gospel of Matthew. Jesus said ‘ *For I was hungry and you gave me something to eat, for I was thirsty and you gave me something to drink, I was a stranger and you invited me in...*’ (*Matt 25: 35-40*). This statement clearly explains the gospel in action.

4.1.2 Empowerment.

The term empowerment is highly contested in various academic fields. In the Christian social practices, empowerment is developed from diakonia as one way of lifting people up. Empowerment is referred in theological perspective as understanding of God’s creation. Every human being is created in the image of God with ability and capability, independent of their apparent social situation (LWF, 2009, s. p. 45). This means all human beings are Gods own image (Gen 1:2). God created all human beings and gave man, power to take dominion. His promise of the Spirit is for all mankind. God said, “That I will pour out my spirit on all Mankind” Joel 2:28). Thus, all inclusive. Jesus promise of the Holy Spirit upon the disciple made manifest (Acts 1:8) During the day of Pentecost, God intervene in the life of the disciples and breath in the Holy Spirit. The Holy Spirit made them to speak in different languages and were empowered to preach the gospel to all nations (Acts 2). This then shows that

empowerment is a move of power from the divine to the humankind and it is also to share power (Kessel, 2014). Zachariassen (2012) explains, empowerment is about people, both males and females taking control over their lives. Thus, setting their own agendas, gaining skills, building self-confidence, solving problems and developing self-reliance. Zachariassen argues that no one can empower another, but that institution can only facilitate and support processes that nurture self-empowerment of individuals or groups.

Nissen (2012, s. p. 27) describes empowerment as the positive change that result from its actions and usually result in a change of life and situation. He further, points empowerment assumes at least two actors: one who has the capacity or the resources that the other does not have. Thus, one is perceived to have power over the other: that the need to empower is sharing of power.

This understanding of empowerment spots the need for different levels of education and varying approaches to teaching. The way of teaching should be one that can bring transformation to pupils. Especially, pupils having challenges in passing and in studying certain subjects to become better. Pupils must therefore be empowered through the assistance of a teacher or a capable person to gain mastery and authority.

From sociological perspective, Empowerment is a key to meaningful development (Rowlands, 1997). In order to explore how the Methodist Church uses their After-School program to promote pupils' interest and improvement in Mathematics, Rowland's definition is employed to show how the professional in Maakro Methodist help to empower pupils in developing interest and improving in Mathematics.

For better understanding of the term empowerment, it is important to know the root word, 'power' Power means the ability of an individual or a group to get another person or a group to do something. Power can be used or exercised in different ways and at different levels like at school, home, community, and nation.

The following are different forms of power by Rowlands (1997) for clarity.

- Power over: this is controlling power, which may be responded to with compliance, resistance or manipulation.
- Power to: this is generative or productive power, which creates new possibilities and actions without dominion.

- Power with: this is a sense of the whole being greater than the sum of the individual, especially when a group tackle a problem together.
- Power from within: this is the spiritual strength and uniqueness that resides in each of us and makes us truly human. Its basis is self -acceptance and self -respect which extends in turn to respect others as equals (Rowlands, 1997, s. p.13).

From the definition of ‘power over’ empowerment then means bringing in people who are outside the decision -making process to the centre. This emphasis on participation in all sphere such as educational, political, social etc. Individuals are empowered when the opportunities available to them are maximised without constraints.

‘Power to` and `power with` empowerment is concerned with the process by which people become aware of their own interests and how these interests relate to the interest of others. So that they participate from position of greater strength in making decision and influence such decisions (Rowlands, 1997, s. p.14). Power to and power within involves human ability and potential. Empowerment must be that people realise that they have capabilities and right to act Rowlands has three fundamental dimensions of empowerment namely, personal close relationships and collective: see illustration of diagram of the three dimensions adopted from Rowlands (1997, s. p.14).

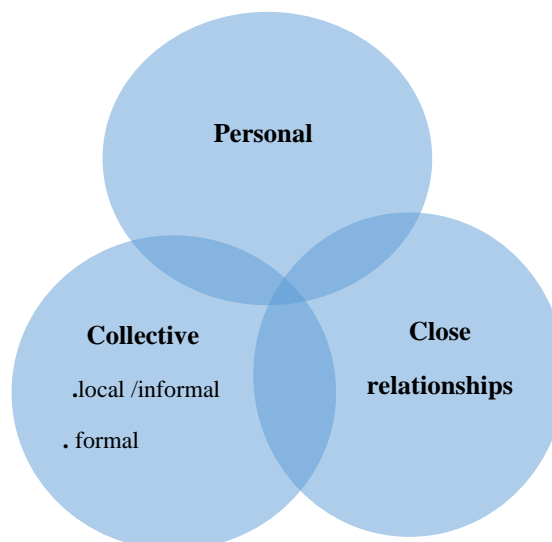


Diagram of three dimension of empowerment adopted from Rowlands, (1997, s. p.14).

Considering the diagram of Rowlands (1997), on a personal level, individual develops a sense of self confidence and worth and is delivered from internal oppression. At the relational level individual develop the ability to negotiate and influence the nature of relationships as they interact with other people. With the collective dimension, people work together to achieve the required results. (Rowlands, 2008).

In the context of the church, `power over` is exhibited with the understanding that God poured out His spirit on all flesh and subjected himself to death as a servant leader Through the holy spirit, God empowers his people, shares power with them and enables them to demonstrate that power from within (Nordstokke, 2009). This is how Jesus exemplified power to, with and within. Similarly, if the church is to emulate, it should be through this servant leadership approach. Invariably `power over` has been used and as well been portrayed as negative because of its misuse. Nevertheless, `power over` can also be viewed positively such as in the teacher-student, parent- infant or doctor-patient relationship (Stortz, 1997, s. p.74), where the latter acknowledge and need the former to exercise control in the best interest of the other. Stortz also viewed power over, within and with, in the context of the church. In this sense `power over` implied to the God -believer relationship with God being Almighty Judge or father of all mankind. This requires the understanding of God who pour out His Spirit on all mankind and subjected Himself to death as a servant leader. For it is God who through His Holy Spirit empower His people, share power with them and enable them to demonstrate that power from within.

In short, from theological perspective empowerment is sharing of power from the divine creator to mankind through the work of the Holy Spirit. Also, it is sharing power among human beings by the leadings of the Holy Spirit as God Himself shared it with us.

From the sociological and theological point of view, empowerment is helping the needy by supporting and bringing them close to the centre and engage them to actively participate socially, academically spiritually and in all spheres of life.

4.2 Vygotsky's theory

The study is also inspired by Lev. S. Vygotsky's a Russian psychologist (1978) on social cultural theory. As the study centres on adapted learning environment and teaching methods as well as the contextual factors which involve interaction with teachers/facilitators and

others. Vygotsky views interaction with teacher and capable peers as an effective way of developing skills and most importantly social interaction plays a fundamental role in the development of cognition.

4.2.1 Sociocultural theory

Vygotsky (1978) on sociocultural cultural theory has been embraced by many theorists across the disciplines of psychology, education, and language acquisitions and has made impact in learning and development.

In his work on “mind and society” sociocultural theory establishes opportunity for pupils to learn with teachers and more skilled peers and professionals (Vygotsky, 1978). He places emphasis on cognitive development which stems from social interaction from guided assistant learning which is within the child’s learning zone of proximal development as pupil co-construct knowledge. The zone of proximal development is interpreted as providing guided assistance and meaningful interaction. It is an approach that shows the level that a child can accomplish a task alone and what that same child can accomplish under the assistance of teacher or capable peer (Vygotsky, 1978). Vygotsky believes culture affects cognitive development because he assumes cognitive development varies across cultures. According to Scott and Palincsar (2013), the theory is to explain how the mental functioning of the individual is related to cultural, institutional and historical context. Vygotsky (1978) asserted that the environment in which an individual grows influence how they think and what they think about. He also believes that the sociocultural perspective is focused on the roles that culturally organised activities and participation in social interactions play in influencing psychological development. The implementation of sociocultural theory is practiced by elementary/basic teacher.

As indicated earlier, teachers who use this theory involve pupils in explaining to justify their ideas or thinking. This helps to better understand pupils’ ideas. Similarly, Freire (2005) in his work on “Teacher’s as cultural workers” also indicated that pupils’ are not empty and that they have ideas or knowledge that teachers need to exploit during teaching and learning processes. One common goal by Mathematics teachers and researchers involved in mathematics education is to increase pupils’ understanding of mathematics. Understanding takes place when pupils advance in connections and relationships in their mathematical knowledge according to

Hiebert, Carpenter, Fennema, Fuson, Wearne, Murray, Oliver & Human (1998). Hiebert, et al. asserted that a key component of developing relational understanding is communication.

Communication is central to learning in a sociocultural approach to teaching. As the church desire to help pupils develop interest in Mathematics, they should encourage effective communication in the teaching and learning process. Pupils better understand when there is effective communication. Effective communication is when there is a feedback. Pupils in this case participate and develop more interest in the studies. I therefore stand to say and with my experience that, in developing mathematical understanding, it is essential or vital to communicate. This is where the child centred method of teaching and learning becomes necessary. Within a sociocultural perspective, when pupils share their thought about ideas with others and in turn listen to others share their thinking or thoughts, it creates understanding of the culturally established mathematical practices. Communication then becomes a cultural tool. Vygotsky (1994) wrote that communication is a cultural tool, where he said language is a cultural tool. Emphasizing language as a human instrument of communication. Vygotsky again mentioned that, individuals come to learn the meanings of a culture by internalizing the meanings and being transformed by them as they learn to speak the language of the culture. This is to say that as individuals (pupils) learn to explain and justify their thinking to others, they create their own knowledge and develop mathematical meanings. Also, they transform their thinking of mathematical concepts as they learn to speak the mathematical language. The mathematical language comes from society and thought (concepts) comes from the individual (pupils). In mathematics education, the construction of meaning is the key focus. However, meaning of words cannot be transmitted from one mind to another. The teachers or the pupils cannot give their understandings to another person in other words. Unless there is active engagement and participation of activities to share ideas, skills and acquire understandable knowledge. Reusser and Pauli, (2015), shares similar view that, construction of knowledge is a life-long, process that requires significant mental engagement by pupils. Therefore, pupils should be allowed to be engaged during teaching process and interact with the available equipment and materials in the environment to solve problem. The environment created by the teacher is one other factor to improve pupils' interest and learning. The role of the teacher is critical in the teaching and learning process of pupils. When a teacher is professionally qualified, has mastery over the subject matter and methodology in teaching, it creates a positive atmosphere in the classroom (Freire, *Teachers as Cultural Workers: Letter to Those Who Dare Teach*. Expanded Edition, 2005). According to Geo-JaJa (2013), in Africa and most developing

regions of the world, some teachers are not professionally competent which affects the delivery of lessons both in content and methods. In his work 'teachers as cultural workers'. Teachers are expected to discharge their duty with professionalism (Freire, *Teachers as Cultural Workers: Letter to Those Who Dare Teach*. Expanded Edition, 2005). Professionalism is when the teacher is capable to blend theory with practice and not only carrying professional tags that has no bearing on real classroom practices Freire explains. Woolnough (1994) added that, professional teachers must have good expertise across his or her subject area. Pupils are to be treated with respect and concern irrespective of their abilities or gender. Teachers professionalism is seen in the use of variety of teaching strategies and unusual activities to aid the different pupils in the classroom (MyersIII & Fouts, 1992). This will sustain the interest of pupils in mathematics education and increase their participation. Freire (2005) on teachers' professional attitude stated that, love must be the foundation on which teachers 'live and discharge their duty'. The teacher's passion and love for teaching will make him or her treat pupils equally and make room for their struggles and challenges during the teaching learning processes. The teacher will then appreciate the individual difference of learners and design pedagogical approaches that will suit all without discriminating against anyone during teaching and learning process. The teacher is however cautioned against coddling and pampering of pupils. When teacher act and pamper as parent at home, such act might be taken as weakness in the teacher by pupils and likely to be taken for granted. Teachers are also not to be seen rigid during teaching and learning process.

In sum, Lev. Vygotsky theorized his work to help integrate individual pupils' development in social, cultural, and historical context (Vygotsky, 1978) His view suggests how useful it is to relate instruction to the learning environment. He points that learning is social interaction meaning a concept is first presented to a child socially (inter-psychologically) either by parents, peer or teachers and later appear or manifest inside the child through the process of internalisation. It is with this view that cultural, historical, and school acknowledges importance of the interaction between child and his/her environment (Vygotsky, 1978). This implies that child does not only learn on his/her own but also with the effort of the social context, for example how learning context is organized, how assistance is offered to child from expert members in the society to help child improve upon the existing knowledge.

Facilitators/teachers are encouraged to engage pupils in order to impart pupils with skills and basis on how to learn mathematics as pupils participate effectively in the teaching and learning process. Also make use of the teaching materials in the environment to ensure practical teaching and understanding. The use of learner-centred education by facilitators(teachers) aims to

develop learner autonomy and independence. It focuses on skills and practices that enable lifelong learning, and independent problem-solving.

4.2.1 Contextual learning process

Context use by Bronfenbrenner as (settings), is seen as environment where people can have a face- to- face interaction at home, school, work, and playground and church (Bronfenbrenner, 1979 p. 22). Contextual learning is interaction between members in the environment through socialization group like the home, school, and church. The contextual learning process constitutes *activity, role play and interpersonal relation* (Bronfenbrenner, 1979). In this way children at home interact with their family and peers within their environment where cultural values are learnt and shared among learners. As sociocultural theory suggests that individual mental function is related to cultural and historical context, it is therefore necessary to factor the cultural and historical background of a learner in the context (Cole & Engestrøm, 1993). As parent at home engage the child with interaction and share cultural values, experience and things that are interested to the child within the immediate environment. It is ‘feeling of dialog’ where sounds and words (language) for part of exchange of communication (Rye, 2001). For example, in role play, instructor should let children take responsibility for their own experience as far as their levels of development and condition are considered. In relation to this study, the teachers should allow and encourage pupils to use their daily experiences and relate them in solving mathematical problems.

As children learn through communication, participation, and observation, they observe and imitate as they experience it. Rye (2001) highlighted on some aspect of child Psychological needs as being an influential factor in the development of the child’s self-understanding and experience of being a person in relation to close caregivers. For instance, aspects of being love, being accepted and knowledge all contribute to child trust in the care of others. The Methodist Church taken it upon themselves to help developing interest and improving pupils` performance in mathematics is a good thing. Knowing that a child has a feeling of belongingness also create confident in child and this is seen through interaction with parents, teachers, and peers within his environment. Rogoff (2003), illuminate that, trustworthy caring environment (caregivers) contribute to psychological, emotional, and social development as parents express love and care to children.

Finally, in the school when learners are involved in group work and participation becomes crucial in context as learners share views and ideas during learning situation. It tends to help them construct their own meaning out of what they have learnt among the group and this contribute to reasoning and solving problem alone after being assisted from a capable peer or a teacher in performing task. This is connected to Brofenbrenner (1979) model of interaction in the environment in the micro and meso system where there is an interpersonal relation between a child and family at home and at school within the teacher and peers where activity, role play and effective communication occur for a child to construct meaning within his/her world (environment). Therefore, teaching and learning context should be free from tension rather should be intended to stimulate child's extended rapport with teachers.

4.3 Motivational theory

Motivation is inspired by a Latin word 'move' for the first time, means movement and it is an English term. Motivation therefore is a force that drives people to behave particularly. To educational psychologists, motivation is of keen interest because it plays an important role in pupils learning as well as the teacher (Deci and Ryan 1997).

In education, motivation has been one of the foremost challenges and has often been inadequately addressed. One of the most important concerns in the field of educational psychology is to attempt to understand why some students stop trying when faced with academic challenges, whereas others rise to the occasion using strategies, with determination and perseverance to achieve higher grades. To predict and prevent dropout, researchers have generated a fruitful display of findings regarding factors that promote and correlate with academic achievement (Winne& Nesbit, 2010).

As one of the factors and with the emergence of the development in the information and communication technology (ICT), multimedia has been greatly adopted into the field of education. 'Audio and video are merge with instruction to create a more interesting, supportive ad learning-conducive environment'. The human nature is such that, there is the need for a drive or force. Thus, to be motivated intrinsically or extrinsically. Some pupils are driven not by any external force. There is the inherent tendency to seek out challenges, to exercise and extend one's capacities, to explore and to learn. Children in their healthiest states are active, inquisitive, curious, and playful, even without rewards and this is acknowledged by the developmentalists

(Harter, 1978). According to Ryan (1995), when pupils are intrinsically motivated, they gain mastery, explore, and have spontaneous interest important to/for their cognitive and social development (Csikszentmihalyi & Rathunde, 1993). It is true that pupils are endowed with intrinsic motivational tendencies, yet there is the need to maintain and enhance this inherent propensity with supportive conditions. Intrinsic motivation can be disrupted by various conditions socially, environmentally, or psychologically.

Again, feedbacks, communication, and rewards of feeling good can enhance intrinsic motivation. Early studies showed that positive performance feedback enhanced intrinsic motivation, whereas negative performance feedback diminished it (Deci, Intrinsic motivation, 1975). Environmental events in intrinsic motivation focuses on issue of autonomy versus control rather than competence. Research on this issue has been more controversial. Repeated demonstration has it that extrinsic motivation/ rewards can undermine intrinsic motivation. Deci (1975) interpreted these results in terms of rewards facilitating a more external perceived locus of causality (i.e. diminished autonomy). Research has also shown that not only tangible rewards but threats, directives, imposed goals, and pressured evaluation diminish intrinsic motivation like tangible rewards. Choice, acknowledgement of feelings and opportunities for self- direction were found to enhance intrinsic motivation in contrast because they allow people a greater feeling of autonomy (Deci & Ryan, 1985).

Intrinsic motivation although an important type of motivation is not the only type of self-determined motivation (Deci & Ryan, 1985). After early childhood, the freedom to be intrinsically motivated is increasingly curtailed by social pressures to do activities that are not interesting thereby making what people do, not strictly intrinsically motivated. There are other external drives that determines a person's autonomy. The extrinsic motivation refers to the performance of an activity in order to attain some separable outcome and thus contrasts with intrinsic motivation which refers to doing an activity for the inherent satisfaction of the activity itself. Unlike some perspectives that view extrinsically motivated behaviour as invariably non-autonomous.

In addition, self-determination theory as stated by Vallerand (1997), proposes that extrinsic motivation can vary greatly in its relative autonomy (Ryan & Connell, 1989). For example, pupils who do their assignment because they personally grasp its value for their chosen career are extrinsically motivated as are those who do the work only because they are adhering to their parents' control. Both examples involve instrumentalities rather than enjoyment of work itself,

yet the former case of extrinsic motivation entails personal endorsement and feeling of choice, whereas the latter involves compliance with an external regulation. Both represents intentional behaviour (Heider, 1958), but they vary in their relative autonomy.

From the more general forms of motivation studied by social sciences, psychologists in the other fields however, the specific kind of motivation studied in the specialised setting of education differs qualitatively. That is the kind of motivation a teacher will need to impart pupils will be different from the motivation a pupil will need to perform better in class. Teachers are important influence on pupil's decision to pursue mathematics or mathematics related courses (Dentith, 2008). Teachers believe about pupils can therefore have both negative and positive effect on pupils' abilities, interest, and participation in mathematics. One factor that explains pupil's participation in mathematics is teacher's expectation and believe in pupils (Osborne, Simson, and Collins, 2003; Sinnes, 2004). When teachers believe are positive, pupils' participation and interest in mathematics is higher leading to a better performance. The opposite leads to low performance in mathematics. This means the attitude of teachers towards pupils can be favourable or unfavourable (Schreiner, 2006) and this could lead to high or low performance, respectively. Over the years, studies have demonstrated that teachers treat pupils differently. Some mathematics teachers have been found to give attention to pupils based on their abilities in the classroom (Dentith, 2008). Mostly, slow learners are ignored while attention is given to fast learners (Warrington and Younger, 2000). Some teachers also give less attention to girls and more attention to boys (Blickenstaff, 2005). And vice versa. This situation is more likely in co-educational institutions in both developed and developing nations. In some cases, female mathematics teachers positively affect the lives of female pupils and vice versa. Both male and female teachers show such biases towards their pupils (Mattern and Schau, 2002). However, there are attitudinal and behavioural differences among teachers regarding their attitude towards pupils based on gender of teacher and that of the pupil they are interacting with (Jones and Wheatley, 1990).

In conclusion, inspired from Deci and Ryan, Maslow and other relevant scholars on various dimensions motivation theory have shared different views and similar views that motivation should drive human- beings interest to work for better performance. Self- determination highlights the importance of human's evolved inner resources for personality development Also aim at maintaining and enhancing the endowed potential and tendencies inherent in pupils with care love and supportive conditions. I believe that when pupils basic and fundamental needs are readily provided and met, pupils will have the interest to participate and perform as suggested

in Maslow's motivation theory of hierarchy. Teachers and other stakeholders who play a role in pupils learning must be sure to provide the basic needs of pupils like psychological need and not just food, clothing, or shelter.

Teachers attitudinal behaviour, beliefs, and approaches to teaching serve as revealing points to either attract or repel pupils from developing positive or negative interest to study mathematics. When teachers show love, respect, and positive attitude to pupils, it will drive them to develop interest. This will in turn improve their performance when given the opportunity to explore. This point to suggest that attitude of teachers and teaching methods are also aspects that motivate pupils in studying mathematics. This leads to the following concepts.

4.4 Approaches for teaching mathematics

Woolnough discovered that pupils' choice of participating in mathematics is influenced by the way teachers teach mathematics as he reconstructed the approaches for teaching in his studies (Woolnough, 1994). The method of teaching used by a teacher in a mathematics class has a greater influence on pupils learning, their contribution and interest. This implies that the teaching methods employed by the teacher has both positive and negative impact on pupils' learning. Therefore, the way teachers pass an understandable information to pupils could contribute pupil's interest and participation in the study of mathematics. Teachers play a vital role in the teaching and learning process of pupils since they are educators and challenge their pupils (Freire, *Teachers as Cultural Workers: Letter to Those Who Dare Teach*. Expanded Edition, 2005). It is therefore important for teachers to think about what and how to teach their pupils and to teach effectively (Shulman L. S., 1986). Woolnough (1994), places greater value on the quality of teaching methods for mathematics and teacher encouragement as critical determinants to attract pupils' interest and participation in mathematics professional careers. Pupils who aspire to pursue mathematics to a greater level, need the love and care of the teacher to encourage them. The teacher must therefore have characteristics such as love and care for pupils which motivates many pupils in their learning. A well-qualified professional teacher should not only be versatile in the content but also competent in methodology and have a unique mastery in any of the topics treated in mathematics. Freire (2005) also adds that professional teacher should not just bear the name but must be able to perform his or her duty by being proficient in content and methodology.

Additionally, Woolnough (1994) declares that good teaching is characterised by teachers who are passionate about their subjects and well organised for interesting teaching. This means that a teacher must be self-motivated and devoted to being able to be prepared and teach to the satisfaction of pupils. When teaching and learning of mathematics is conducted in a systematic manner, students are involved and value the teaching and learning process. The role of the teacher is therefore important in teaching and learning process.

Other studies like Buli-Holmberg (2010) have shown that building teachers' competence is significant to implement in schools to improve practice (Skogen, 2014). In this study, it is demanded that teachers' teaching competence is not overlooked at schools. Holmberg and Tangen (2000) shows how important it is for teachers to participate in practice-oriented study programme as developing better applicable competence in schools and promoting implementation of the vision of inclusive education. It is important that teacher understand the basic unit of knowledge acquired and build upon it to effectively teach and put into practice.

Shulman (1987) maintains that the basis of knowledge in teaching lies between pedagogy and content. He used the concept of 'transformation' as an aspect of larger process of knowledge and referred to as pedagogical reasoning which explained how teacher should acquire ideas and how to process the knowledge, deciding on what and how to teach. Understanding critically complex ideas to be taught is the first thing in teaching he argued.

He noted furthermore that, understanding the subject matter is the most important thing a teacher should comprehend. The first stage of pedagogical reasoning is 'comprehension' and after which transforming the content to the pupils for a new comprehension to be arrived.

To summarise, 'using approaches that integrates theory and practice is more productive than mere teaching theoretical constructs to pupils.

4.4.1 Methods of teaching and learning Mathematics

One of the aspects prescribed in the curriculum is methods of teaching. This clearly shows the different kinds of teaching methods to be used based on the pupil's expectation and interest. Woolnough (1994), Hodson (2009) and others are of the view that the use of different methods for teaching mathematics will aid in involving and promoting active participation of pupils as they explore in the teaching and learning activities (Osborne, Simon, and Collins, 2003). Teaching methods which give priority to problem-solving, decision making, and reflective and

critical thinking is adapted. Pupil/learner-centred and monitoring approach is used in some cases.

The teaching methods that could be employed is a learner-centred method of teaching and learning Mathematics. The key components to this method are (a) deep engagement in rich Mathematics activities, and (b) opportunities to collaborate with peers for instance through group work (Hoveid and Gray, 2013). This method to learning gives learners the opportunity to explore, rethink and reconstruct their ideas by formulating mathematical concepts. It further gives learners the opportunity to learn from their colleagues. In learner-centred method, the role of the teacher changes from dispensing all knowledge to facilitating learning. The teacher does that after the use of relevant resources to teach his or her subject. This helps the teacher to know how best the learners have understood and for learners to apply knowledge acquired as well as process and build up knowledge in solving problem.

Finally, the teacher repositions him or herself in the classroom yet plays significant role in the reasoning processes of the pupils.

4.4.2 Assessment

Assessment and evaluation play a role in teaching and learning process as it used to monitor the way and direction of educational activities towards their intention (goals, aims and objectives). According to Bashinski (2002), the adaptation of assessment practices is not only to the expansion of test-taking parameters. Johnsen (2001) criticized the traditional ways of assessing pupils where the achievements of pupils are measured and given marks in comparison with other pupils in class and nationwide.

Continuous assessment and cumulative records processes in inclusive educational system has been approved and used by many professionals (Johnsen, 2013; Wolf et.al 2006; Johnsen, 2003). Assessment is done based on what has been learnt and takes place through everyday teaching and learning.

4.4.3 Learner centred approach

Learning that places pupils at the middle of learning process is the learner or pupil centred approach. Pupils are the active participants of their learning in this approach. Pupils are self-

motivated as they are actively involved and learn at their own pace. They develop skills on how to learn and solve problems as they learn with interest. Their interaction with peers and learning materials gives the opportunity to improve their potentials. Learning becomes easier and flexible based on pupils need (National Centre for Research on Teacher Learning, 1999). With a learner centred approach to teaching, complete learning experience is focused on the learners and it is basically activity based. Subject must be designed in a way where pupils would be able to access the content of their choice, interest, and work easily at their own pace. When content is made to include the interest and choice of pupils, pupils would find the topics relevant to their challenges and learning needs. The importance of the learner or pupil centred approach is to help pupils retain information acquired during participation of activities with peer, hence improve retention of knowledge (Weimer, 2002). Collaborative learning is fostered.

4.4.4 Practical activity work

For effective teaching and learning of mathematics in the classroom, it is vital to consider practical work where pupils get the opportunity to lay hands on some materials for teaching. The consortium of Local Education Authorities for the provision of Science Services (CLEAPSS, 2008) noted *'appropriate practical work enhances pupils' experiences, understanding, skills and enjoyment of science'* (p.109) and this is also applicable in mathematics. This means that teaching and learning may be interesting and productive when teachers engage and involve pupils to take active part in the teaching and learning processes. Practical work according to Millar (2004), is any teaching and learning activity, which at some point involves pupils in observing or manipulating the objects and materials under study. Millar has explained in his work why he prefers the use of the term 'practical work' to 'laboratory work'. In (p. 2), Millar explains that, location for activity is a key characteristic in laboratory work unlike using practical work where activities could be done in and outside classroom, school, and college environment. I agree with Millar's preference with a reason that practical work has no restrictions to location unlike the laboratory work which to me is too confined and restricted. Practical work looks at the broader perspective for how activities, exercise, and demonstrations are done to involve pupils to explore and solve problems at their own pace.

Pupils learn best through active participation. They learn to build their experiences and develop knowledge systematically for better understanding. Pupils do not only memorise facts and formulae rather make sense out of information (Freire, 2000). To help pupils to solve problems,

any form of practical work which involves series of activities, demonstration and discussion is ultimate.

4.4.5 Teaching learning materials and equipment

Teaching learning materials and equipment are educational resources that aid and support the teaching and learning processes, for example, textbooks, real objects, and improvised materials. Spreen and Vally (2006) in a survey of schools in South Africa, found that about 80 schools have no libraries and laboratories and about 78 have no computers. Most of these schools are found in urban, peri-urban, and mostly rural areas. A study of four African countries namely, Uganda, Cameroon, Tanzania, and Ghana revealed that majority of schools primary and secondary, have no or few textbooks, tools and equipment's, teaching aids, stores and offices and laboratories (O'Connor, 2002). There is no exemption in the junior high school.

4.5 Summary

This chapter has discussed three theories vital for the analysis of the data and some related concepts for better understanding. Diakonia explains why a Christian church should do work like this after-school project. Empowerment is a method that describe both theological and sociological perspective on how pupils' can be empowered to overcome the fear of mathematics by showing love to pupil rather than being rigid for them to develop positive attitude towards the subject. Social cultural theory delved into strategies, communication, and cultural background by relating teaching strategies to the context of the pupils. It also explained how learning development occurs through social interaction and how teachers provide guided assistant to the pupils. Lastly, the motivational theory discussed how effective a teacher should arouse and sustain the attention and interest of the pupils in mathematics. It also emphasizes how love, respect shown to pupils in class contribute pupils having interest in studying a particular subject.

Finally, in the school learners are involved in group work and participation becomes crucial in context as learners share views and ideas during learning situation. It tends to help them construct their own meaning out of what they have learnt among the group and this contribute to reasoning and solving problem alone after being assisted from a capable peer or a teacher in performing task. This is connected to Brofenbrenner (1979) model of interaction in the environment in the micro and meso system where there is an interpersonal relation between a

child and family at home and at school within the teacher and peers where activity, role play and effective communication occur for a child to construct meaning within his/her world (environment). Therefore, teaching and learning context should be free from tension rather should be intended to stimulate child's extended rapport with teachers.

CHAPTER 5: PRESENTATION OF FINDINGS

5.0 Chapter introduction

The aim of the chapter is to present information from the data collected. The findings emerged from the study on how the Methodist Church at Maakro Circuit, in Kumasi, Ghana have used their after-school programme to promote pupil's interest and abilities in Mathematics is presented based on questions asked during the interviews and also observations made during the study. The presentation will be from the perspective of three categories of interviewees:

- reverend minister (education committee),
- facilitators(teachers) and
- early pupils considering the research question presented earlier.

The findings are organised into three emerged findings which will help in the discussion and analysis of the findings. This is also used in answering research question. The three emerged themes are:

- importance of Mathematics,
- teachers' attitude and teaching methods),
- teaching and learning materials and equipment

Each of the themes has sub-theme (s) which will also be presented.

Basically, the findings were from primary data source such as interviews and classroom observations.

The following codes were used to anonymise the interviewees: F1, F2, F3- facilitators (teachers), EP1, EP2, EP3- earlier pupils and M1, M2, M3-reverend minister (education committee). Quotes and excerpts from the participants' responses have been included to substantiate the analysis and to provide the reader with a better understanding of the finding (Patton M. Q., 1987).

As mentioned earlier, this study will explore the attitude of teachers teaching materials, approaches and methods used by teachers in the after-school program. How teachers use activity method in the teaching of mathematics of pupils will also be explored.

5.1 An understanding of after school program

The church leaders interviewed in my research who were asked what after school program is, described it in a similar way. A common definition was helping pupils to overcome their challenges in the ordinary school set-up. They emphasised that it serves as an additional support to pupils in improving on their challenged subjects for instance mathematics as a case. Other definitions included the nurturing of pupils' in-built talents and abilities. And so, the question of why mathematics was asked, and similar and different opinions were presented by the three leaders selected. These definitions presented by leaders gives a fair idea of what an after school is about. It is so clear that the church is aware of the challenges and difficulty some pupils are faced with in school. I therefore present my data under the various themes.

5.2 Presentation on the importance of mathematics

In this section, views from earlier pupils on the importance of Mathematics are presented. For clarity purposes, in this section, I shall represent the earlier pupils who have benefited from the church's after-school program with EP1, EP2 and EP3. The views presented are professionals who were one's pupils of the church's after-school programme.

5.2.1 Views on the importance of mathematics (EP1, EP2 EP3)

When the first participant EP1 was asked to give one or two reasons why mathematics was important for him and any other person, the response that came was quite impressive. The response was that *“mathematics cannot be done away with because it is applied in our daily activities such as walking, talking marketing and many other activities of life”*. He also mentioned that mathematics is everywhere in life, almost every program choice made for higher level and the whole world. As the discussion was getting more interesting for me, I probed to find out why he thinks mathematics is necessary in our daily life activities. He justified by saying that wrong calculating of steps will either lead a person to the wrong location, hit an object or one can fall when a step is missed as he demonstrated. Again, without any idea in basic mathematics, it is difficult doing buying and selling (marketing) (interviewed an earlier pupil (1), 16th December 2019). Talking without any proper timing may bring disgrace or take one to court. I found this interesting to present in this study.

When the second participant, EP2 was asked the same question as the first participant, the response was that mathematics is a compulsory subject for all pupils. Every pupil needs to pass mathematics to climb to the next level of the education ladder. Even to get a program of your choice and school is sometimes affected and so it is important mathematics is taken seriously. Participant went further to say that doing mathematics at higher and professional level creates more avenues and opportunities to job. She gives an example of herself as a professional mathematics teacher and how more mathematics teachers are needed making it easier to acquire a job after study. Again, mathematics teachers and pupils who are good at mathematics command respect (Interviewed an earlier pupil (2), 16th December 2019).

Lastly, the third participant (EP3) who was also an earlier pupil when asked the same question responded that;

“though mathematics is considered a difficult subject, it challenges pupils to solve not only flexible problem but more challenging problems leading pupils to critically think to come out with an answer” (EP3).

As pupils think through problems, it broadens their way of thinking, improving one’s knowledge and understanding of more difficult mathematics concepts. Another claim participant made was that mathematics is good since every program for further studies has some content of mathematics especially at the senior high level. The justification was that, pupils who try to run from mathematics meet it even in the home economics class, visual art, and the general art class. In these classes, mathematics is treated as a core subject which cannot be ignored (interviewed EP3, 18th December, 2019).

The information received from these participants are considered interesting and true.

5.2.2 Facilitators (teachers) view on the importance of mathematics

Teachers who were interviewed on the importance of mathematics in the lives of pupils gave almost the same answers. F1, F2 and F3 mentioned that, mathematics is a necessity to move to the next higher level in education. They went on to say that there is the need to devise a way which will make pupils have the interest in studying mathematics. It is necessary to take away the fear in pupils because even in their day to day life, they still need it.

F1 made emphasis on how important mathematics is in our daily live activities such as walking, marketing and the likes and so pupils need at least the basics if not a mastery. For him, Mathematics is the heart of education. It is a compulsory subject in the Ghanaian context he clarified. He again mentions how education is the concerns of the government. He explains that government alone cannot do it. The church as a stake holder to education has a role to play. For this reason, the church has taken it upon herself to assist pupils to better understand, build and improve upon their abilities and interest in the study of mathematics.

F2 and F3 shared a common opinion on how essentials the study of mathematics is and an important requirement to most professions worldwide including engineering, medicine, teaching to list a few.

According to F2 mathematics is vital, she further explained that the study of mathematics is incredibly significant in nation building and leadership role in our society. For better development of the church, accountability is paramount, and the church depend on the expertise of her congregation to achieve this. For this reason, the church takes it upon herself to educate their youth (pupils) and members in the community who are willing and ready but are challenged in better understanding of mathematics. The aim of doing this according to F2, is to help develop and build the youth (pupils) to support themselves, the church, community, and the nation in the future.

F3 mentioned whether school or no school, one needs the simple basic mathematics to be able to survive on this planet. He continued by saying even common movement to and fro, cooking, is calculated to know the distance taken to one place to another as well as opening to the chapters in the bible, commented by F3.

F1, F2 and F3 mentioned the problem they are been faced with. They talked about the attitude of some of the pupils as not so encouraging because of how some the pupils perceive mathematics. Some pupils think mathematics is so difficult and so they are not ready to even participate but the problem is whether they have interest or not, they still need mathematics to complete the basic school.

5.2.3 Minister's view on the importance mathematics

The ministers shared their views on the benefits associated with the church supporting and incorporating the teaching of maths to the youth (pupils) in their church as part of their

community development plan. M1 and M2 commented on a series of activities that require the understanding of mathematics including treasury, financing, administrative role, and several other positions in the church. They further stated that knowledge in maths was important in the development of the community.

There is a general fear in most pupils even at the mention of the subject name mathematics. The incorporation of mathematics into the program is to help take the fear out of the pupils and to motivate them in liking the subject. 'My view on the importance of mathematics will be helping improve on pupil's confidence' a comment added by M3.

M3 declared how worried he was because he thinks parents are to support them in helping these pupils with mathematics, but they do not have that support. All they need from them is to allow their children to be part of the program, yet parents think they need the services of their children at home. He said the pupils are the future leaders of the nation and therefore need proper nurturing. He said, getting mathematical concepts at the basic level, improves one's learning and thinking at the higher level and that is for a fact. He finally said it is a particularly good thing to express oneself with good English, but it is also best to be able to logically reason well and fast. Mathematics is especially important in many ways he ended.

5.3 Presentation on teacher's attitude and teaching methods

This is the second theme of the findings which presents the views of teacher attitudes towards pupils and the teaching methods teachers use. With the teachers' attitude the approaches to pupils in teaching and the behaviour is presented. Concerning the teaching methods, the kind of teaching methods employed in the teaching is looked at and how they conduct their teaching methods in the mathematics lessons.

5.3.1 Participants view on the attitude of teachers (earlier pupils)

This section presents earlier pupils' views on the attitude of some teachers in the regular school (precisely the government school) as compared to that of the after-school program. The kind of instruction between teachers (facilitators) and pupils during teaching and learning in the classroom is revealed. An observation conducted during my visit shows how some teachers are making most effort to develop in pupils the interest in the study of mathematics as they involve

pupils in their teaching. What I call peer teaching which help improve on pupils' abilities in their studies. Declared by EPI:

As compared to my mathematics schoolteacher in my former school attended, our mathematics teachers at the after-school program were very impressive. They were very patient with pupils irrespective of your abilities. Whether a slow learner or fast learner, we were all treated fairly and equally. Questions were equally distributed. The same goals and objectives were set for everyone (EP1).

Normally, mathematics teachers in the regular schools would want to rush through a topic to finish within the time schedule for instruction. They plan lesson for a time range. Whatever has been planned must be accomplished within that time and so pupils are rushed through with the topic. This deprives pupils their understanding to most mathematics topics which kill their interest in the subject. During my observation in this study, I realised how teachers were so committed to their call. The pupils were their most concern, not time. They made sure each pupil has benefited from the class. Questions were evenly distributed. Each pupil had a question to answer whether a fast learner or a slow learner. This is to confirm what EP1 had mentioned.

EP2 also testified how mathematics was his best subject even though was perceived as difficult. He mentioned how his teacher was so passionate in his teaching. Further explaining that there was no wrong answer but when you needed to be corrected, was done in a nice way. Even with a wrong answer, one is still encouraged. In my observation, I realised teachers using many alternative methods to catch the attention of pupils for better understanding. There were display of several materials relevant for the lesson to aid understanding. Meanwhile, some teachers were using various methods but without any teaching materials. Upon asking why, the responds were that materials for that topic was not available, but pupils managed to understand.

Finally, my last participant EP3 declared;

“I detested mathematics because of the kind of treatment I received from one of my mathematics teachers. The insults and discouragements from that particular teacher made me develop dislike for the subject” (EP3).

She explained, the teaching was not well delivered and so most pupils as herself were struggling. Caning was not out of the picture and words like ‘you are not a school product, so you better learn a trade instead of schooling’ was what pushed her out of the mathematic class. She failed mathematics and had to write again to be able to further her education. According to

her the after-school program has really helped her throughout her education and her professional career. Teachers were so committed, loving, and believed in everybody's potentials. She believes the attitude of teachers have greater impact on pupil's performance. Some pupils do not believe in themselves or have confident, but teacher kept on encouraging them. My observation during this study tells that EP3's declarations were not far from right.

In attempt to find more on the attitude of teachers, I asked if all teachers believed and encouraged pupils and the responses from F3 was that, not all of the teachers have the same believe but at the end of the day, pupils are placed at the centre of teaching. At a point, some cannot cope with pupils who do not pull through with all effort a teacher makes but said it was normal for a teacher to feel that way. He said since the aim is to bring the best out of pupils, there are many teachers around to fill any gap when necessary.

5.3.2 Presentation of teaching methods

This section of the chapter presents the views of teachers and earlier pupils on the teaching styles, approaches and methods of teaching of teacher from the school visited in this study. Teachers and earlier pupils mentioned that, depending on the topic to be taught, various methods and approaches are used by the teacher during instructional hours. There are basically two approaches to teaching, namely: *the learner centred, and teacher centred approaches*. However, this study concentrates on learner centred approach. Practical activity method is one of the examples under the learner centred approach.

5.3.2.1 Learner centred approach: practical activity method

Given pupils the opportunity to be actively engaged in a task at their own pace and putting them at the centre of their own learning is termed as the learner centred approach.

5.3.2.2 Teachers views on the teaching methods

All teachers F1, F2 and F3 said they used the activity method in their teaching. F3 also made mention of using demonstrations in the teaching and learning process.

Teachers were asked as to how teaching methods were used in their mathematics lessons. F1, mentioned with an example how the activity method was used in teaching some topics. For instance,

when I want to teach a topic like shape and space (two-three dimensional figures), I use real objects and cut-out shapes. Materials are displayed sometimes on the

teachers table and pupils come around to identify faces, vertices, and edges to the whole class. Sometimes too pupils are put into groups with the materials at their own disposal while they explore with the materials. And at other times, each pupil has a material to manipulate with. I do this, depending on the class size or the materials available for the lesson (F1).

F3 to respond to how teachers use the teaching methods explained that, with the activity method, a teacher could demonstrate to pupils the use and importance of a material in a lesson. He further mentioned that teachers involve pupils by engaging them in an activity for individual active participation especially in construction of plane figures, example triangle, square, rectangle etcetera. and diagrammatic work like measurements, geometry etcetera. Apart from pupils sketching and manipulating materials themselves, the teacher also demonstrates to achieve a specific objective and skill he or she wants to impart into pupils declared F3.

With a topic like construction, I demonstrate to the whole class on how to use the pair of compasses to draw curves an angle with ease. Pupils are showed how to handle the pair of compasses for free turning (interviewed F3)

He clearly said that, to save time, pupils are put into smaller groups of five while each person in the group can use the pair of compasses in drawing curves and angles. He moved round the groups while the activity was been carried out to ensure that pupils were focused and doing the right thing.

F2 shared similar view like what F1 and F3 had mentioned earlier and added that, “taking pupils through activities help broaden interest, participation, and knowledge and to understand some theoretical concepts in mathematics practically” (interviewed F2).

All three teachers were confident to indicate that teacher’s attitude towards teaching counts a lot in the progress of pupils learning. From the classroom observation, I realised that teachers involved pupils in groups and had time for each pupil. I asked why pupils were put in groups and teacher answered by saying it was to save time and moreover pupils can catch up faster with their peers understand better. The teacher had time for pupils because they believe pupils can make it when they are engaged in activities in teaching and learning process. Some pupils do not believe in themselves or have confident, but teacher kept on encouraging them.

5.3.2.3 Earlier pupils view on Teachers teaching methods

Pupils were asked on the methods teachers used in their teaching and EP1 answered by saying it was the activity method mostly because pupils were placed at the centre of the teaching and learning process. She said however that, there were some few topics which needed just pupil's attention while the teacher delivered the lesson or demonstrates. So, she said it depended on the topic to be treated. EP2 and EP3 gave an example that graph works were mostly presented diagrammatically on the graph board or chalkboard but meanwhile the teacher goes rounds to help pupils who were in difficulty. F1 declared how construction was exceedingly difficult topic for her. She said,

my mathematics teacher had to guide me as to how to properly hold the pair of compasses and how to make some free turns until I was conversant with it. I can now say boldly that I am a master's in construction work. I am now a professional mathematics teacher (F1).

Some teachers are full of encouragement, but others are not neither do they believe in pupils. Some will even give you the insult of your life. Had it not been the rescue of one teacher, I would have dropped the mathematics class declared F2. Teachers attitude is what sometimes put fear and dislike for the subject. A classroom observation during instructional showed how some teacher used the lecture method in teaching. Upon asking why the lecture method was used, the teacher explained that, he only uses it when he is revisiting a topic or when he is sure pupils are okay. With the lecture method, the teacher makes sure to give more examples until the result is a positive one.

There is the assumption that a teacher method of teaching can influence the teaching and learning processes and how lessons are assimilated by pupils in most subject especially mathematics and science. Again, group work has been identified as remarkably effective in the teaching and learning processes but however, a classroom observation revealed that, group work is not always encouraged. The reason being that, without any effective supervision, teaching and learning is almost sometimes zero because pupils choose to talk and do their own thing.

5.3.2.4 Reverend ministers view on teachers' attitude and teaching methods

The reverend minister commented based on the report given to him by the education committee. His work as a minister would not permit him to do most of the supervision by himself. A committee is therefore set up to supervise the teaching and learning activities. This is done occasionally to monitor the progress of the program. The education committee who stood in for

the reverend minister had commented on the attitude, and methods of teaching of their teachers both positive and negative. M1 had commented that, one good thing about their teachers is that they engage pupils throughout the lessons. Pupils are made to work on the board to test their understanding to a topic and their confidence. He also mentioned that he had seen teachers couple of times putting pupils in groups during and after lessons to work together. This for him is a good thing to do since some pupils learn best from their peers. M2 and M3 made the same comments as M1.

When I asked how often supervision was done by the committee. the responds were that supervision was three times in the month. They mentioned that because they have their job and some activities to attend to sometimes, they are not able to go on supervision on regular basis. M1 thought that was not a problem because there was always one teacher on duty to see to the smooth running of the program even in the absence of the committee. They said teachers use the child/learner centred method in their teaching and sometimes too there were group presentations in the classroom. They also said teachers were so committed to their work.

However, the committee mentioned that, sometimes teachers left pupils all by themselves causing unnecessary noise sometimes. You know pupils when they are left alone without any proper supervision tend to do worse things. This is the minor challenge experienced by them.

5.4 Teaching and learning material equipment

In the day to day running of a school, the facilities of the school are especially important. Facilities like well-ventilated classroom, relevant textbooks, computers, graph board and other relevant materials and tools for effective and efficient studies and teaching. Teaching learning materials used in this study is the learning aids like chart, models, cut-out shapes, objects in the community that teachers use to support teaching methods during the teaching and learning processes. Equipment on the other hand are the instruments used to conduct practical activities like in construction during teaching and learning of mathematics.

5.4.1 Pupils view on teaching and learning materials

Most often than not, the facilities of a school give a clear idea of how the performance of pupils would be. My observation during this study has not proven this wrong. It was noticed that pupils

in the regular school who had limited teaching and learning materials in their schools were those who could not further their education to the next higher level. Unlike those who were exposed to incredibly good facilities in school. My interview session had not proven my observation wrong. My interview with my three participants showed how poor facilities lead to their failure in mathematics and how the after-school program came to their rescue because of the facilities that were available for a sound study. My interview with an earlier student EP1, revealed how there were few mathematics books in his formal school (government school). He said for a class of 40 pupils, there were only eleven (11) mathematics books. For every pupil there was a book to be managed while the teacher uses the remaining one book for the lesson. He continues further to say that, even those books did not match the new syllabus and so the teacher had to find a way to make the lesson go on. Those times he said was not easy at all for a pupil to confidently say he/she was going to pass exams. It was a matter of try your luck he added. The school structure alone could cause your failure. There was no roofing on the building and so one could not tell or predict if the day was going to be bright or otherwise. The classroom was so poor with very few chairs. We had to run a first come first serve leaving the rest standing he said. So, this was how bad his formal school was. Unfortunately for him, he failed massively and had to go back to another school for a better grade. EP2 and EP3 shared a similar view as EP1.

Moreover, EP2 and EP3 commented on the teaching and learning materials which were of no use because some tools and equipment were broken. They said for a topic like construction, teachers could not illustrate and demonstrate to pupils on how to construct some simply angles. Mostly it was sketched and so one had to imagine to construct and by the time the teacher could attend to each pupil, it is already break or change lesson. Always very few gets the concept leaving the rest they said. All three participants were happy about the church's after-school program because it was their rescue. They said the facilities and teaching materials enhanced and made learning easier. Again, in the absence of the teacher, learning was not a challenge at all.

The focus of this study is how the after-school program seek to promote and improve pupils' performance in the study of mathematics. From the observation I conducted during the after school I found out that sufficient equipment and teaching learning materials were readily available at the church's after-school program. This made the teaching lovely and pupils' active engagement were also ensured as the teacher guided the pupils on how to use the drawing equipment, example how the use the tools in the set square (compass) to locate a point to draw

circle. Teacher demonstrated extra love to all pupils by assisting each pupil to get it correct before she continued to the next stage until all were done and achieved the objective for the lesson. My observation confirms what pupils have already revealed. In fact, I was impressed about all the teachers that I observed their teaching processes.

5.4.2 Teachers view on teaching and learning material

All three-teachers shared a common view on the teaching and learning materials. Some teachers who were part of the afterschool were also teachers in the government schools. My participants who were also teachers in the government schools compared the facilities at the government schools to that of the after-school program. F1 was sure to say that the church is really doing well with regards to facilities and materials needed for teaching and learning. Also, as a government teacher, F1 mentions that:

“facilities at the government schools especially where he was, were not good enough and does not create any good and conducive atmosphere for teaching and learning. Both teachers and pupils must manage with the few textbooks available” (Interview F1).

He indicated there were 40 computers but about almost half of them are not functioning. He explained, they could be repaired but the capitation grant from government are not enough to repair pupils’ desk and computers that will enhance the teaching and learning of all subjects, especially mathematics. Furthermore, he revealed at the government school, some teachers including himself must borrow from other schools, those materials which are not available and improvise those they can help pupils. Comparing to after-school, pupils are not too many and the materials is enough for pupils whiles some are improvised. He concluded by saying the afterschool is really helping.

F3 and F2, on the other hand declared that, in their various government schools teaching and learning materials are available to enhance pupils learning apart from the very few ones which are of no use. Like F1, they also improvise some materials. However, the only problem they have is with the nature of the school structure, classroom, and desk. These are in bad shape they said. F3 said:

I do not think the facilities in our government schools can be compared to that of the after-school program. The church is really trying.

5.4.3 Ministers view on teaching and learning materials

The government of Ghana through the ministry of Education and its agency Ghana Education Service are responsible for furnishing public and government assisted school (mission schools) with resources such as textbooks, school building, computers, desk and all other resources needed for the smooth running of school and effective teaching and learning. After-school is not one of such where government is waited on to get materials for its smooth running. As a private agency, the church provides teachers and pupils with all the materials needed to enhance learning for a good result declared all participants. M3 said he believed that the government is doing everything in capacity to provide schools with the necessary facilities and materials for the progress of teaching and learning. In his view, some schools are not careful enough with these materials and facilities well of course it is not their own property. He said some material that are to be maintained by schools are rather neglected and ignored to the mercy of rain or community men. Most heads and teachers in the government schools only think of their salary and nothing else. Teachers and learners(pupils) are requested to take care of materials and equipment's as if they were their own.

The difference with the church's after-school program is that there is no support from government and that members of the church particularly charge of the facilities of the facilities and materials. Any damage of facility or material is reported immediately and fixed. Teachers and learners (pupils) are requested to take care of materials and equipment's as if they were their own.

5.5 Summary

The result of the findings clearly spelt out the importance of mathematics and the fact that human beings cannot experience daily lives without the application of mathematic. The findings have also proven that the use of method in teaching and the attitudes of teachers too can either influence pupils' interest, choice, and participation of studying mathematics to a higher level. Presentation reveals that teachers approach to teaching of mathematics and pupils' engagement in the teaching and learning also motivate and arouse pupils' interest in the learning of mathematics. It also points that when teachers embrace and show love to all pupils, it motivates pupils to feel belonging in the class irrespective of their ability and performance in the subject. Finally, findings show that when mathematics is taught in relation to contextual learning it

makes pupils more active and pupils can easily relate with things in the environment to learn. This is because pupils learn best by doing for instance when teachers use concrete teaching/learning materials within the environment like using pieces of sticks or fingers as counters for teaching addition in mathematics for better understanding.

CHAPTER 6: DISCUSSION OF FINDINGS

6.0 Introduction

The focus of this study was to explore and find out how the after-school programme helps pupils who perform poorly in mathematics improve in their performance and develop interest in studying Mathematics. The specific aim was to investigate and find out the teaching methods and resources used in after-school programme of the Methodist Church in Maakro Kumasi, Ghana. The study was guided by the main research question: How and why has the Methodist Church at Maakro in Kumasi, Ghana, used their after -school programme to promote pupil's interest, participation, and improvement in Mathematics?

To answer the research question, this chapter discusses and analyses findings from the data presented in chapter 5. The discussion is based on three main themes presented from the data: (1) importance of mathematics, (2) teacher's attitude and the teaching methods and lastly, (3) teaching and learning materials/equipment). These three themes are discussed in relation to the relevant theories selected for this study as theoretical framework: diakonia and empowerment, sociocultural theory by Vygotsky and motivation theories for discussion and analysis. Chapters 4 and 5 are therefore linked for discussion in this study. This means that the theories will be connected and reflected in the presentation of the findings and discussion of the findings based on the three themes for discussion.

6.1 Importance of mathematics

Mathematics which is considered as a challenging subject is also recognised as very vital in the organisation of our daily lives from infancy throughout old age; hence the need for all persons to embrace. Unfortunately, in the acquisition of mathematical knowledge, most individual have less preference especially at the junior high schools and even beyond.

Findings from this study through the interviews and observation with teachers, ministers, and pupils on the importance of mathematics tells that mathematics is seen as a benefit for the individual's life and the society. Interviews with all participant in the study revealed that, in every life activity, there is some form of mathematics involved. Mathematics education is good for life. It is a basic tool of everyday life. In buying and selling one needs to know what is going

on. Secondly, mathematical reasoning is an important part of informed citizenship. When listening to politicians, it is necessary to note how important some statistics is, and what it means. Mathematics is important to help one plan a budget. When graphs are seen in newspapers and magazines, pupils should be able to understand what it means. Again, for many jobs in the infrastructure of our increasingly technological and complex society, mathematics is a needed tool. Certain proficiency with mathematics is needed for the trader, the nurse, the banker, the lawyer, fast food manager, dental technician etc in their jobs. From all the importance mentioned, it is noticed that mathematics is necessary in all forms of education being it formal, informal, or non- formal. This means that mathematics is for all. All of this was confirmed during the interviews with all participants. Critical attention, patience, and love must be demonstrated in the teaching of mathematics knowing how important it is in the lives of pupils.

In line with diakonia, the fruit of love which is a gift of all believers demonstrated by the professionals in the after-school programme revealed the relevance of mathematics. Professionals showing to pupils' extra love and encouragement in teaching the mathematics increase interest and pupils participation. The patience in teachers lesson delivery tells pupils how important it is to get a concept right. As a gospel in action, diakonia is expressed through love and care as stated in the church of Norway plan for Diakonia and within the field of diakonia, learning processes are mutual (Dietrich, 2014). Teachers aim is not only to help pupils gain mastery and be independent but also for pupils to give back to the church and community with their knowledge and skills. We are part of community called to share with each other to show how mutual diakonia is. It is therefore prudent for teachers to handle mathematics lessons with love. Pupils must be treated with love and care which will inspire them to love and have interest for the mathematics lessons as well as realising the importance of mathematics for daily lives. When the interest is there, pupils are encouraged to participate. This study revealed that, pupils love and passion for other reading subjects is not because mathematics is perceived as a difficult subject as some studies and people put it. Rather, this has been because of the way mathematics is been handled by some teachers in the mainstream as noted by an earlier pupil. One of my participants (earlier pupil) mentioned how mathematics was his favourite subject in the primary school until this feeling changed at the junior high level even though he still had the passion for it. He confirmed that, his mathematics teacher at the time would rush through a topic in the name of time and this made him struggled most of the time in the classroom. However, he stated that his passion for the subject made him go the extra mile to after school

programme to engage in quality hours to overcome this challenge. He said he was so determined to pass mathematics because he wanted to pursue a mathematically inclined programme for his further studies in life. He was one of the few who was so optimistic.

This could imply that most pupils dislike for mathematics may not necessarily be because of how they perceive mathematics but rather the value of the subject and the attitude to the teaching of mathematics could either lead to developing pupils' interest and performance or not. Woolnough (1994), stated that department which are noted of not performing very well and have teachers who are not friendly do not attract pupils. This study noted that professional teachers in after school programme spent quality time with pupils and demonstrated love by taking pupils through systematic step in teaching them. This provides pupils with some form of empowerment as teachers show and share love in their teaching to help pupils to develop interest and improve on their performance. Nissen (2012) points that, empowerment pops it as the positive change that result from its actions and usually result in a change of life and situation. He emphasis, empowerment assumes at least two actors: one who has the capacity or the resources that the other party does not have. In relation to this study, the teacher who have power over the pupil uses the power positively and share with the pupil for better understanding and to know the need for mathematics. This in turn give pupil as teacher show extra love and care by providing the needy teaching resources which arouse external motivation from pupils which further leads to intrinsically motivated acts as their minds are psychologically prepared for positive change (Deci and Ryan, 1997). Rogoff (2003) also highlight that, trustworthy caring environment by caregivers in this work teachers contribute to psychological, emotional, and social development as teachers express love and care to pupils. This also point to the Vygotsky (1978) sociocultural theory places, as the useful tool for social interaction when teaching and learning instruction is related to the contextual environment. Learning environment where teachers and learners are lovely and actively engaged in learning for a mutual purpose.

Finally, all participants confirmed that mathematics is particularly important in the lives of human beings because whatever career one decides to choose whether academia or trading it requires mathematics.

6.2 Teacher's attitude and teaching methods

It discusses attitudes of teachers after which teachings methods they used is also discussed. This is presented to show the impart and influence of teachers' attitudes and methods of teaching mathematics on pupils' promotion, interest, and performance.

6.2.1 Teachers attitude

The notion that mathematics is only for some group of individuals such as brilliant, smart, boys or girls depending on who is teaching, is becoming a thing of the past. Everybody irrespective of gender, age, intelligence etc need mathematics in their lives. For some reasons, attitude of some teachers in the classroom has greater influence on pupils' interest, abilities, participation, and performance. Some pupils who are slow to learning mathematical concepts and therefore considered as dull by some teachers, are sometimes separated, and discriminated against during instructional time. This negatively affect such pupils in developing mathematical knowledge. Mathematics teachers as stated in most studies, have giving more attention to smart and brilliant pupils than dull and slow learner, pupils who are boys than girls and vice versa especially when the teacher is gender bias. This according to Haase (2009), negatively influence pupils' participation in mathematics.

However, in this study, the interviews and observations made, during teaching instructions revealed teachers make effort to give equal attention to all pupils irrespective of gender, ability, and intelligence. As diakonia is caring ministry of the church (Church of Norway, National Council, 2008), the Methodist church serves as a ground to helping and protecting humanity. The professionals in the church are moved by faith and voluntary organised after school programme to teach with love, care and respect for pupils who could not make it at the mainstream school to develop interest for mathematics in the after -school programme. The professional teachers in the church have shared their God's giving wisdom(power) from within (Nordstokke, 2009) to empower the pupils in their teaching. According to Freire (2005), love and humility are key virtues that every professional teacher is to exhibit and have. This will make teachers love what they are doing and the kind of interaction to have with their pupils with the idea of giving equal attention. The virtue of humility will make them consider and accept the differences in pupils when teaching. Findings from the church's afterschool programme shows that both boys and girls are given equal attention as pupils are encouraged by teachers. In this study, slow learners are equally given attention as the smart ones (Woolfolk, Hughes, & Walkup, 2008). Sometimes if extra time must be given to the slow learners to catch

up with those who are faster, provision is made for that. In this case, pupils get equal opportunity to pass in their class exercises, class tests and examination. In relation to diakonia as the gospel in action, teachers in the Maakro Methodist church were moved by faith and demonstrated extra love for all pupils. Love without discrimination and with patience taught to empower pupils to develop interest in studying mathematics and improve performance. Empowerment from teachers is likely to cause a change in pupils. This is done by how teachers organise their lesson to engage pupils in participating in learning activities with step by step approach. After teachers have given them power and they have control over the subject, then they can now make informed decisions and choices that can affect their career choices. As Nissen (2012) and Rowlands (1998) believe power can lead to a positive change. This is realised when teachers respect and believe in pupils that they have something in them and can explore to discover and understand concept taught to become better pupils.

This study, through observation and the interview, the number of pupils that have benefited from this programme and have progressed testifies the positive change they have experienced. This confirms Osborne and Dillon (2008) assertion that one factor that can drive pupils' participation in mathematics is expectation and believe in pupils. This suggest that when teachers believe are positive pupils' interest and participation are boosted and in turn leads to better improvement. In light with empowerment, Nissen (2012) points positive change comes from its actions and usually result in change of life. This study with the focus on how after-school program has helped to improve pupils' interest and improvement in mathematics has revealed positive attitude of teachers in the Maakro Methodist Church after school program.

An interview conducted with EP1 confirmed that because of what the church is doing and with the help of teachers(facilitators), he was able to make an informed decision with no regrets. He was empowered and now has power over mathematics through the intervention of the church's after-school programme. This has positively influenced his career choice for life. Those who rather took a decision late, it has affected the way they organise their own individual businesses. They have come to understand that Mathematics is part of daily life and it runs through life. Therefore, in whatever area, being it business or academia, pupils need mathematics. In line with diakonia, the church believes that, as a Christian organisation who receive teaching orientation from God, they are mandated to sacrifice both spiritual and physical for the members. This is done as the minister feed them spiritually with the gospel and ensure their physical needs and support are as well considered. As diakonia in action, the statement made by the Lord Christ "for I was hungry you gave me something to eat, I was thirsty you gave me

something to drink....”Matthew 25:30:40). This shows gospel in action. Member and professional in the church by faith also sacrifice to help the needy in-kind free gifts to show their love to one another. In the context of this professional teachers who believe God created man in His own image(Genesis 1:28) were moved by faith to help pupils with difficulty in subjects like mathematics ,Science and English and teach pupils with their resources and capacity the pupils with mathematical challenges. They teach them with patience, care and love until they become understand and independent to solving mathematical problem which is necessary for pupil’s life. Teacher exercising these ways help pupils to take control over their lives autonomy to build self-confidence, gaining skills and solving problems on their own (Zachariassen, 2012). this As God came down to our level with his only son for our salvation, the church also feel as a group that, they have to invest their human resources, time and other available resources to make sure that those pupils struggling with mathematics will be able to have control over it, at least if not fully, to some extent and according to their levels. When teachers make teaching learning flexible according to learning capability it gives pupils confident. Also create friendly and conducive environment; environment which is tension free provided pupils some form of security and belonging as teachers demonstrate extra love care and respect for pupils.

In another dimension, interview with one of the earlier pupils, it was clear that some teacher’s negative attitude towards some pupils is the reason why interest, participation and performance is sometimes low in regular or mainstream school settings. She mentions that, before she joined church afterschool programme, she was in one of the mainstream schools and what she realised was that some of the teachers only concentrated on those who were mathematically good leaving the rest. She also talks about instance where one of the teachers told some of the pupils, they were not school material and so should stop schooling and learn a trade. Some teachers use harsh words and insulted pupils with any slightest mistake made. Both boys and girls who saw themselves not performing felt uneasy and as in the words of Freire (2005), ‘in secured’ in the classroom. With this attitude and act of some teachers, pupil’s performance in the classroom is been affected and even extend to the society out of fear. Earlier pupil concluded that most pupils are discouraged from pursuing mathematics and science related courses in their further studies and for some, there is nothing like further studies. From the interview, one of my participants, mentioned how a teacher nearly killed her interest in mathematics but with the intervention of the church’s after school programme, she is now a professional mathematics teacher. This study demonstrates the effect of positive attitudes shown by the professional

teachers in the church after-school programme and its' impact on pupils influence as the programme has prepared and positively influence and empower an earlier pupil to become professional in mathematics. This coincides with Nissen (2012) assertion that empowerment is positive change that result from its actions and usually result in a change of life and situation. On the other hand, negative attitude of teachers to discourage and deter pupils from studying is unprofessional. A professional teacher should always demonstrate love and patience to pupils in teaching and learning environment. Freire (2005), outline some virtues that a well -qualified professional teacher must possess to help pupils. The virtues Freire termed as qualities are, love, tolerance humility, flexibility, and security. In this thesis, love, tolerance, and flexibility were notably applied and observed from teachers in the after -school programme. The extra love, tolerance and flexibility demonstrated by teachers in the after-school program had changed most pupils' negative orientation towards the studying materials to positive and has benefited some as EP1 expressed in her response. This shows that teachers' professional attitude must be based on extra love, which will in turn help to perform duties effectively. Again, the extra tolerance and flexibility expressed by teachers made teachers in the after-school affected pupils positively to improve the interest and performance in studying mathematics. With this act teachers treated all pupils equally with discrimination. They had quality time and patience for each pupil irrespective of ability as revealed by all earlier pupils. Positive attitudes with love and patience shown to pupils in teaching give pupils confidence. This was done through taking pupils through step by steps approach with guided assistance which help pupils to develop and gain control over materials at their disposal to solving problem on their own way.

Also, they made sure variety of teaching styles were apply by grouping pupils in smaller groups for pupils to learn from each other. The implication is that pupils learn best with their peers. This coincides with Vygotsky (1978) view that learners learn through social interaction with experienced adult or more capable peers.

This leads the discussion to teaching methods.

6.2.2 Teachers method of teaching

Teachers methods of teaching have great impact on pupil's performance, participation, and interest in the classroom. Quality teaching of mathematics plays an important role in the

performance and the attitude formation of pupils towards school mathematics and science Woolnough (1994). There is no one way method for teaching mathematics. Teachers are encouraged to use different ways with different methods in teaching to cater for pupils needs. The use of many and variety of examples or exercises and learner-centred method improves pupils experience on a topic. Meyers and Fouts (1992) mentioned that, a teacher's professionalism is seen in the use of variety of teaching strategies and activities to help bring the best out of all pupils in a classroom during the teaching and learning process. In this study, teachers demonstrated their professionalism by combining content and methods to involve each pupil's in teaching and learning situation (Freire, 2005). This implies that there is no one fixed method to depend on during teaching as a professional. Findings obtained from all participants reveals that teachers do not just stick to a particular method, rather they use different methods like activity methods which is learner centred. Teachers give different exercise and more examples to solve together with pupils in class by teacher guiding pupils. After which they leave pupils alone to solve more problems this is guided assistance. Rogoff (1990), She points that learning is considered as process of participation in socially organised practices through which pupils develop skills as they as they engage in apprenticeship. Wellingtons (1998), points that practical work can improve pupils understanding and promote their conceptual development by visualising principle, rule and theories. This means that doing practical activities could illustrate, verify for example formula, and affirm theoretical work as things could be simply observed and prove. This makes learning mathematics interesting and motivating and hence help pupils to remember things learnt. Again, give pupils greater feeling of autonomy and hence enhance intrinsic motivation (Deci and Ryan 1997).

The use of learner-centred education by facilitators (teachers) aims to develop learner autonomy and independence. It focuses on skills and practices that enable lifelong learning, and independent problem-solving. This study shows professional teachers' virtues in teaching mathematics to help pupils to become better in the study of mathematics.

In this study, different methods to teaching and active learning strategies to inspire, motivate and sustain pupils' interest to study Mathematics and develop a positive attitude towards the subject have been used and observed. These range from the traditional 'chalk and talk' or 'marker and talk' to activity-based methods such as discussion, group work, project work, puzzles or investigative work and the use of internet (Mulema, 1999; Nautah, 2011). Again, to gain power over Mathematics, hand-on experience is encouraged. Practical work such as handling some teaching and learning materials / equipment's may increase pupils' interest in

mathematics (Greenfields, 1997). Studies carried out in Norway (Angell et al., 2004) and in the United Kingdom (Hart, 2002; Sharp, 2004) as reported by Nautah (2011) give confirmation for the value of practical learning showing that practical activities improve the interest of pupils in mathematics. As explained by Nautah (2011), practical work makes the studying of mathematics enjoyable and by exciting the curiosity of the learners. This study has proven that the teachers in the church after-school programme promote, sustain interest of pupils by showing positive attitude and using variety of teaching methods which engages pupils' participation in learning mathematics. In line with Rogoff (2003) caring environment contribute to psychological and social development as teachers and other caregivers show love and care to children. This is done by creating conducive teaching environment that makes pupils feel belonging to participant free in learning activities and exploring together with materials within the environment.

6.3 Teaching learning materials and equipment

In Africa, many studies such as Addae-Mensah (2000), Babaci-Wilhite and Geo-JaJa (2011), Samoff (2007) and many others have shown that, on the development of education in Africa and across the world, most schools either lack or have inadequate facilities (computers, teaching and learning material or tools, classroom infrastructure etc) to facilitate progressive teaching and learning in schools (Geo-JaJa, 2013; Spreen and Vally, 2000). My experience as a teacher in the government school in some years back could affirm previous studies. However, in this present study findings from the interview and observations in the after-school program stands to differ as the teachings learnings materials are well resourced in the church after school program. There are enough facilities for smooth and progressive teaching and learning.

The church's after school program are well resourced with different teaching and learning materials such as models, chart, realia, and even more improvised teaching aids found with the learning environment are used by teaching visual and practical learning. As indicated earlier, the use of concrete and realia teaching and learning materials example orange to teach topic like circle and division of whole numbers for practical activities makes learning more lovely real. It in turns makes pupils enthusiastic to develop passion to study mathematics in the after-school to higher level as EP1 confirms that the love and patience exercise to her in the after-school program made her developed interest and improved in mathematics to become mathematics teacher.

6.4 Summary of Discussions

The chapter reveals that when teachers' beliefs and attitudes are positive, pupils' interest and participation in studying mathematics is higher. This leads to improved performance. Empowerment from teachers is likely to cause a change in pupils. The professionals in the church are influenced by their faith in God, knowing that God created man in His own image in perfect mode. They believe when man gets the needed support, they can do all things, improve, and perform better. The professional teachers in the churches after-school program always initiate to show extra love, positive attitude and teaching methods that engages pupils' active involvement in teaching activities. Teachers give pupils power or empower them in love, engagement until pupils get better understanding and control over the subject. Then pupils can make informed decisions and choices that can affect their career choices after successful completion. From the interview, EP1 confirmed that because of what the church is doing and with the help of teachers (facilitators), he was able to make an informed decision with no regrets. He was empowered and now has power over mathematics through the intervention of the church's after-school program. This has affected his career choice for life. Those who rather took a decision late, it has affected the way they organise their own individual businesses. He has come to understand that Mathematics is part of daily life and it runs through life. So, in whatever area, being it business or academia, pupils need mathematics. The church believes that, as a Christian organisation who receive orientation from God, they must sacrifice until pupils understand mathematics which is necessary for pupils' life. As God came down to our level with his only son for our salvation, the church also feels as a group that, they have to invest their human resources, time and other available resources to make sure that those pupils struggling with mathematics will be able to have control over it, at least if not fully, to some extent and according to their levels.

The emphasis is not on making every pupil a mathematician or a scientist but whichever area chosen, mathematics is a necessary aspect of life. One needs control over to succeed in whichever area. The church believes that, mathematics is most pupils' weakness and as a result the professionals in the church are trying to help pupils. They do that by providing step by step approach to teaching which gives pupils the opportunity to be engaged and give them power to solve problems. With this practical experience stemming from the power given them, they can now have power over mathematics to move on to their various fields of endeavour. Throughout their education and life, mathematics will be something that can be mastered. As outlined by

Kearsley, Foucault believes power can lead to a positive change. This study, through observation and the interview, the number of pupils that have benefited from this program and have progressed testifies the positive change. Freire (2005) also noted that pupils' confidence in the teaching learning processes is built when they are allowed to participate and their views are respected. The churches mission is to bring out the best in pupils. They honestly believe each pupil has talents deposited in him or her, which when nurtured will bring out the best in him or her to benefit themselves, society and to the glory of God. The individual is an integral part in contributing to the relationship on equal level on the relational level and on the collective level, people work alongside each other in the interest of the greater good (Rowlands, 1997). Indeed, empowerment needed because it leads to individual's autonomy and independence. This is applicable and needed for pupils who see themselves as not good enough to pass Mathematics.

Haugen (2016) mentions that, when individuals, families and communities are empowered, human rights principles in decision-making process is/has been adequately acknowledged. As churches respond to the promotion of pupils' interest and abilities in Mathematics, this will enable to pupils to gain control over mathematics as a core subject.

CHAPTER 7: CONCLUSION AND RECOMMENDATIONS

7.0 Introduction

This section of the study draws a conclusion on how and why the Methodist church at Maakro district in Kumasi, Ghana, is using their after-school programme to promote pupils' interest and abilities in the study of mathematics. The section evaluate, reflects, and highlight on how Maakro Methodist Church uses its after-school programme to help the final year Junior High School pupils to promote interest and improve on performance in mathematics. It further concentrates on how the Methodist church contribute to help promote pupils' interest and improvement in studying mathematics. It evaluates whether the professional teachers promote and sustain pupils' interest or not. Suggestion are made on what needs to be done to promote and sustain more pupils' interest in mathematics. Recommendations are made to conclude this section.

7.1 Conclusion

Throughout this study, emphases were placed of the importance of Mathematics to all pupils and the need for pupils to be actively involved in Mathematics. The study has shown that the professional in the churches after-school programme uses variety of learner centred methods like activity methods where pupils are placed at the centre of learning and grouped in small groups and equally attended to with extra love, patience and care in teaching learning environment. Activity work has been found to motivate pupils' engagement and participation in mathematics (Cooper & McIntyre, 1996).

Findings in this study have revealed that learner-centred which was mainly activity methods welcomes pupil's participation which is a way of enhancing pupils' interest and understanding. This is because the activity method created room for the teachers and learners to relate content and pedagogy appropriately.

Also, the study emphases on the socio-cultural context of the pupils where teaching and learning were basically related to the environment. Learning materials were improvised where there were no readily available materials.

The study has identified that enthusiastic teachers actively seek to find means to build and expand knowledge of pupils for new skills, ideas and uses different ways to teach. Findings revealed teachers provide their materials to help pupils to understand some topics through

improvisation. Punctuality, systematic ways of teaching by the pupils' engagement was good practice exercised by the professional teachers in the after-school programme.

Finally, the study and Vygotsky (1987) has proven that caring environment contribute to psychological, emotional and social development as teachers or other caregivers show love and care to children (Rogoff, 2003) .

7.2 Recommendations

Education is the fundamental right for everyone as set out and protected in universal declaration of human right (1948). In modern societies, education is one of the main keys to development as it brings about change in the lives of the individuals and the nations at large. With education, the individuals can make informed decisions and choices that affects their own lives and education helps in the socioeconomic development of the society. Schools are supposed to be democratic grounds where positive attitudes and values are acquired for the development of the individual and the society at large.

The Methodist church at Maakro, Ghana, as a stakeholder to education has taken a good initiative helping pupils who have challenges in their classroom work and education especially in mathematics wholeheartedly by assisting pupils in the churches' after -school programme.

I recommend that other churches who have not done anything yet to come in support of bringing up pupils who are also the future leaders of the church and the country. Diakonia belongs to the whole church and the responsibility of each member of the congregation. Diakonia meet the needs in the society and since mathematics is identified as a need should therefore be addressed by the church. The church been one of the stakeholders to education must empower to be able to use the God-given gift. Faith must be transformed into action.

Other stakeholders to education like the board of churches, government, parents must also play their effective role in the lives of pupils. Parents on the other hand must make a conscious effort to motivate and encourage their children in mathematics education. Much effort and support in terms of finance must be put in place in the improvement of academic and social lives of pupils.

Furthermore, the church can organise annual festival set aside for raising funds toward development of the churches' after-school programme to involve all children of school age, the entire community and to those who are not members of the church.

Pupils themselves must hold on to the positive attitudes shown to them by the professional in the after-school programme and continue to exercise that faith in learning to improve themselves. Pupils must be intrinsically motivated to be able to make it in life and must persevere and be determined in both academic and their social life. This helps to forget about the negative experiences they have had from some teachers in the mainstream school.

The After-school programme management committee must continue to support the progress of the programme by putting effective mechanism that will include more pupils from first year Junior High School pupils to third year so that they can get solid foundation right from the first year of Junior High to the final year to bring about better pupils' progress in the study of mathematics.

Since diakonia embraces inclusiveness, and mathematics seen as a necessity in everyday life activity of every individual, I will recommend for the church to open up their after-school program by providing materials and facilities that are friendly for pupils who are physically and mentally challenged. This way they will feel loved, welcomed and part of a family. We are all made in the image and likeness of God and therefore the dignity every human being must be recognised and acknowledged.

The church must continue taking part in social work since it is their mission and ministry to transform faith into action. The youth is the future leaders of the church and the society and as such need to be adequately prepared.

Finally, the study suggests that all churches in the nation could initiate and implement this after-school programme in all children from class one to six through Junior High School one to three(basic school level).This is because that is the fundamental Right to education for all, where every child of school age should enjoy the fully. So that if the mainstream could help that child to actualise his or her potential fully the church as a rescuing place and comfort shelter will help save souls from perishing. In relation to diakonia empowerment Christ pour out His spirit on all flesh (Acts 2:12, Joel 2:28) not some flesh. In line with empowerment, it is enabling individuals to act and participate for the improvement their own lives. Jesus Christ is an example who share His power, which was given to Him by His Father to mankind like pupils.

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APPENDICES

Appendix A

Interview guide for earlier pupils

1. How did the church help you in the teaching and studying of Mathematics?
2. What methods did teachers use to help you to develop interest in studying Mathematics during teaching processes?
3. What teaching and learning materials did teachers use in teaching you?
- 3b. How relevant were the teaching and learning materials to you?
4. Was there anything special thing that facilitator did to boost your interest in studying Mathematics?
5. What has this education meant for your further studies?

Interview guide for facilitators

1. How do you help the final year pupils in the church to develop interest in Mathematics?
2. What are the measures you put in place to help pupils in studying mathematics and passing to enter senior High school?
3. What kind of methods do you employ in the teaching of mathematics and how do you apply them?
4. What kind of teaching and learning materials do you use?

5. How do you examine pupils' progress
6. What do you think this classes in Mathematics means for the pupil's further education?
7. Why do you think it is an important task for the church?

Interview guide for reverend minister

1. How has the church used after school programme to promote pupils' interest in Mathematics
2. Why is the church organising after school programme whiles the state government is there?
3. What approaches do facilitators use to help pupils to develop interest in studying Mathematics?
4. How do you assess the progress of pupils?
5. What do you think this classes in Mathematics means for the pupil's further education?

Appendix B

Observation guide

Teaching and learning materials used by facilitators will be observed.

Facilitator interaction with pupils during teaching contacts and activities will be observed.

Teaching methods used by facilitators will be observed.

Observing how tasks are given to the pupils.

There will be an observation on the Learning environment or classroom

VID
vitenskapelige
høgskole
Oslo

Oslo/Stavanger, 02.12.2019 To whom it may concern,

Concerning student project for Philipa Kusi.

It has been clarified with VID Specialized University that Philipa Kusi will store collected data for use in his/her master thesis on encrypted memory stick. Data will not be stored on a PC connected to the Internet.

Students conducting interviews will use recorders that do not have internet connection and will transfer data to encrypted memory stick while the PC is offline.



Tomas