

**BARRIERS TO TEACHING AND LEARNING
MATHEMATICS IN GRADE FOUR**

A study in one primary school in Addis Ababa city, Ethiopia.

Yohannes Bekele GEZAHEGN



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Department of Special Needs Education, Faculty of Education,
University of Oslo, Norway

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ABSTRACT

The application of Mathematics in this modern world of information technology is becoming more and more crucial. Bearing this idea in mind and the contribution it can have to the development of the country, the Ethiopian government has given emphasis to the teaching of Mathematics in the Ethiopian schools.

However, in spite of this understanding of its importance the overall performance of students in Mathematics is unsatisfactory. The objective of this research was to assess some of the possible reasons why students are not successful in their education of Mathematics and to pin out some of the major problems in the teaching-learning process of Mathematics and propose possible solutions in order to overcome these problems.

A mixed design approach was used to collect data from concerned stake holders involved in the teaching and learning of Mathematics. It was found that the problems are multifaceted and accordingly the solutions require overall effort from all concerned stakeholders. The problems range from pedagogical, social, economical, administrative and policy aspects to attitude of students and teachers, competence of teachers, methodology of teaching etc.

I believe this study will have a contribution in the effort of identifying some of the major aspects, which hinder the teaching and learning of Mathematics and thereby towards possible solution. It could be also used as an initial work for those who are interested to do further studies in this area.

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Acronyms

EGSLCE – Ethiopian General School Leaving Certificate Examination

FDRE – Federal Democratic Republic of Ethiopia

GNP – Gross National Product

NGO – Non Governmental Organization

ZPD – Zone of Proximal Development

CHAPTER ONE: INTRODUCTION

This is a study conducted in one government primary school in Addis Ababa city, Ethiopia. The main objective of this study was to assess some of the problems and possibilities in the teaching-learning of Mathematics in grade four. In this chapter general background of the country, background of the topic, statement of the problem, objectives of the research, limitations of the research, delimitation of the research, significance of the research and organization of the study are presented.

1.1 GENERAL BACKGROUND OF ETHIOPIA

Ethiopia, formerly Abyssinia, now the Federal Democratic Republic of Ethiopia, republic in eastern Africa is bordered in the north-east by Eritrea and Djibouti, in the east and south-east by Somalia, in the south-west by Kenya, and in the west and north-west by Sudan. The area of the country is 1,133,380 sq. km (437,600 sq. mi). Its total population was estimated to be 71,064,465 in the year 2005 (Education statistics annual abstract: 2005). The capital city is Addis Ababa and Ethiopia's resources are primarily agricultural.

Ethiopia is one of the world's poorest and least developed nations. Its GNP was estimated at around 6,737 million US dollars in the year 2005, amounting to a per capita income of only US160 dollars (World Bank: 2005). Roads, water supply and other areas of the country's economic infrastructure were badly neglected during years of civil strife between 1974 and 1991.

The educational structure according to the education and training policy of the country has different levels. Kindergartens focus on all round development of the child in preparation for formal education. Even though, the government is involved in supervising and supporting, these are run by private owners or NGOs. Primary education which has the aim of offering basic and general education to prepare students for further general education and training has eight years duration and is divided into two cycles, first cycle (1-4) and second cycle (5-8). For those who drop at

the end of each cycle in grades four and eight short term vocational and technical trainings are given. Secondary education has four years duration, consisting of two years of general education which enable the students identify their interests for further education, for specific training and for the world of work. General education is completed at the first cycle of secondary education (grade 10). The second cycle of secondary education and training enable students to choose subjects or areas of training which prepare them adequately for higher education and for the world of work.

Students are assigned to preparatory schools or vocational and technical training institutions based on their achievement in the national exam in grade 10. Usually those with good achievement are selected for preparatory schools and later to pursue their education in colleges and universities, in fact the door is not closed if some one wants to continue in the vocational and technical institutions. Higher education at diploma, first degree and graduate levels are also in place. Non formal education is part of the education system focusing on literacy, numeracy, environment, agriculture, crafts, home science, health services and civics (FDRE education and training policy, 1994). Due to the reason that most of the schools were built in towns, children in rural areas have been deprived of getting access to education. But, now tremendous efforts are being made to expand and construct schools in the rural areas and the enrollment rate is rapidly increasing.

Gross Enrollment rate for primary, in the year 2004/2005 was 79.8% (Education statistics annual abstract: 2005). A major programme to increase literacy, which was only 4% in the early 1950s, was started in 1979; many schools were opened, and new generations of teachers graduated from several teacher-training schools (Encarta, 2003). Free education has been provided from primary through college level; however formal school facilities were available to only about one third of school age children. In 2004/05 about 11,448,641 students enrolled in primary schools (1-8), 860,734 students enrolled in secondary schools (9-10), 92,483 students enrolled in preparatory (11-12) and 106, 336 students enrolled in technical and vocational education and

training. These schools and training centers are run by the government and religious groups (Education statistics annual abstract: 2005).

Currently, there are nine universities all over the country and thirteen additional universities are under construction. In the last 10 years tremendous efforts has been made to increase student enrollment throughout the country. Schools are built in different parts of the country, and now, the educational coverage at primary level has elevated to 89.14%

(http://www.waltainfo.com/Interview/2006/Jun/Response_by_Dr_Sintayehu.pdf). It is hoped that Ethiopia will attain the international commitment “education for all” by 2015.

As a Mathematics teacher and school principal I had the opportunity to observe closely the teaching and learning of Mathematics in Ethiopian schools. It was a common incident to see most students consider Mathematics as a subject which can not be easily understood and due to this reason their interest towards Mathematics was low and consequently the achievement of most students was unsatisfactory.

What are the main problems related to the learning of Mathematics? Why do most students achieve low marks? What can be done to improve their achievements? These were some of the questions which come to my mind during my teaching career. Now having this opportunity of doing a research, I decided to do it in this area to investigate my questions.

Various reasons as to why students’ achievement is very low can be considered. Some of the possible reasons could be their attitude towards Mathematics, not understanding its practical application, large class size, no enough resource materials such as text books, reference books and teaching aid materials, not understanding the application of Mathematics in relation to other sciences and other fields etc. However, it is important to understand the real existing problems related to teaching and learning

Mathematics based on a scientific research and hence propose a solution to alleviate the problems.

1.2 BACKGROUND OF THE PROBLEM

The school selected for this research is located in Addis Ababa, the capital city of Ethiopia. Most of the community members around the school mainly depend on the income they earn from traditional works such as weaving and pottery. The area is located in one of the areas in Addis Ababa where people live in a very destitute situation and most of the residents are in a very low economic status (Teshome, 2004). Their low income doesn't allow them to provide their families with sufficient living conditions. Children in this area are forced to work in order to help their family earn their income. This extra engagement of children in work leaves them with no sufficient time for their education. Besides, due to the poor economic status of their parents learning materials are not fulfilled as required and hence their academic performance is highly affected.

Education is important for the development of individuals as well as the society in any given environment. It looks impossible for people to make the best use of the environmental resources for life and society without having proper education in their respective settings. In this respect then, it could be said that education is one of the vital components of life.

In the rapidly changing world and in the development of science and technology Mathematics plays a vital role. In daily life and in most human activities the knowledge of Mathematics is important. To understand the computerized world and match with the newly developing information technology knowledge in Mathematics is critical. Emphasizing this Krulteskii (1976) as cited in Benbow & Arjmand (1990) said the development of sciences has been recently characterized by a tendency for them to become more Mathematical. Mathematical methods and Mathematical styles are penetrating everywhere.

Education systems throughout the world place high importance on the teaching and learning of Mathematics, and a lot of resource is put to maintaining and improving efficiency and effectiveness in these activities (Garden, 1987). There are two major reasons that add to the importance of Mathematics. One is the relationship between Mathematics performance and academic or career opportunities and performance (Mills, Ablard & Stumpf, 1993). The second is the importance of the study of Mathematics to the scientific, industrial, technological, and social progress of a society (Burton, 1979).

Despite such importance it is unfortunate that many students have mistaken impressions about Mathematics and dislike Mathematical activities; many seem to fear, even hate, Mathematics (Neale, 1969). More generally Mathematics appears to be unpopular as a school subject (banks, 1964; Ernest, 1976).

The causes of poor attainment in school are complex. Usually many factors combine to give a low level of learning – physical, intellectual, emotional and social. The most common are slow maturation, poor attendance, environmental deprivation, emotional disturbance, and low average intelligence (Irving, 1972).

1.3 STATEMENT OF THE PROBLEM

Problems related to learning Mathematics are common phenomenon among students around the world (Fennema & Shermann, 1976). This holds true in the Ethiopian context too. A number of factors do influence student's Mathematics achievement positively or negatively. One among these factors is student's attitude towards Mathematics. The direct relationship between Mathematics achievements and attitudes as well as their reciprocal influence are well documented (Aiken, 1970; Johnson, 1984; Sherman, 1980; Tsai & Walberg, 1983). One of the reasons why students attitude towards Mathematics is negative is that students are not able to see its relevance in daily life or in relation to other sciences, and hence the feeling that why learn if it has no use prevails among most students (Fennema & Sherman, 1976).

In the Ethiopian context, the number of schools and number of students is incompatible. There are a large number of students in each class where this becomes a barrier to the learning of Mathematics. Many studies indicate that reduced class sizes lead to improved student achievement (Finn & Voekl, 1992; Glass, Cahen, Smith & Filby, 1982; Robinson, 1990).

Mathematics is considered as a male domain in various countries (Burton, 1979; Fennema, 1974; Fennema & Shermann, 1976; Jacobson, 1985). Particularly in the Ethiopian communities girls are engaged in household duties in order to support their family. They involve in taking care of young children, cooking and in carrying out other duties (Belay, 2004). This doesn't allow girls to spend much time in their education in general and Mathematics in particular.

Most of the above mentioned problems have their roots in the lower elementary schools. This makes the assessment of the problems and the proposing of possible solutions at this stage vital. In the Ethiopian educational system grade four is the end of the first cycle (lower elementary), hence the study gives us a general overview of the problems related to the teaching and learning of Mathematics in the lower grades and helps us to act accordingly.

1.4 OBJECTIVES OF THE RESEARCH

The major objectives of this study are:-

- To assess existing problems in relation to the teaching and learning of Mathematics and propose possible solutions.
- To identify some of the major reasons as to why students achieve low grades in Mathematics.
- To investigate what the current Mathematics achievement of students look like.

These being the major objectives of the study the following are the main research questions to be dealt in this study.

Main research questions

1. What is the Mathematics performance of students in grade four like?
2. What are the major factors that affect the teaching and learning of Mathematics in grade four?

1.5 LIMITATION OF THE RESEARCH

Students in grade four are young children of age 9-10. Thus, the process of filling the questionnaires by themselves with no assistance was not easy. However, efforts were made in such a way that the questions were set in a very simple way (almost only yes or no options were given) so that they could understand and fill in the questionnaires while the researcher is there to help them in clarifying things which are not clear.

One of the instruments applied in this research was record analysis where Mathematics achievement of students was analyzed; however these students were taken from four different sections where four different teachers were teaching. Hence the variation among the teachers in ability, methodology, way of assessment etc had its own limitation on the Mathematics result of the students.

Other limitation faced in this research was related to interviewed parents. Almost all parents interviewed had little knowledge of their children's experience in learning Mathematics and hence the opinions given by them were more general emphasizing on the education of their children and lacking focus on the issues related to Mathematics.

1.6 DELIMITATION OF THE RESEARCH

This study was delimited to only one elementary school located in one of the sub cities in Addis Ababa city. The barriers and possibilities related to the teaching and learning of Mathematics in grade four are the focus of the study. The study was planned to be finalized in six months.

1.7 SIGNIFICANCE OF THE STUDY

It is believed that the study would have the following significances:

-
- Gives insight policy makers, executioners at various levels of educational administrations and teachers take measures to overcome or lessen the existing problems.
 - Adds to the knowledge we have about the barriers and possibilities in learning and teaching Mathematics in the Ethiopian schools.
 - Indicates possibilities to explore and overcome the barriers encountered.
 - Can be used as a reference to other researchers who want to do their research in this area.

1.8 OPERATIONAL DEFINITION OF TERMS

Mathematics achievement: - Student's performance in Mathematical tasks.

Barriers: - The obstacles that hinder the understanding of Mathematics.

Learning: - Relatively permanent change in behaviour as a result of such experiences as exploration, observation and practice.

1.9 ORGANIZATION OF THE STUDY

The study has five chapters. The first chapter focuses on the background, statement of the problem, objective and significance of the study, limitations and delimitations of the study. The second chapter comprises review of theoretical aspects and related literatures. The methodology of the study is given in chapter three. The results/findings of the study are dealt with in chapter four. Finally, chapter five dealt with the discussion, conclusion and recommendation.

CHAPTER TWO: THEORETICAL FRAME WORK AND REVIEW OF RELATED LITERATURE

The impoverishment of facilities, lack of instructional materials and declining quality of teachers has contributed to the decline of educational standards in general and the impact was bad on the quality of teaching in science, Mathematics and English in particular (FDRE Education Sector Strategy, 1994). Taking this problem into account and their crucial contribution towards the development of the country the educational sector strategy of Ethiopia gives emphasis to the teaching of Mathematics, Science and English.

Considering these two points that is low performance of students in Mathematics and its contribution towards development, it is essential to assess the existing challenges in the teaching learning process and recommend some ideas which contribute towards the solution. The roots of the problem are believed to be multi dimensional and it needs a wide research to identify exhaustive possible barriers and solutions. In this chapter some theoretical aspects and previous studies related to the topic are discussed.

2.1 THEORETICAL PERSPECTIVES

2.1.1 Some aspects of curricula for the individual learning needs.

In order to create relevant learning and teaching situations, and for children to be successful in their education and future life, overall assessment of school situations and other determinant factors is essential. Children's academic performance or other potentials can be affected or strengthened by internal or external factors. If some of these aspects are not seen thoroughly and dealt with proper considerations, the desired outcome of children being capable, self confident and successful will be shuttered. As needs, potentials and interests of children vary, defining and implementing individual plans to meet the individual child's need is very important. Having these issues in mind in the curriculum model developed by Johnsen (2001), eight curricula aspects

which are interrelated to each other and believed to be major factors in helping the children attain and fulfill their individual needs and hence become successful in their future life are discussed as follows.

The pupil: - The child is the core element in the process of education. It is important to give due consideration to the knowledge, skills, attitudes capacities and needs of the individual child in order to have overall understanding about the child. In addition whole range of influencing factors concerning the learning and teaching environment needs to be also considered.

Frame factors: - Education of the child can be affected by external factors other than the situation within the child. These can be divided in to three categories. Those which are at macro level such as laws and legislatives, policy and budget, Physical frame factors such as convenient class rooms, school yards, location of the school, availability of playing ground etc. and physical frame factors which can be seen related to socio-cultural situations of the community where the school is found.

Intentions: - Basically the intentions of education are set by educational acts and other policy documents. However, these need to be adopted at school level to concrete educational actions within the framework of the existing policy to meet the individual learner's aims, goals and objectives.

Content: - Selecting curriculum content for an individual as well as a group is based on societal aims and needs, the educational needs of individual pupils and of the group or class. A variety of concepts are used to describe content in educational literature and national curricula. A widely used categorization is to divide the content into school subjects and themes, which in turn, be divided into main parts and subparts.

Learning strategies, teaching methods and classroom organization: - pupils learn through different strategies, activities, media and methods.

Strategies: - The teacher is expected to adapt the learning environment, so that each learner is able to develop and use different learning strategies and methods that are suitable for him or her.

Method: - Main teaching methods

The prescribing method: - lecturing, dictation and demonstration.

The achromatic method: - uninterrupted lecturing.

The dialogic method: conversation with questions and answers.

The heuristic method: - The teacher asks questions and pupils answer with independent activities.

Other teaching methods such as story telling can be also considered as alternative teaching methods. We should bear in mind also methodological considerations strongly affect choice of material and equipment. The existing teaching method in the Ethiopian schools requires a paradigm shift to student centered, as teacher centered method is widely in implementation.

Class room organization: - Deals with creating class rooms that welcome students in general and students with special needs in particular. Other possibilities of creating learning environments like gardening, excursions, study visits and field work can be considered whenever convenient.

Assessment: - To assess and evaluate is to gather, interpret and reflect on a variety of information in order to adjust the direction of action towards future aim. Educational assessment and evaluation consists of considerations and judgments about teaching and learning environments, process and results, and about their contextual relations. The very restricted perception of continuous assessment as continuous exams needs a revision.

The purpose of assessment and evaluation is neither to give marks nor to place pupils in segregated environments. Rather its purpose should be to identify the needs, interest, capacity and problem areas of each individual child and act accordingly.

What are to be assessed are all eight main aspects of the curriculum model with relevant sub-aspects, and the interrelationship between these aspects.

Assessment methods: - Examples of *assessment in a class setting* include checklists, dialogue with the people, observations, logbook or diary, pupil's works, screening tests and portfolios.

Individual assessment can be done through interviews and conversations, questionnaires, pupil's self evaluation, assessment as part of mediating, achievement tests and specific mastery or ability tests.

Assessment is an on going process. This assessment process leads to continuous modifications of curricular plans and implementations.

Communication: - Without communication there will no be education, no matter how qualified and relevant the adaptation of content, methods and organization seems to be. Communication is certainly at the core of interaction and mediation.

- Pupils learn through interaction with their fellow human beings and with their environments.
- Language and communication are essential tools in learning and cognitive development.
- Parents, teachers and peers may function as mediators and discourse partners in joint teaching and learning process.

Care: - It emphasizes that positive learning depends on the satisfaction of at least some basic human needs, like food and shelter, security, belongingness and love and social acceptance and recognition. Therefore we need to be aware of-not only the learner-but the whole child and young person within her or his social and cultural context, and with his or her personal history.

Care is manifested in concrete actions: - some of the measures include Encouragement and participation in play activities with the pupils, listening to the

pupil(s), sharing personal experiences with the pupil(s), Creating opportunities for feelings to be expressed and discussed, giving support to pupils who have experienced disappointments, traumatic events and losses, supporting the pupils to develop positive coping strategies, Promoting self confidence through self- talk and other empowerment strategies and showing the pupil(s) trust.

2.1.2 Some aspects from Vygotsky's theory

Scaffolding: - In Vygotsky's view of cognitive development, the adults or other parents in a child's world provide scaffolding to help children learn new information and develop more complex thinking abilities. A child who can't solve a Mathematical problem might be able to do it with little help or guidance from his teacher.

Zone of proximal development: - The zone of proximal development is the distance between a child being able to do it all by himself and doing it with some scaffolding or help from the outside. A child who is not able to do a certain Mathematical activity, even with the support from the teacher shall be helped by letting him do a lesser activity, as that activity is becoming beyond his ZPD. On the other hand a child who is able to do an activity very easily shall be confronted with an activity which is more challenging.

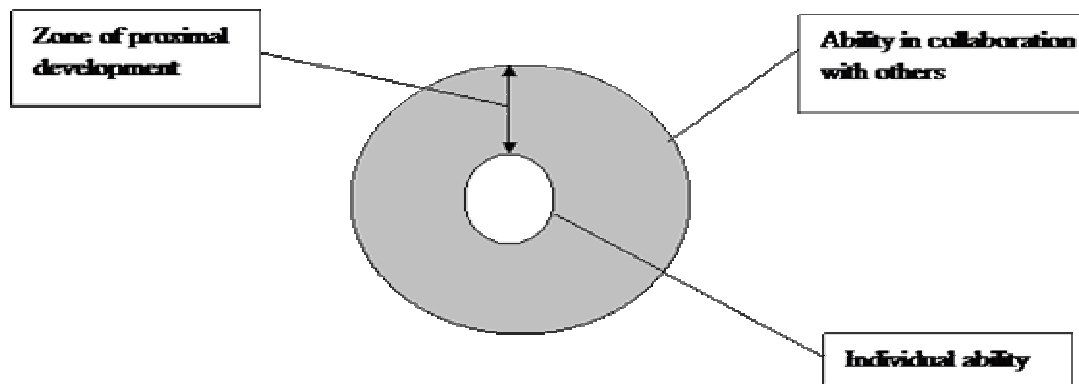


Figure 1 Vygotsky's zone of proximal development (Slater A. & Bremner G., 2004 p 426)

2.2 REVIEWS OF RELATED LITERATURE

2.2.1 The need of relevant and meaningful Education

Meaningful learning is a process through which new knowledge is absorbed by connecting it to some existing relevant aspect of the individual's knowledge structure (Orton, 1992). One of the reasons why students attitude towards Mathematics is negative is that students are not able to see its relevance in daily life or in relation to other sciences, and hence the feeling that why learn if it has no use prevails among most students (Fennema & Sherman, 1976:14).

How is Mathematics applied to various professions in which most of the members of the society lead their life? How is it related to other sciences? What practical application does it have in the scientific world? What contributions can it have to the farmers, to the weavers; to the potters etc is not well addressed in the text books currently used in the Ethiopian schools. This has an impact in bringing positive attitude towards Mathematics and hence a better achievement.

2.2.2 Attitude towards Mathematics and its impact on achievement

In almost all Ethiopian schools considering Mathematics as a challenging subject which can not be understood is a common phenomenon among students, teachers and parents. But, this is true in many countries too. Mathematics is considered by many individuals as a difficult subject to learn (Fennema & Sherman, 1976). This kind of outlook has a direct relation with achievement. Children with negative attitudes towards Mathematics have performance problems because they develop anxiety (Hembree, 1990).

A number of factors do influence student's Mathematics achievement positively or negatively. One among these factors that contribute to variations in Mathematics achievement is attitude towards Mathematics. The direct relationship between Mathematics achievements and attitudes, as well as their reciprocal influence are well

documented (Aiken 1970; Johnson 1984; Sherman, 1980; Tsai and Walberg 1983). If students have positive attitude towards Mathematics, it is likely that they will allot a considerable portion of their study time to the subject and strive to master the knowledge and skills necessary.

Many children develop fear towards Mathematics due to their misunderstanding, non understanding and failure during previous lessons; effort must be exerted to resolve this fear before proceeding to the next section as students learn new Mathematical concepts and procedures by building on what they already know. Teaching is like constructing a building by putting one block over the other, if the lower block is not put properly as to carry the next block to be put on it the whole idea of building goes wrong. The same is true in the education of a child; if he/she didn't understand the previous lesson then he/she can't follow and understand the coming ones. In other words, learning with understanding can be viewed as making connections or establishing relationships either within existing knowledge or between existing knowledge and new information (Hiebert & Carpenter, 1992).

Negative attitude towards Mathematics is also common among most Parents. Parents believe that Mathematics is hard to understand and they try to avoid it for their children as far as possible. Simple example which shows us the negative attitude of Ethiopian parents is their reluctance to send their children to college or university faculties which offer Mathematics as a course. They encourage their children to enroll in the social science faculty where they think there are "no" Mathematics courses.

Another factor which bears some influence on the relationship between success and motivation is the whole notion of 'worth'. This is arguably the aspect most likely to change over time as motivation, social and emotional development will all influence the pupil's perception of what Mathematics achievement is 'worth'. For some pupils at certain stages their notion of the worth of Mathematics may simply reflect teacher attitudes. At other stages peer attitude may be more significant and, particularly at the later stage of the secondary school, the perception of worth may be bound up with

ideas of examination and employment prospects. In the case of young slow learners the parental attitude towards education is of very considerable significance in the pupil's view of worth (Larcombe, 1985).

Even those people who experience no great difficulty with Mathematics at school often avoid the subject as possible outside school. Hostile feelings and negative attitudes toward Mathematics and science, therefore, are much more influential on general behavior and values than epistemological issues. These feelings and attitude that sustain a dislike of Mathematics or hinder any interest in Mathematics-are much more significant obstacles to the development of Mathematical literacy than any lack of particular concepts, skills, or thinking abilities' (Atweh, B. et al, 2001).

The existing traditional way of teaching in our schools is teacher centered; the teacher is expected to do every activity while the students are mere listeners. It doesn't give the students a chance to learn by doing and hence learn from their mistakes. The outlook of students, that the role of students is to receive Mathematical knowledge and to be able to demonstrate it; the role of the teacher is to transmit this knowledge and to ascertain that the students have acquired it, is a common phenomenon in our schools (Frank, 1988). Such views prevent students from making their own efforts towards alternate strategies and approaches to Mathematical problems. The teacher may also develop a mistaken view of what a pupil's Mathematical strengths and weaknesses are. Motivation can break down just as easily if a pupil is repeatedly 'under challenged' as it can if the pupil is 'over challenged' by their teachers.

It is also common to find tests and other diagnostic procedures used in Mathematics to discover what the pupil cannot do (a very common incident in the Ethiopian school system). It is common again to see some teachers unsatisfied in their exams if a considerable number of students pass the exam. This is often followed by concentrated teaching designed to put this right. When looking at a pupil's progress in school over some years it may well be the case that year after year the same inability has been identified and 'hammered' time and time again. This can only confirm pupil

and teacher alike in the view that so and so cannot 'do' fractions or whatever. In so many schools there is end of term/semester exams designed to produce a rank order which makes formal recognition of the relative "failure" of the pupils in the lower part of the rank order (Larcombe, 1985).

2.2.3 Conditions related to human and material resources

Teacher related

In most Ethiopian Educational institutions, teachers are not trained according to their interest. That is they are forced to study subjects other than their choices. It is hard to expect motivated and creative teacher who is forced to join the department and even the teaching profession unwillingly. The training institutions are not well organized and the training of teachers doesn't address properly the handling of children with different abilities in general and children with disabilities in particular.

There is a high turn over of teachers due to various reasons. The poor working conditions, low salary, low social acceptance of the profession by the society and other additional factors are forcing qualified and competent teachers to leave the teaching profession and look for other occupations, which is contributing to the steady decline of the quality of education.

Teachers must have access to continuous professional development through in-service programmes, short term seminars and workshops. This is believed to create an opportunity for them to introduce themselves to new findings of teaching methods, knowledge and skill on how to handle and help their students, to promote their capacity in the subject knowledge area, exchange of experience with other teachers.

The classroom management in the first cycle (lower elementary) is in such a way one teacher sometimes with an assistant teaches all the subjects (self contained). There is a possibility for the teacher to incline and spend more time in the subject which he/she is good or interests him/her and not giving enough time to the other subjects.

Therefore, it is worth to assess how teachers are confident enough to teach

Mathematics and whether they spent enough time on it or not as this stage could be the base for developing a positive or negative attitude towards Mathematics.

Teaching materials

In spite of the attention given to education by the government the budget allocated to schools is limited and is not sufficient enough to fulfill the basic needs of the schools. There are not enough teaching materials in schools and teachers are forced to teach with almost no additional teaching materials. It is hard to find even simple materials such as protractors, solid figures, rulers etc in schools. Text books are scarce so that each child can not have one book of his own; one book may be shared with 2 or 3 other students. Since Mathematics by its nature is full of home works and assignments, not having a book on one to one basis has a big impact on the Childs' education.

The shortage of relevant, low-cost books for use inside and outside the school continues to create challenges to provide quality education for all. Low access to teaching and learning materials, inadequate provision of additional reference books, not well equipped resource centers are some of the problems which can be mentioned as barriers to teaching. The absence of the above mentioned resources make the teaching and learning of Mathematics more problematic to the students and teachers as they are forced to deal with only theoretical aspect and can't learn in a more concrete way.

2.2.4 Some aspects of curriculum

Curriculum should be flexible enough in order to meet the need of the individual child, however, the existing practice of preparation of curriculum doesn't allow teachers to involve and participate in the preparation. In every class there most certainly is a need for high degree of flexibility in order to adapt the learning environment to all pupils' level of mastery, learning possibilities and barriers (Johnsen, 2001). The preparation of elementary school and secondary school curriculum are highly centralized at the regional government and federal government

levels respectively to limited experts. As in other subjects the syllabus of Mathematics in most grades is very vast and is expected to be covered at the end of each academic year which forces the teacher to proceed whether the students understood or not.

Methods of teaching

The existing method of teaching in schools is old fashioned which is highly dependent on the performance of the teacher only. It is teacher centered, that is teachers are expected to explain, demonstrate, illustrate give detailed note and the students have a minimal participation in the teaching learning process (Dean, 1982). Engagement and motivation are critical elements in student success and learning. Engaged students learn more and retain more, and enjoy learning activities more than students who are not engaged (Akey, 2006). In subjects like Mathematics students benefit more from active participation and they can learn more things by doing than listening only to the teacher, they can learn more from their peers and advantaged from group dynamism. Since the composition of students in a class varies in different aspects such as level of mastery, economic background, cultural background etc each child should be treated according to his/her individual need. Different strategies and teaching methods shall be used and individual plan should be adapted to meet the student's requirements.

The style of teaching of some teachers is to prepare students only for examination purposes. This exam oriented approach may be fruitful at the end of each semester or term, but it will not be lasting as once the exams are finished the study of the subject will be also finished. Teachers should implement combination of various teaching styles to attract their students and make them understand the subject with interest. Teachers in general place heavy reliance on the text books and regular testing, which makes the students value only those activities that would contribute to their end of year grade (Barnes, 2000).

Home Works

Mathematics by its very nature requires a lot of exercises in order to master it. Students should be involved in class discussions, group discussions and class works should be given to give them opportunity to involve themselves in the practicing.

Home works are the common and frequent alternative ways of engaging students in the learning of Mathematics. However, many things which should be taken into consideration do not get enough attention the quantity of home work given; level and topic do not provide useful Mathematical work for the people (Dean, 1982). Home works must be given in such a way the level of understanding of the child is taken into consideration. If the quantity is too much and if the level is beyond the capacity of the child it is easy for the child to develop negative attitude to home works and to the subject.

When a home work is given it should have a clear purpose either to reinforce what the child has learnt or to prepare him/her for the next lesson. Home works should be discussed at the beginning of the next lesson as this provide the child a feed back and give him/her a chance to learn from his mistakes. Available research shows that homework facilitates achievement and attitudes of students, especially if teachers provide their feedback (Walberg et al, 1985). Marking home works need due attention, care should be taken not to make many big crosses which affect the self esteem of the students, and comments which provide guidance and encouragement are likely to help the children in making better progress (Dean, 1982). Mistakes committed by students can be used as indicators of the areas where Mathematical understanding of the child needs to be improved.

Parents' involvement in school activities is essential for the success of the school objectives. Besides parents have a lot to contribute in helping their children to do their home works by providing proper study area, help them with their difficulties, supervising time for home work and study (Henry, 1996).

2.2.5 Class room size and arrangement

Many studies indicate that reduced class sizes leads to improved student achievement (Finn & voekl, 1992; Glass, Cahen, Smith & Filby, 1982; Robinson, 1990). There has been a vigorous debate about class sizes in schools. On one side of the debate are the enthusiasts who feel very strongly that smaller classes lead to better teaching and

more effective learning. On the other hand of the debate are the skeptics who argue that the evidence for efficacy of class size reduction is in doubt and that there are likely to be other more cost-effective strategies for improving educational standards (Blatchford, p. et al, 2003).

Class size reduction changes numerous features of the classroom situation. There are fewer students to distract each other. Each student in a reduced size class gets more attention on average from the teacher, and more time to speak while the others listen. Reduced class size also reduces the level of noise in a class. One theory offered to explain the positive effects of class size reduction on student achievement simply argues that in smaller classes each student receives a larger portion of the educational resources represented by the teacher's instructional time, and consequently, learns more.

Currently the average class size in the Ethiopian primary schools is 50 – 60 and in high schools it is 70 – 80. From my experience, teachers teaching in the lower grades where the number of students in a class is relatively low agree that the classroom atmosphere is better. Students can receive more individualized attention, and that the teachers have more flexibility to use different instructional approaches and strategies. The teachers found themselves with more classroom space to work with, because they are using the same classrooms with smaller numbers of students. Researchers also have suggested that smaller classes are more likely to be "friendlier" places, where students develop better relationships with their classmates and with the teacher, encouraging students to become more engaged in classroom learning activities. The smaller the class, the harder it is to escape the positive influence of the classroom educational experience.

Large class size affects the interaction between the teacher and the students. The students are expected to do class works, home works and assignments frequently and the teacher is expected to correct these assignments and give feedback to the students, but when the number of students in a class is very big it makes this task impossible

and it affects the progress of each child because of not getting the correct feedback timely. The large class size has also other impacts such as suffocated class rooms, hinder active participation of all students in class discussions, inconvenience in assessing each child, uncomfortable sitting and writing conditions etc.

On the other hand there is an argument that class size reduction by itself doesn't bring better academic achievement. Besides what should be the number of students in a class is controversial. Some propose unless the number of students is less than 20 students in a class, then we can not talk about reduced class size.

School officials and policymakers also have to face the problem of the effect of class size reduction on the supply of teachers and more class rooms. If the supply of teachers remains the same and class size reduction increases the demand, then it would seem that class size reduction policies will result in the hiring of less qualified teachers or shortage of teachers. Besides, for countries that couldn't offer education for all school aged children and where there are also other social aspects which need due attention class size reduction can't be a priority.

Ethiopia as one of the poorest countries in the glob has various socio economic problems. Basic needs such as food and shelter, other social services such as health facilities, roads, electricity, and telecommunications are not expanded and majority of its people are living below the level of poverty. In 1991 the educational coverage was less than 19%. Now it has reached around 89.14%, but still we can see that many school aged children has not the opportunity to go to school. Therefore, even though it is clear that small class size has to do with the quality of education and good achievement of students, its implementation is not easy due to the economic constraint and besides it is not a priority at this moment as first we should strive to make education accessible to all school aged children. It is morally unacceptable and in relation to the right of the child impossible to reject a school aged child in order to let others learn in a small class size. But, this doesn't mean effort shouldn't be made to reduce class size at all.

Collaborative learning- Students working together usually in small groups, on a shared activity and with a common goal – has been widely recommended in recent years as a strategy to enhance Mathematics learning for all students (Barnes, 2000). The traditional way of teaching is based on competitive and individualistic learning, which makes students work against each other to show who the best is.

Cooperative learning is advisable particularly in Mathematics class as Mathematics concepts and skills are best learned as a dynamic process with active engagement of the students, talking through Mathematics problems with classmates helps students understand how to solve the problem correctly, it helps them to communicate effectively, it develops confidence in their individual Mathematics abilities, it helps them to learn more about future carriers from peers. In general cooperative learning creates more positive attitude towards Mathematics (Trafton & Shulte, 1989). It also helps students to develop self discipline and good social habits, while providing opportunities for language development and concept growth (Irving, 1972).

However, attention should be given to back draws of cooperative teaching such as less able members leaving all the tasks to the able ones, more able students may be reserved in the assumption that they are always sucked by the others, uneven division of labor, negative reaction among the group members and other possible barriers.

2.2.6 Gender issue

A number of scholars (Burton 1979; Fennema, 1974; Fennema & Sherman 1976; Fox 1981; Jacobson, 1985) have noted that Mathematics is perceived as a male domain in various countries. Recent studies show that the magnitude of gender differences in Mathematics has declined over the years (Hyde et al, 1990; Leder, 2004). This statement shows us the existence of gender difference in learning Mathematics even though it is declining over time even in the western countries through their socio economic development.

The problem related to the education of girls can be seen associated with different outlooks. There is an outlook which emphasizes any found difference is biological

and hence this difference is unalterable and could not be changed. Therefore schools could accept the difference as no-changeable and not work to change them. The second outlook associates the existing problem to socio-economic situations and can be changed (Forgasz, 2001).

Gender difference in the achievement of Mathematics varies from country to country (Grønmo, 2004). In developing countries like Ethiopia, girls are not given equal opportunity to education as boys. They are forced to marry at early age, remain at home to look after their siblings and to help their mothers at home. Parents with low economic status can't send all their children to schools and hence priority to attend schools is given to boys and the girls remain at home. Besides parents have a negative attitude towards the education of girls, this negative attitude is related to socio cultural beliefs regarding gender roles and abilities, women are seen as less capable.

Among other factor which contributes to the gender difference in the achievement of Mathematics are treatments of students by teachers in the class room. Studies show that males receive more attention from teachers in terms of help, interactions and informal contacts, particularly from male teachers, a higher proportion of criticism for their behaviors, a great amount of work- related criticism. Teachers tend to overestimate boy's potential in Mathematics and underestimate that of girls. Friendly learning environments or classes where there are cooperative activities, low level of social competition, extensive career guidance contribute to better performance of girls, any form of discrimination in Mathematics classrooms such as sexist humor, consistent use of male names and masculine contexts in test questions can have detrimental effects on females' attitude towards Mathematics (Goodell, J.E. et al, 2001).

2.2.7 Children with Mathematical disability

Even though there is a long history of studying about children with reading and other kind of disabilities, the study of Mathematical learning disabilities was not given due attention and studies in this area are scarce. Currently Mathematical disability is an

academic discourse and considered as one reason for the low achievement of students and some researches has begun to be done in that area. It is known that Mathematics achievement in almost all Ethiopian schools is very low but this problem has never been associated with the problem of Mathematical learning disability. There is general consensus among professionals in the field that Mathematical disability is widespread in young children and that it has serious educational consequences (Bryant, 2000; Ginsberg, 1997; Jordan & Hanich, 2000; Jordan & Montani, 1997; Ostad, 1998) as cited by Zeleke (2004).

Dyscalculia is a term referring to a wide range of life-long learning disabilities involving Math. There is no single form of Math disability, and difficulties vary from person to person and affect people differently in school and throughout life. Since disabilities involving Math can be so different, the effects they have on a person's development can be just as different. Since Math disabilities are varied, the signs that a person may have a difficulty in this area can be just as varied. However, having difficulty learning Math skills does not necessarily mean a person has a learning disability. All students learn at different paces, and particularly among young people, it takes time and practice for formal Math procedures to make practical sense (www.ncl.org/LDInfoZone/InfoZone_FactSheet_Dyscalculia.cfm).

In Ethiopian schools there is a trend that functionally blind students do not learn Mathematics as a subject and all subjects which are believed are highly related with Mathematics subjects such as physics, chemistry etc. But, experiences from other countries show that it is possible to teach Math at all school levels. Functionally deaf students learn Mathematics with the help of sign language interpreters, but most teachers has no training and they lack patience to teach via interpreter and hence are not willing to teach in these classes (as we have special units for deaf students).

2.2.8 Impact of language and culture in the learning of

Mathematics

Mathematics is a subject with its own language. Different Mathematical symbols and figures which make it hard for the child to understand the concept, besides if a child is from a language group other than the language used as medium of instruction in the school, the situation becomes more complicated.

For students learning in their second language particularly when the teacher and the children have no common language it is hard to understand the concepts easily even sometimes the wordings teachers use could be confusing and not easy to understand. When children are learning in a second language they are supposed to do the thinking in their first language and then the communication in the second which is of course is additional burden for the children. Some Mathematical terminologies and symbols are not easy to translate to other languages (example no Amharic words for symmetry and octagon). These problems are summarized by Berry (1985, p20) as

“In general it is likely to be easier for a student to function effectively in a second language which is semantically and culturally close to his mother tongue than in one which is remote ... [for] ... the structure of person’s language has a determining influence on that person’s cognitive processes ... such as classification and recognition of equivalences-processes which are central to the understanding of Mathematical concepts”.

Ethiopia is a multilingual country and significant numbers of residents in the surrounding area of the school are people who came from rural areas and they have their own language. Children of these parents use a language other than the language used in the school as medium of instruction and hence they face the challenges discussed above.

2.2.9 Conclusion

As we can comprehend from the discussion above the learning process in general and learning of Mathematics in particular is full of problems. Some problems are related to the economic and social conditions of the country. Due to economic reasons school materials can not be fulfilled, additional schools can not be built to reduce the student

class ratio, students are forced to spend less time (half a day) in schools, qualified teachers can't be made available etc.

The curriculum should be prepared with the participation of teachers, students, professionals and concerned offices; it must be flexible enough for the teacher to deal with the capacity of each individual child. Effort should be made to bring attitudinal changes among students, teachers and parents towards education of Mathematics. The curriculum should be designed in such a way the students and society at large can use it in their daily life and students should be aware to its practical application. How can the weavers, the potters, and the peasants' etc use Mathematics in their daily life must be a question to be tackled. Even though attention is given to Mathematics in the new educational policy of Ethiopia, still there is a lot to be done in bringing practical changes in the teaching of Mathematics in order for it to play its basic role in the development of the country.

The problem related to disabled students that they are not learning Mathematics is a part of the general attitudinal problem towards disability. Teacher training institutions must give due attention in their training programmes of teachers in how to deal with the needs of individual children particularly that of disabled children. Some problems such as not teaching Mathematics to blind students have no scientific justification other than trends, these must be addressed properly.

Girls in the Ethiopian society are not treated as equal as the boys and they are not given equal opportunity in all aspects. Usually they spent most of the time helping their mothers at home and hence no time for study, early marriage is common practice particularly in the rural areas. This doesn't motivate girls to pursue their education in stable condition. Effort must be intensified to bring awareness in order to improve the problems of girls in the society as the saying goes" teaching a woman is teaching a society".



CHAPTER THREE: METHODOLOGY

Based on the research questions posed a mixed design of both qualitative and quantitative research methods were applied for the collection of data. In this chapter, detail of the designs, instruments used in this study which include interview with school principal, interview with parents, focus group discussion (FGD) with teachers currently teaching in grade four, questionnaire for teachers and students, record analysis and observation are presented. In addition a criterion's used for the selection of the sample, steps taken to make the data valid and reliable and ethical considerations are also discussed.

3.1 RESEARCH DESIGN AND METHODOLOGY

3.1.1 Research design

To investigate the real barriers of the teaching and learning process of Mathematics deeply, it was preferable to use different data collection strategies. That is different designs and instruments (triangulation of instruments). The more we use different designs and instruments the more our data will be vast, deep, reliable and valid. If you generated a finding by a qualitative method, perhaps you can check it by using a quantitative data collection method (Gall et al, 2003).

In this study the researcher has applied a mixed design of quantitative and qualitative designs. In relation to the quantitative design questionnaires were developed and used to collect information from teachers and students who were selected purposefully. Besides record analysis of Mathematics achievement of grade four students of the school selected for this research and Mathematics achievement of would be teachers at Kotebe College of teachers' education was done.

As part of the qualitative design, the researcher had conducted interview with the school principal, parents, focus group discussion with six teachers who are currently teaching in grade four and one head of the Mathematics department, as well four class room observations were conducted.

3.1.2 Methodology

The research methodology of a particular research is determined by the research questions formulated. It should be the best way to collect appropriate and valuable data to tackle the research question at hand. A research design is the logic that links the data to be collected (and conclusions to be drawn) to the initial questions of the study (Yin, 2003). In this study the researcher used questionnaires and interviews as main instruments to collect data while record analysis and observation were used as supplementary methods.

Record analysis

Records are written communications that have an official purpose. A quantitative researcher should begin by identifying documents and records that are part of the situation that he/she plan to study. Once the materials are identified, the next step is to determine which material might be relevant to the research study, and determine how these materials can be collected (Gall et al, 2003).

In order to answer one of the main research questions; what is the Mathematics performance of students in grade four like? With the permission of the school principal the researcher obtained consolidated mark list (grade report) of grade four students and achievement of each child in all subjects was analysed using SPSS. The analysis had the following aims:

- Comparing the average Mathematics performance with the average performance of other subjects.
- Observing the current Mathematics achievement of grade four students.

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- Getting an overview of gender difference in Mathematics achievement.

In addition, three years Mathematics result assessment (2004-2006) of students at Kotebe college of teachers education was done with full cooperation of the college's dean, vice dean and record officer. This include

- Their Mathematics achievement of the Ethiopian General Education Certificate Examination while they enter the college.
- Two semester's Mathematics achievement during their stay at the college.

Kotebe teachers training college is the only government owned teacher training college which provide first cycle teachers to schools in Addis Ababa and the aim of this assessment was to see the Mathematics background of those to be teachers in the first cycle of Addis Ababa schools.

Observation

To collect data through observation careful planning and piloting are essential. Observations provide important data, but they reveal only how people perceive what happens, not what actually happens (Bell, 1999). The researcher used observation as supplementary data collecting method. The first step in observation is to define the variables to be observed. Check list of items to be observed was prepared prior to going to class room for observation. Classroom observation was conducted four times in which two of them were conducted prior to the administration of the questioners /interviews, and the two remaining were done later.

The prior two observations were helpful in generating ideas which must be included in the questionnaires and interviews and the two later observations after the administration of the questionnaires and interviews were used for confirmation of what was said in the interviews /questionnaires and the actual practice in the class room.

Questionnaires

Questionnaires are documents that ask the same questions of all individuals in the sample. The respondents can fill out the questionnaires at their convenience, answer the items in any order, and take more than one sitting to complete it, make marginal comments or skip questions (Gall et al, 2003).

In order to get opinions of most teachers on the challenges and possibilities that exist in the teaching and learning of grade four Mathematics, teachers were given the chance to express their views. To do so a questionnaire was developed and used to collect this information. The questionnaire consisted of closed type questions with different type of settings such as Likert scale, multiple choice and some open ended questions which were included in order to give the respondents more chance to express their views. This questionnaire consists of a total of twenty nine questions (Appendix 1). The questionnaires were prepared and made ready by the researcher and distributed and collected by the school deputy director. Even though there were some missing items in the collected questionnaires which were not significant in number, a total of twenty one questionnaires were distributed and were all collected back during the given period of time (three days).

Students are major participants in the teaching and learning process. Consequently there is a high probability for them to identify existing problems and possibilities in the teaching and learning process of Mathematics, therefore sixty grade four students were selected and filled in a questionnaire. The preparation of the questionnaires to students was in such a way the age of the students was taken in to consideration. Efforts had been made to simplify the wording of the questions and types of choices were restricted to 'yes' or 'no' in most cases (Appendix 2). The questionnaires were administered while the researcher was there clarifying points which were not clear to them. The school administration arranged a class room and students were brought to this class in their free period as not to miss their classes.

Interview

Qualitative design approach is mostly used to answer “why” and “how” questions, however depending on the context “what” questions can also be dealt with qualitative design (Creswell, 1998). Using interviews and observations as instruments for data collection one can have in depth insight of the respondents about the matter.

Qualitative design gives a deep understanding about the phenomenon under investigation. Definition of qualitative research defined by Denzin and Lincoln as cited in Diab, S.D. (2000) is given as:

“A multimethod in its focus, involving an interpretive, naturalistic approach to its subject matter. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or interpret, phenomenon in terms of the meanings people bring to them”

In an interview the respondents typically speak in their own words, and their responses are recorded by the interviewer, either verbatim on audio tape or video tape, through hand written or computer generated notes, or in short-term memory for later note taking. The interviewer is largely in control of the response situation, scheduling with the participant a mutually agreeable time and place and then controlling the question pace and sequence to fit the circumstances of the situation (Gall et al, 2003).

In this study, the school principal and parents are those involved in the interview. A discussion was carried with the school principal about the whole purpose of the study and as to why the interview with him was important. After getting his permission, time for the interview was agreed and a place other than his office for not being interrupted and disturbed by telephone calls and persons was arranged and the interview was conducted for forty five minutes. The information was important in relation to administration aspects, providing text books and teaching materials, availability of sufficient and qualified teachers, preparation of lesson plans and other related topics (Appendix 3).

In cooperation with the school administration three parents were selected for an interview. The researcher contacted these parents and brief them the purpose of the study and how their opinions could be important in identifying problems related to

Mathematics education of their children. They were all willing to participate in this study. Suitable time to each parent was discussed and set. The interview was conducted in the deputy director's office which was available and convenient (Appendix 4). The interview took an average of thirty minutes for one parent. Tape recorder was used to record the interview and transcribed later.

Focus group discussion

Six teachers who were teaching in grade four in this academic year and one teacher from the second cycle who was working as Mathematics department head were involved in the discussion made in a form of focus group discussion (Appendix 5). The consent of the participants was asked by the researcher and accepted. Convenient time for all teachers was discussed and set, a place far away from the class rooms and administration offices was selected to avoid unnecessary interruptions of persons and voices. There was active participation of all involved in the focus group discussion. It was believed this helped the teachers to supplement each other and see the existing problems in a wider and deeper way. Besides it gave the teachers a chance to add what they missed in the questionnaires.

3.2 POPULATION OF THE RESEARCH

The school selected for this research is a government primary school in Addis Ababa city, Ethiopia. The main reasons why this school is selected for this research are because

1. It is believed it represents other primary schools in terms of material and human resource, socio-economic situations, class size and other factors.
2. This school is located in an area where a joint project of the University of OSLO and the University of Addis Ababa is carried on. The school has been a target school for various studies and hence fertile background information was available.

In this study, in order to get sufficient information from various stake holders, it was found necessary to involve various respondents. Therefore, teachers who have the experience of teaching in grade four, students from grade four, parents of children in grade four, the school principal were the chosen respondents in this study.

Information related to Mathematics background of would be teachers at Kotebe College of Teachers Education were also in focus of this study.

3.3 SAMPLING TECHNIQUES

All teachers teaching in the first cycle (1-4) are trained as general teachers with no specialization. According to the system in practice teacher's are supposed to begin teaching in grade one and keep on teaching the same students until they reach grade four. This makes all these teachers in the first cycle eligible to fill in the questionnaires as far as they have experience of teaching Mathematics in grade four. However, according to the information obtained from the school there were only twenty one teachers who had the experience of teaching in grade four. Since it was found to be a manageable size all of these teachers were included to fill in the questionnaires. Some teachers who had no experience of teaching in grade four were excluded from the sample.

Students are major stakeholders in the teaching and learning process and their opinion is vital in identifying the existing barriers and difficulties they face. Sixty grade four students were selected to fill in questionnaires. Purposeful sampling was used to select these students. Gender and level of mastery in subject matter of the students were used as a selection criterion. The total number of boys and girls in grade four was found to be almost equal (136 male and 135 female) and hence, thirty boys and thirty girls were selected. Level of mastery in subject matter of the students was the second criterion for selection, therefore children who were high performers, medium performers and low performers were included in the sample in proportional way (20 students from each category). The mechanism used to choose these students was in

such a way their Mathematics achievement was listed in ascending order (male and female explicitly) and the first 10 students were taken to represent the poor performers, the mean achievement was calculated and five students below and above the average were taken to represent medium achievers and last ten students were taken to represent the high performers. Microsoft excel software was used for this purpose.

Even though all teachers in the first cycle fill in questionnaires, particularly, those teachers assigned to teach in grade four in this academic year were interviewed (six teachers and one department head) in a form of focus group discussion. As there was only one school principal the selection was automatic.

Parents play a great role in the education of the child. They fulfil educational materials, give support in his/her study and home works, are near observant to the progress and effort the child is making, and the challenges the child is facing. In general, parents have valuable information in relation to the Childs education. Therefore, three parents were selected purposefully with the cooperation of the school administration in such a way they are parents of children with low performance, medium performance and high performance and besides had a good involvement in the school.

Table 1: Summery of respondents

	Teachers	Students	Principal	Parents	Total
Interview	7 (FGD)	-	1	3	11
Questionnaires	21	60	-	-	81
Total	28	60	1	3	92

3.4 DATA COLLECTION PROCEDURE

The questionnaires and interview guides were primarily prepared in English and it was necessary to translate them into Amharic, the language used as medium of instruction in the school selected for this research. The questionnaires prepared for

students and teachers were pilot tested during the beginning of the academic year. The pilot testing was conducted in the opposite shift where the students and teachers had no class. Depending on the obtained feed back the questionnaires were improved for final administration.

In the main study, students were selected according to the chosen criteria. Appropriate time was set and they were briefed about the aim of the study and finally the questionnaires were administered with the presence of the researcher and the school principal to give necessary assistance. They were given one hour to fill the questionnaire which was sufficient time to fill the questionnaires. The questionnaires for teaches were distributed and collected by the school vice principal, three days were given for them to fill the questionnaires. The focus group discussion was held in the school library in the afternoon where all grade four teachers were free of teaching.

To conduct the interview with the parents, first the researcher met the parents and convenient time was set and then they were interviewed individually in the school vice principal's office. The interview with parents took an average of thirty minutes for one parent.

3.5 CONSIDERATIONS CONCERNING VERIFICATION

Whatever procedure for collecting data is selected, it should always be examined critically to assess what extent it is likely to be reliable and valid. Reliability is the extent to which a test or procedure produces similar results under constant conditions on all occasions. Validity tells us whether an item measures or describes what is supposed to measure or describe (Bell, 1999).

Proper consideration had been taken in order to make the data collected to be valid and reliable. The researcher has taken three major steps to make the collected data valid and reliable. The first step was pilot testing the questionnaires and the interview guides, which gave a chance to check and recheck the questionnaires and made proper

corrections before they were administered. The questionnaires prepared for teachers and students were pilot tested by choosing sample randomly from the assumed respondents. 5 teachers (25%) and 10 students (16.7%) of the total assumed respondents.

The second measure was using different data collecting instruments; interviews, questionnaire, focus group discussion, record analysis and observation (triangulation of instruments) to collect data and as a third measure various respondents; school principal, teachers, students and parents (triangulation of respondents). These being the major steps taken towards ensuring the validation and reliability of the data, in addition I believe the following points strengthen the validity and reliability of the data collected:

- Time and effort exerted to prepare the instruments.
- The instruments were thoroughly discussed with advisors.
- The respondents are those who have direct relationship with the teaching- learning process.
- Most of the data collection was conducted in the presence of the researcher.
- A briefing was given about the whole purpose of the study to all participants.
- Consideration concerning age of grade four students was taken and effort had been made to simplify the questionnaires.
- All instruments were administered in the local language where every respondent can easily understand the questions.

The only possible validity trait was the interview with the school principal. The researcher had been working as head of the education department of the sub city in which the school chosen for research is under that office. It was likely to think for the school principal that the researcher will be back in the previous position after completion of the training, and hence there was a high probability that he would not tell the researcher the real problems he believe exist. But efforts were made to reduce such reservation by discussing the whole purpose of the study in advance.

3.6 DATA ANALYSIS

The data collected through questionnaire was analysed using SPSS and the result was presented using frequency distribution tables. The results are interpreted using statistical measures such as percentiles, mean, and standard deviation. The information collected through interviews was transcribed and categorized into themes systematically and interpretation was made accordingly. A matrix was used to categorise and interpret the data.

3.7 ETHICAL CONSIDERATIONS

Proper permission was requested from the sub-city education department and a letter of cooperation was written to the school (Appendices 13 & 14). The school principal was contacted and the whole purpose of the study and area of expected cooperation discussed thoroughly. The teachers, students and parents who participated in this research were informed about the aim of the research and their consent was obtained. The selection of students with different level of masteries was confidential for it not creates low self esteem to the children. It was made clear to all respondents the information they gave will remain confidential until the end of the study and all materials will get rid off at the end of the study.

CHAPTER FOUR: ANALYSIS AND PRESENTATION OF DATA

In this study different stakeholders; school principal, teachers, and parents were interviewed and questionnaires to students and teachers were administered. The information obtained from the questionnaires was analyzed using SPSS (Appendices 11&12) and the information from the interviews was transcribed and analyzed. In this chapter the findings are categorized and presented in six main themes namely student related, teacher related, parent related, resource related, gender related and curriculum related.

4.1 STUDENT RELATED ASPECTS

The school principal and participants of the FGD agree that Mathematics achievement of students compared to other school subjects is low. From the questionnaires administered to teachers and students it was found that 61.9% of the teachers believe students' Mathematics achievement is low as compared to other subjects while 38.1% disagree. The response of students to the same question was actually contrary to what the school principal and teachers said, only 40% of the students agree with that statement while the remaining 60% disagree. However, the researcher has tried to compare Mathematics achievement of grade four students with other subjects by taking the result of students from consolidated mark list (grade report), and the result as shown in table 2 is accordant to what the majority teachers and the school principal acknowledge.

Table 2: Average achievement of grade four students in all subjects.*

N	SUBJECTS					
	Valid	AMHARIC	ENGLISH	MATHS	SCIENCE	ESTETICS
	Missing	0	0	0	0	0
Mean		64.26	55.53	54.40	65.49	73.06
Std. Deviation		21.28	16.29	15.64	13.30	8.83

* In the Ethiopian school system each subject is graded out of 100%.

Various possible reasons were mentioned for the lower achievement of students. Perceiving Mathematics as a subject hard to understand, students negative attitude towards Mathematics, students not giving due attention to their education in general and Mathematics in particular, not acquiring the necessary skill and knowledge in the previous grades, not understanding the application of Mathematics in different professions, no enough support from parents in fulfilling learning materials, they being engaged in work at home and hence have no enough time for their study, not doing their home works regularly, problems related to large class size and age difference among students were some of the major reasons mentioned in quest by teachers. Effort had been made to identify which of these mentioned possible reasons are the major contributing factors in this particular school.

From literature and the experience of the researcher one of the basic problems related to Mathematics is the perception that it is a subject hard to understand by students, parents and the society at large. A question to assess this situation in this particular school was raised and the response given by teachers goes in parallel with what is mentioned in the literature and experience of the researcher.

Table 3 Do students see Mathematics as a subject hard to understand?

		Frequency	Percent
Valid	disagree	3	14.3
	agree	15	71.4
	strongly agree	3	14.3
	Total	21	100.0

85.7% of the teachers agree that students perceive Mathematics as a subject hard to understand while 14.3% disagree. However, the answer given by students was quite contrary to what the teachers answered. 75% said no it isn't hard to understand while 25% said yes it is hard. The paradox the researcher observed here is that students with low achievement are the ones who said it is not hard to understand (85%) while some students (35%) who are considered as good achievers answered it is hard to understand. Even though, the response given by majority of the students indicates that they don't see Mathematics as a subject hard to understand, their actual achievement as shown in table 2 indicates the fact that Mathematics is a challenging subject for them.

One of the questions posed was to see how students and teachers perceive the importance of Mathematics. The response obtained from both students and teachers in relation to this question shows that they understand Mathematics as an important subject. 100% of the respondent teachers agree and 98.3% of the student respondents also share the same understanding. They mentioned that in this modern world and new technology the application of Mathematics in different fields is becoming more useful.

In spite of the different outlook among students and teachers on how students perceive the difficulty level of Mathematics, when it comes to the interest of students to learn Mathematics there was unanimous agreement between them. When teachers were asked whether students like learning Mathematics or not, 75% said yes they like it and almost all students, 93.3%, said they like learning Mathematics while only 5% said they dislike it and 1.7% didn't answer. One may bear in mind perceiving it as a subject hard to understand and understanding its importance and liking to learn it are quite different things. According to the students some of the reasons why they like Mathematics are that, working with Mathematical problems makes them happy; they understand its importance for future life and can use it in their daily life, like a market place etc.

Negative attitude could be developed due to various reasons. One of the presumed reasons by the researcher for negative attitude towards Mathematics was the way teachers handle their students. Hence a question was forwarded to students whether their previous teachers had committed corporal or emotional punishment against them and if that had an impact in disliking the subject. 85% of the students respond their previous teachers didn't commit corporal or emotional punishment while 15% answered they had this kind of experience and when asked if it had made them hate Mathematics 5% of them said yes.

Mathematics by its nature requires doing more exercise and study; however, according to the parents due to their age the students are easily bored and want to spend more time in playing than sitting and doing Mathematics. Not doing class works and home works contribute to the low achievement as it denies them the chance to learn from their mistakes. However, according to the school principal recently the implementation of continuous assessment (group works, assignments, frequent exams etc), though not in its full sense, has a positive impact in the improvement of student's Mathematics achievement.

In the FGD with teachers and interview with the school principal it was frequently mentioned that students are engaged in work at home in order to help their families. In addition, in the questionnaires to teachers 84.3% answered parents do not give their children sufficient time for their studies. But, when the students themselves were asked about the situation of having adequate time for study at home 84.7% answered yes we have.

In the discussion with the parents it was repeatedly emphasised that they are all ready to give all kinds of support and assistance for their children to be successful in their education. One of the parents said his child has her own study room and they have a trend at home to work in group with other members of the family. Her elder brothers and sisters assist her by asking what she has learnt and the difficulties she encountered. Due to this support the child is one of the high achievers in

Mathematics. A second parent also said her child has a study programme at home and his brother in grade seven tries to help him after his own study, but Mathematics is becoming hard to her child as he proceed into higher grades. The third parent said they understand that Mathematics is a base to all subjects and they want their child to be good in Mathematics. They don't engage their child to work at home; however the child doesn't spend much of his time in studying, what he wants is to play more. The child complains the questions are hard and worries very much about his Mathematics home works. He has a problem doing Mathematics alone with out a support.

However, even though it is insignificant there is a tendency that children with medium (25%) and low (15.8%) achievement have less time for their study at home compared to good achievers (5%).

Generally speaking according to the students and parents, engaging children in work and the children having less time for their study seems non existent. This indicates that even though the parents living around the school have a low economic status and requires help of their children, parents nowadays understand the importance of sending their children to school and give them adequate time for their study and home works.

When teachers were asked whether students do their home works and assignments regularly 33.4% agree while large portion 66.7% disagree. Majority of the students (91.7%) claimed they do their home works regularly which is contrary to what the teachers answered. In my opinion, since teachers are in a better position to assess the performance of their students, and student's Mathematics achievement is low (Table 2), it is likely that the reality is what the teachers have stated. So we can conclude that students do not do their home works and assignments on regular basis and hence they are missing the opportunity they could have to learn from the exercises they do and to learn from their mistakes via given feedbacks.

4.2 TEACHER RELATED ASPECTS

A teacher requires a one year college education in order to be assigned as a teacher in the first cycle (lower elementary) of Ethiopian schools. All teachers in the first cycle of the school selected for this study have this kind of training. However, according to the school principal and participants of the FGD the knowledge and interest of the teacher in one particular subject has an impact on the teaching learning process. Some teachers tend to spend more time and use different approaches and methods to communicate with their students in the subjects they like while subjects which they feel have no adequate knowledge and interest are overlooked. That is they are challenged to teach that subject and hence spend less time and effort to help their students.

According to the teachers who participated in the FGD the reason that the classroom management in the first cycle is self contained (one teacher teaching all subjects) has forced them to teach subjects which they are not interested and have no adequate knowledge. Most of the teachers who participated in the FGD believe self contained class room management is very tedious. They prefer to be assigned to teach subjects according to their interest, that is they prefer departmentalized class room management (different teachers teaching different subjects). However, one of the participant teachers in the focus group discussion didn't agree with this conclusion, he said unless the teacher has his/her own special problem a teacher who completed high school and pass through a college training programme at a certificate level shouldn't have a problem in teaching Mathematics at lower grades. But, the other teachers indicate that when they say the teacher faces a problem they don't mean only the teachers understanding, but the teacher faces a problem in using different methods or approaches to teach.

One of the teachers shares her experience by saying: "I prefer to teach only science. Teaching Mathematics for me is uninteresting and cumbersome". A second teacher also supports this point and adds that she is interested to teach only English and she

recommends if teachers could be assigned according to their interest and talent. Most of the teachers who participated in the FGD favor a departmentalized class room management. Those who argue for departmentalized class room management gave the reasons that the interest and knowledge of the teacher in a subject has an effect in the teaching-learning process, besides it doesn't make the child enjoy the diversity of teachers and there is also a high probability that if the students dislike the self contained class teacher the students also dislike all the subjects.

This discussion with the school principal and teachers prompt the researcher to see how the Mathematics background of the teachers could look like and what impact it could have in their teaching carrier. Derived by this motive the researcher tried to asses three years Mathematics achievement of would be teachers in the national exam before their entrance to Kotebe College of teachers' education (the only government college that provide teachers to that cycle) and what was found is shown in the following table.

Table 4

Kotebe Teachers training College Students EGSLCE (national examination) result assessment						
Year	A	B	C	D	F	TOTAL
2004	0	0	31	144	50	225
2005	1	7	191	255	70	524
2006	2	20	123	31	3	179
Total	3	27	345	430	123	928
	0.3%	2.9%	37.2%	46.3%	13.3%	

The minimum passing grade in the Ethiopian general school leaving certificate examinations (EGSLCE) is "C". As it can be observed from the table 60% of would be teachers had a failure grade in Mathematics which is "D" or "F", and 37.2% had the minimum passing grade that is "C" while they join the college. In addition the researcher has assessed their two semester's Mathematics achievements during their stay at the college and the result is as shown in Table 5.

Table 5: Kotebe College of teachers' education
Student's annual Mathematics result assessment

Year	SEMESTER	A	B	C	N/GRADE	TOTAL
2004	I	18	66	141		225
	II	42	67	115		225
2005	I	100	138	284	2	524
	II	70	161	285	8	524
2006	I	26	43	105	5	179
	II	26	48	100	5	179
		282	523	1030	20	1856
		15.2%	28.2%	55.5%	1%	

The majority of the candidates (55.5%) graduated with the minimum passing mark, which is "C". The researcher has tried to inquire why the minimum achievement of the students was "C". According to consulted teacher at the Mathematics department of the college, as a rule a teacher can give a "D" mark to only 5% of his/her students and if the teacher is to give an "F" he/she is supposed to justify as why this is so to the office. So, since 5% of the students are few in number and the teachers do not want to go to the office to justify why they gave "F", they prefer to give a "C" mark to all students and lessen the "burden" of reporting to the office. If it had not been for this reason one can anticipate the achievement could be worse than it is now.

The response given by teachers to the question about the adequacy of the training they had in teacher training college for their profession is as shown in table 6.

Table 6 The training you had in teachers college was adequate for your teaching Profession?

		Frequency	Percent
Valid	strongly disagree	4	19.0
	disagree	8	38.1
	I don't know	1	4.8
	agree	4	19.0
	strongly agree	4	19.0
	Total	21	100.0

Only 38% of the teachers agree that it was adequate, one teacher is not sure while 47.1% of them either disagree or strongly disagree.

One can see how Mathematics background of these candidates was very poor in high school and during their stay at the college and how considerable number of the

teachers are not satisfied with the training they had at the college. When all these facts are related with what the teachers said, it is obvious a teacher with such poor Mathematics background and unsatisfactory training is likely to face a problem in teaching Mathematics even in the lower grades and hence the teaching of Mathematics is overlooked.

The fact that once teachers are trained as teachers and then there are no efforts to build their capacity to update their knowledge and methods of teaching is also among the problems which make the condition worse. Through the years the Mathematics text books are revised many times, different methodologies are developed, yet the teachers are teaching with the skill and knowledge they had while they graduated from teacher education colleges some time ago. According to the school principal except a one week workshop to introduce the newly prepared student Mathematics text book there were no other short term capacity building programmes to teachers either at school level or other educational administration levels.

In the school selected for this study, some efforts had been done to improve Mathematics performance of students such as voluntary teachers' participation in a weekly tutorial programme to help students with low Mathematics performance where majority of the participants are girls. Teachers also help students by organizing and following study groups in the class room in such a way students of different abilities are mixed in the same group so that they can learn from each other. Teachers believe that positive changes have been obtained in the Mathematics achievement of the students as a result of this effort.

However, even though most teachers are involved in such fruitful programmes which are helpful in improving Mathematics performance of students, some students believe that their low Mathematics achievement is sometimes related to teacher related causes. That is, some teachers don't control their class properly and the disturbance in the class doesn't create favorable situation to follow the lectures attentively, do not use their time properly, do not teach responsibly simply they order students to copy

from the text, do not make students participate in class discussion, their teaching methods are not attractive and some do not use proper teaching aid materials. One of the parents interviewed also complained that according to her child the problem is within the teachers, simply they order the students to copy from the blackboard or from the text books with no adequate explanation. The parents want additional support from teachers to their children at school particularly for those children who can't get support at home.

Mathematics by its nature requires frequent exercise; the more students are engaged in revising what they learnt the more they grasp the subject matter. Giving home works and assignments create an opportunity for the students to engage themselves more in Mathematics. It also creates an opportunity for the teacher to understand to what extent the students have grasped what he/she has thought and helps to identify the problem areas faced by the students and make the necessary remedies.

When asked how frequent they give home works, 28.6% of the teachers answered they give home works on daily basis, 61.9% answered 3-4 times a week and 9.5% said twice in a week. By and large it can be seen that more than 90% of the teachers give home works a minimum of 3-4 days in a week which I think is adequate. This response of the teachers about giving home works is more or less supported by the students. 26.7% said they are given home works daily, 48.3% said 3-4 times in a week, 10% said twice in a week and 11.7% answered once in a week. More than 75% of the students agree that home works are given at least 3-4 times a week, which is consistent to what the teachers said.

Giving home works and assignments by itself can't be sufficient in creating good learning opportunity. It has to be followed with proper follow up and feed backs, as it give the students a chance to learn from their mistakes. Even though there are complaints related to large class size and vast portion to be covered which hinder the process of giving feed backs, teachers make their best effort to do so. When asked how many times in a week they give feed backs to the home works and assignments

they gave, 9.5% answered daily, 71.4% answered 3-4 times and 14.3% said 2 times in a week and one teacher didn't give a response. Generally speaking one can say feed backs are given at an average of 3-4 times a week. The response of the students is also in line with this response (98.3%). During class observation the researcher had a chance to see the exercise books of students and observed that feed back to home works are given for several times.

One of the advantages of a self contained organizational pattern is that it promotes instruction which is child-centered rather than subject-centered. As the class room management in this school selected for this research is self contained an attempt was made to see how they apply this essence of self contained in their respective classes. In spite of the complaints regarding large class size (an average of 69 students in a class) and work load, 71.5% of the teachers answered they give individual feed backs to each child according to the need of the child, while 19% said no and 9.5% didn't respond.

Students will have a higher motivation to learn when they feel they have a real stake in their own learning. Involvement of students in the teaching-learning process is vital in deep understanding of the subject matter. When the teachers were asked whether they encourage students to be involved in class room discussions, 100% reply either they agree or strongly agree; this is also supported by majority of the students.

However, this is not what the researcher confirmed during his class observation. Even though there were efforts by some of the teachers in some sections there were also classes where the teacher was simply writing what is already written in the text with no additional explanation and no effort to engage students in class discussions. This makes hard to accept what all teachers said about involving the students to that extent.

A visit was made to the school pedagogical centre where different teaching aid materials are produced with the cooperation of teachers and a person assigned as coordinator of this resource centre. Compared to other schools, the resource centre of this school is well equipped and there are plenty of teaching materials already

produced. Even though, the researcher had no chance to see teachers using teaching aid materials during his time of observation, the response to the use of teaching aid materials in class rooms while teaching Mathematics by teachers was positive. 90.5% of the teachers answered yes we use teaching aid materials whenever necessary and 81.7% of the students too approved that their teachers supplement their teaching with the help of teaching aid materials.

Although the teachers claim they use teaching aid materials, when a question as how frequently they use them in class while they teach Mathematics was asked, 40% of the students answered always while 51.7% said sometimes and 8.3% didn't respond. One can see that the frequency of using teaching aid materials is not as such satisfactory, as more than half of the students had said their teachers use it sometimes. A discussion with the resource centre coordinator also prevail that even though there are sufficient number of teaching aid materials in the centre, the readiness of teachers in borrowing and using them is not satisfactory.

Teachers require updating their skills and knowledge continuously by reading or sharing experiences with other teachers. Academic discussion among teachers is vital in exchanging practice in different methods of teaching; acquire new knowledge in the subject area, challenging problems faced in class rooms etc. Particularly junior teachers have a lot to learn from experienced teachers. The existing experience in this area is most teachers are not ready and willing to learn from others as asking others for help is usually considered as if one is not competent enough or has no adequate knowledge in the subject matter. However, it should be understood that everybody has something to share with his colleagues in different areas of the teaching profession. In spite of these kinds of constraints 81% of the teachers in this school agree or strongly agree that they have such professional cooperation with teachers in the school or teachers from other schools which I believe is one step forward to cooperative teaching.

4.3 PARENT RELATED ASPECTS

Most of the parents living in this area are illiterate and have a low economic status, which hinders the required follow up of the education of their children. The focus group discussion revealed that the perception that Mathematics is a hard subject to understand prevails among the majority of the society and this situation has an influence on the children to hate and fear the subject.

The commitment and readiness of parents to support their children in their education is expressed in the interviews conducted with the parents. While this commitment to assist their children is quite impressive, the poor economic and academic status of the parents is being a hindrance to fully commit their support. One of the parents claimed that he do follow ups on daily basis, try to fulfill learning materials as far as his economic condition allows him and give his child close support. The second parent said due to her low economic condition and educational background she can't give the support which she wish to give him. However, she tries to check his exercise books to see what he has learnt daily. The fact that the father of the child is not living with them and brothers and sisters of the child have no enough time to help him as they are engaged in weaving in order to support the family make the needed support unavailable. The third parent said:

“I want my child to be successful in his education. If it hadn't been for my poor economic status I would like him to have his own tutor at home. I try to help him in his home works and he asks me whenever he faces a problem; I try to fulfill all necessary learning materials”.

In general all parents wish their children to pursue their education and don't want their children to pass through the miserable life they had.

Good performance of schools requires active involvement of all concerned stake holders. It is not something you leave to only one partner. Government, schools, teachers and parents should play their un- substitutable role to attain its goals and provide the necessary service it is supposed to give. In this respect involvement of parents in schools is very essential, as parents can make financial, professional and other kinds of assistance to the good will of schools. By involving themselves they

can learn more about the academic performance, disciplinary conditions of their children.

However, due to various reasons the involvement of parents is not as expected. When the parents were asked if they go to school to talk with the teachers about the education of their children, all said they attend only some of the general meetings called by the school once or twice in a year, otherwise they don't go to school in their initiative to talk about their children. One parent added he goes to school only when the child commits a mistake and asked by the school to bring a parent. The second parent said I don't go to school in the assumption that the teachers might not be willing to talk and besides I believe that the support given to my child at home is sufficient and hence I don't go to school to have a word with teachers and school principals. In general the involvement of parents in school activities due to various reasons is not satisfactory. To reduce this problem of involvement, parents suggest if the school could arrange programmes to meet parents 3 or 4 time annually.

Fulfilment of learning materials is vital for the students to pursue their education. Even though there are some NGOs who help students in providing school materials such as school uniforms, exercise books, additional reference books, fees requested by school for various activities etc, basically it is the parents who are expected to cover all necessary expenses for the majority of the students. Opinion of majority of the teachers is negative in regard to the help of parents in fulfilling learning materials; only 47.6% of the teachers agree that parents provide their children with all necessary school materials. However, parents and students have a different opinion on this matter. Interviewed parents claim that they try to provide all necessary materials in order for their children to be successful in their education. In accordance to the opinion of the parents 91.7% of the students' also agree that their parents do their best to fulfil necessary learning materials.

It is clear how far academic support by parents /guardians or other persons could be very helpful in the improvement of academic performance of the children. Even

though most of the parents have low academic status, they have the commitment and readiness to help the children in their education and as these are students of grade four, in most cases it is not a problem for parents to assist their children in doing home works and giving other additional supports. When the students were asked whether help is provided by their parents while they do home works, 80% of the students reply yes they have such assistance while 18.3% answered they don't have. But, teachers have a different opinion 85.7% of the teachers believe such assistance is not provided by parents.

This kind of support can't be expected only from parents, as in the Ethiopian tradition extended families usually live together, other members of the family a brother, sister, cousin etc can be source of this kind of assistance. In relation to this 65% of the students mentioned they had someone other than parents who help them in their study of Mathematics. Significant number of students (35%) had no this kind of opportunity to be supported by siblings or other members of the family. The condition of getting such assistance is worse in the case of low achievers which account up to 40%.

According to the students their parents/guardians are aware of the importance of Mathematics in the future educational life of their children. 81.7% of the students respond that their parents/guardians encourage them to give special attention and study Mathematics.

4.4 SYLLABUS (CURRICULUM) RELATED ASPECTS

The teachers complain regarding to the preparation of text books. The text books are prepared by few experts at the education office, while teachers who are directly involved in the teaching of this text books are not consulted or involved in the preparation. According to the teachers the text book is full of various errors and redundancy and even some of the terms are difficult to the teachers themselves. Significant number of teachers (28.6%) agrees that Mathematical terms are being barriers to the understanding of the subject. In addition some parts of the text book

were supposed to be accompanied by pictures, but this is not done and it makes it hard to be easily visualized and understood by the students.

According to the school principal the preparation of the text book doesn't give consideration to the age of the students. As children in grade four are young children of age 9-10, it would have been more fruitful if the syllabus was in a form of a play. The school principal and participants of the FGD highly believe this kind of approach would have motivated the children to be interested in the learning of Mathematics.

The continuity of the syllabus in one grade from the previous grade is very essential as the students can't understand what they learn now unless they had adequate knowledge and understanding of the content in the previous grades. A question was posed to see how far the continuity of the Mathematics syllabus was in order and the finding shows that 61.9% of the teachers agree that the syllabus has continuity from the previous grades while 19% disagree and the other 19% said they don't know.

In the previous Ethiopian educational policy secondary school was used to be finished in grade 12, but now changes have been made so that secondary school is finished at grade 10. Related to this change, syllabus which was used to be taught in higher grades is taken to lower grades and consequently there is a wide spread worry that it might be becoming a challenge to the students as they are now learning what previously was taught in higher grades.

To assess the situation the question whether the Mathematics syllabus of grade four is within the level of mastery of the students or not was raised in the FGD with the teachers. Most participant teachers of the FGD agree that the content of the Mathematics text book is within the level of mastery of the students while one teacher was against it. But, the response given by teachers in the questionnaires indicates that most of the teachers disagree with the idea that the content is within the level of mastery of the students. 52.3% of the teachers disagree while 47.6% agree. When the same question was asked to the students, 75% of them say yes it is with in our level of mastery and 25% answered no it isn't. Contrary to what is normally expected it was

found that 85% of the low achievers believe the content is within their level of mastery while only 70% of good and medium achievers agree.

In addition to what is stated above, according to the information from the school principal Mathematics text book of grade four was evaluated by teachers and was found that the last chapter which is the geometry part was beyond the level of mastery of the students and decided to be thought in grade five by the regional education office, otherwise according to him the remaining part has no problem in relation to the level of mastery of the students.

All teachers agree that the portion to be covered in one academic year is vast and teachers are forced to cover the portion in spite of the understanding of the students. The weekly period allotted to teach Mathematics is less compared to its vastness. Finishing the book for the sake of finishing with out the understanding of the students creates problem in the next grade. Another additional factor for not completing the text book in one academic year is that the book is prepared with the assumption of schools teaching in a full day programme, while due to shortage of class rooms and large number of students the school selected for this research function only for half a day.

When asked if they manage to cover the portion expected to be covered in the regional grade four Mathematics Syllabi during the academic year, 81% of the teachers respond yes while 19% said no. The reason why teachers are able to cover the portion is only because teachers teach extra time and they are always in rush in order to cover it. This has an impact in the understanding of the children and it hinders their participation in class discussions.

One of the reasons why students like or dislike Mathematics is believed to be their understanding of its relevance or application in their day to day activities. In relation to this teachers and students were confronted with a question how they evaluate the content of the text books in practice. Only 47.6% of the teachers agree that the content is relevant to the daily life of the students at home, play, surrounding etc, 47.6%

disagree and 4.8% couldn't determine. The respond given by students to this question is not much different from the answer given by teachers, 53.3% say it is relevant and they use it in their daily life while the remaining 46.7% said it is not relevant. When we see these answers in terms of level of achievement of the students, to the surprise of the researcher it is the students with low achievement (65%) that answered it is relevant.

The researcher anticipates this difference might emanate from the difference of teaching methods of teachers. Since the students were taken from four different sections taught by different teachers, the individual difference in their ways of teaching must have brought this difference. One teacher might associate what he/she teaches with the daily incidence the students face while other teachers emphasize only on the theoretical aspect.

4.5 RESOURCE RELATED ASPECTS

Due to shortage of class rooms the school is forced to accommodate an average of sixty nine students in a class which is against the education policy which proposes a maximum of fifty students in a class. The large number of students has also created a situation where students learn in a shift system (students stay at the school only for half a day). Besides, due to technical administrative errors the number of students in each section varies, that is one finds less number of students in one section while there are more number of students in other section. This creates unnecessary crowdedness in some classes, shortage of desks and other inconveniences.

Large class size creates various problems in the teaching and learning process in general and to Mathematics in particular. According to the teachers the following are some of the problems which are observed frequently; it hinders the teacher to follow and give individual support to each child, It creates a problem of movement, the noise in the class disturb students to follow the lectures attentively, it doesn't enable the teacher to give feed back to each individual child and each item and hence is forced to

give general correction to the whole class which doesn't create opportunity to each individual child to learn from his/her mistakes and teachers can't entertain questions raised by various students; which hinders the participation of students. The above mentioned effects of large class size are more observable in the learning of Mathematics as duties such as giving home works and giving individual feedbacks are more frequent and necessary in the teaching of Mathematics than other subjects.

Most teachers who were involved in the focus group discussion believe that the school pedagogical center is not well equipped and there are no sufficient teaching materials. In addition, according to them the school pedagogical center produces more teaching aid materials to the second cycle (5-8), and it gives emphasis to other subjects other than Mathematics. But, one of the teachers argues that the school pedagogical center is well equipped rather the problem lies on not using them properly by the teachers.

It is cited by the teachers that self contained class room management is very tedious which makes the assignment of assistant teachers very essential. Even though, there is no shortage of main teachers; assistant teachers are not assigned to each class as it is done in other schools. One assistant teacher is assigned to three classes. The budget constraint doesn't enable them to make assistant teachers available to each class. The availability of assistant teachers is vital particularly in relation to Mathematics as they can help the main teacher to follow, help and give appropriate feed backs to each individual child, particularly to those children who require additional support.

The school has a library which can accommodate up to 150 students at a time; however the books in the library are very old editions and are not enough in number. This hinder the teachers from enriching their teaching by using additional materials and the students are forced to read only their exercise books or text books.

During the class observation the researcher had a chance to observe the physical condition of the class rooms and most of the class rooms are not well lighted, they are

exposed to sounds coming from the surrounding area, they are not well decorated, generally speaking they lack convenience for the teaching-learning process.

Related to resource the school considered for this research has the following positive aspects: -

- Previously Mathematics text books were distributed to students in groups, but now this problem is solved and the school has almost managed to distribute one Mathematics text book to one student except few (8.8%) who claimed they got books in groups, according to the school administrators these students are those registered lately due to different reasons, however they admit the problem should be resolved.
- The number of desks in each class is more or less proportional to the number of students and one do not see critical shortage as it is in other schools.
- In spite of shortage of assistant teachers the number of main teachers assigned in each class is sufficient.
- Twenty four additional class rooms are under construction and believed to be functional as of January, 2007. The construction of these additional class rooms will enable the school to reduce the class size from sixty nine to fifty and introduce a full day programme.
- The school pedagogical center is relatively well equipped and various teaching aid materials are available compared to other schools.

4.6 GENDER RELATED ASPECTS

The school principal mentioned that from the experience he had from other schools, boys' achievement in Mathematics is much better than girls, but here in this school girls excel boys in their Mathematics achievement. According to him one possible reason why this is so is because most of the parents in this area lead their life engaged in traditional jobs like weaving and pottery and boys are supposed to help their parents in fetching materials needed for pottery from far places or else they are involved in the weaving. Relatively girls have better time to their education and

study. The second possible reason is provision of tutorial programme to students once in a week where most participants and beneficiaries are girls.

The opinions of the participants in the FGD vary on the issue related to the relationship between gender and Mathematics achievement. One of the teachers believe girls achieve much better than boys, however most participants disagree with this idea, they believe that there is a difference in favor of males. They argue that, in this area girls are more engaged in work to help their parents and have no sufficient study time as the boys, boys have better participation in class, girls don't give due attention to their education as boys. However the group comes to a consensus related to performance of some elderly girls who are coming from a child care center near the school with sufficient study time, have better Mathematics achievement.

Opinion of students on Mathematics achievement of students in relation to gender also varies. Some believe boys are better achievers than girls because girls are more engaged in house work than boys, some believe there is no difference and some believe previously boys used to perform better than girls, but nowadays there is no significant difference. When the parents were asked how they treat boys and girls in their homes, all said that they don't make any difference between their boy and girl children, however they admitted in other families in the community girls are forced to work at home to help their parents and hence they have no equal opportunity as boys for their education and study.

In the data obtained from questionnaires, 71.4% of the teachers agree that there is a difference between boys and girls in their Mathematics achievement in favour of boys while 19.1% disagree and 4.8% are not sure to respond. Even though, majority of the students believe that there is no difference in the performance of boys and girls (61.8%), still large numbers of students are with in this type of thinking (38.2%). However, the researcher tried to assess the available record to see if there is any difference in Mathematics achievement of boys and girls of grade four students on the

ground by analyzing the consolidated mark list (grade report) of students using SPSS software and the finding is as shown in the following table (Table 7).

Table 7: Mathematics achievement of grade four students by Sex*

		Mathematics achievement		Total
		<50	≥50	
Sex	Male	56	80	136
	Female	55	80	135
Total		111	160	271

*50% is the minimum passing mark in the Ethiopian schools.

Male ≥50	58.8%	Female ≥50	59.3%
<50	41.2%	<50	40.7%

Contrary to what the teachers and considerable number of students think, there was almost no difference.

4.7 OTHER ASPECTS

The regional education bureau in cooperation with UNICEF is providing a weekly tutorial programme in the selected school focused on Mathematics, science and language. There are also other tutorial programmes given by voluntary teachers to those students who are weak in Mathematics and teachers believe these additional programmes had a contribution in improving student's Mathematics achievement and believe the programme should be strengthened for the future. 66.7% of the teachers respond that they engage themselves in extra activities to help their students improve their Mathematics performance. 70.7% of the students express that there is a Mathematics tutorial programme which they are beneficiaries, while 29.3% don't know about such a programme.

The school administrators and teachers have to work towards creating awareness among students that such programmes are available for students for free. In addition effort should be exerted to contact NGOs working in that area to support such valuable programmes which bring tangible changes in the Mathematics achievement of students as the existing experience shows that the NGOs are not functioning in this respect.

There are also other additional factors which are either influencing or not functioning as they are supposed and hence have negative impact in the teaching and learning of Mathematics. This includes missing periods for various reasons, such as unplanned school meetings which have an impact in finishing the required portion in the given academic year. The Mathematics association formed at national level and other administrative levels is nominal; it is not doing any observable function to promote the teaching and learning of Mathematics. Besides, the Mathematics club in the school is expected to perform various activities by involving teachers and students, however such activities don't exist.

CHAPTER FIVE: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

In this chapter, the findings are discussed in view of theoretical aspects, previous related studies, experience of the researcher and the research questions. At the end of the chapter general conclusion of the findings of the study and points which require attention are stated as a recommendation.

Just to remind the reader the research questions posed were:-

1. What is the Mathematics performance of students in grade four like?
2. What are the major factors that affect the teaching and learning of Mathematics in grade four?

5.1 STUDENT RELATED ISSUES

One of the major aims of this study was to see what the Mathematics achievement of grade four students look like. There were two main reasons as why it was necessary to assess the current achievement of the students. The first reason was related to the teaching experience of the researcher. In the previous years it was common incident to see majority of students achieve low grades in Mathematics. Is there a change of circumstances in these days? Was a question in my mind. The second reason was to have a concrete current data instead of hanging in experience of previous years.

In the curriculum designed for grade four, five subjects namely Amharic (the national language), English, Mathematics, Science and Esthetics (which composes art, music and physical education) are the subjects thought. The finding shows that still the average Mathematics achievement is lower than that of the other subjects, but contrary to the assumption and experience of the researcher a remarkable improvement was observed within the subject itself. In the previous years 70-80% of the students used to score less than the minimum passing mark which is 50%, while in this study only 40% scored less than 50%. Of course, the failure of 40% students is

still large number which requires more attention and effort. However, compared to what has been in place it is encouraging to see Mathematics achievement of students is gradually changing.

This improvement in achievement is a result of positive efforts by students, teachers, parents and the school administrators. If further efforts are made by all concerned, a much better achievement could be attained. If problems like lack of competence and commitment of some teachers, not providing full support by parents as required, not doing home works by students, large class size, considering the subject as hard to understand, less involvement of students in the teaching-learning process, vastness of the syllabus etc are given due attention and made appropriate remedy a much better performance and achievement could be achieved than it is now.

It is worth to mention here the difference observed in outlook regarding achievement among teachers and students. Most of the students believe their Mathematics achievement is adequate compared to other subjects while the teachers and the school principal don't agree. The empirical situation shows their Mathematics achievement is lower than that of other subjects. The egocentric nature of children might be the reason for not clearly understand what their performance look like.

Considering Mathematics as a subject hard to understand and consequently develop negative attitude towards it is a common phenomenon among students, parents and the society at large. In this study the existence of such outlook among students and parents was confirmed during the FGD with teachers. This understanding is not unique to Ethiopian students or parents alone. Various educators have written about it. Mathematics is considered by many individuals as a difficult subject to learn (Fennema & Sherman, 1976) and with such preconceived fear of Mathematics it is very possible for students to develop negative attitude towards it which has a direct linkage with their achievement (Aiken, 1970; Johnson, 1984; Sherman, 1980; Tsai & Walberg, 1983). These scholars have stated that there is a coherent relationship between Mathematics achievements and attitudes. As it is clearly stated by Hembree

children with negative attitudes towards Mathematics have performance problems because they develop anxiety (Hembree, 1990).

Students with negative attitude towards Mathematics are not expected to follow and understand the subject as it should be and definitely their achievement is affected. The role of teachers in changing such kinds of thinking and bring awareness among students and parents, that if one can work and study hard there is no reason why the students can't be successful in the learning of Mathematics should be intensified.

However, in spite of considering Mathematics as a subject hard to understand all teachers, students and parents agree in the importance of Mathematics in this modern world. They understand that with the newly developing information technology, knowledge in Mathematics is crucial. One can say today's world is highly influenced by Mathematics. The modern world of information technology and other sciences are highly dependent on the application of Mathematics. It is very promising to see teachers, students and parents understand Mathematics as very useful for their future.

Even though majority of the students agree with the relevance of Mathematics in their daily life, there were considerable number of students who don't recognize its application. These different views can be the result of different teaching strategies and methods of teachers. Some teachers made an effort to relate it to the surrounding conditions and give practical examples in how students can apply what they learnt, which makes the learning of Mathematics more meaningful and initiate the students to like it, whereas some teachers teach only what is written in the text with out giving due consideration to its practical application and not relate it to the daily life of the students.

The importance of doing home works and assignment in facilitating achievement of students is indicated in available researches (Walberg et al, 1985). In spite of various problems such as large class size, load of work etc the frequency of giving home works and feed backs by teachers is something to be appreciated in this school. However, due to large class and vastness of the syllabus they are forced to give

general corrections to the whole class and simply sign in the exercise books. The teachers should be able to give individual feed backs to each child and to every item in the home works as this help the child to learn from his/her mistakes. Individual feed back to each child and each item is most important when it comes to Mathematics as each following item can't be easily understood if the previous once are not understood to all intents and purposes.

As cited in chapter two, cooperative learning is advisable particularly in Mathematics class as Mathematics concepts and skills are best learned as a dynamic process with active engagement of the students. Talking through Mathematics problems with classmates helps students understand how to solve the problem correctly, it helps them to communicate effectively, it develops confidence in their individual Mathematics abilities, and it helps them to learn more about future carriers from peers. In general cooperative learning creates more positive attitude towards Mathematics. In this regard the efforts by the teachers to organize study groups in a class in such a way students with different level of masteries are grouped so that they study together, share their experiences and help each other is very important. According to the teachers this has brought an observable improvement in the Mathematics achievement of students. Besides its academic advantage, organizing study groups is best mechanism to help the children develop cooperative work in their life, learn from each other and develop a sense of cooperation than competing to each other. Students with low Mathematics understanding are believed to benefit more from such group works.

5.2 TEACHER RELATED ISSUES

5.2.1 Self contained Class room management

Educators have debated elementary school organizational structure since the beginning of the twentieth century (Gibb & Matala, 1962; Lamme, 1976). One aspect

of organizational structure involves the number of subject areas covered by each teacher. In the self-contained approach, the teacher acts as a generalist and carries responsibility for the curriculum all day. The other extreme is the departmentalized approach. Here students change teachers for instruction in different subjects. Thus teachers cover fewer subject areas (Roger & Palardy, 1987; Mac Iver & Epstein, 1992).

Advocates for a self-contained organizational pattern argue that it promotes instruction which is child-centered rather than subject-centered. Self-contained classrooms allow the teacher and students the opportunity to become well-acquainted. Moreover, self-contained teachers know their students' strengths, weaknesses, and personality traits enabling better accommodation of the students' individual learning styles (Squires, Huitt, & Segars, 1983). According to these advocates self-contained classrooms allow:

- The teacher and students the opportunity to become well-acquainted.
- Self-contained teachers know their students' strengths, weaknesses, and personality traits enabling better accommodation of the students' individual learning styles. (Squires, Huitt, & Segars, 1983).
- Self-contained classes allow for greater flexibility in scheduling.
- It helps the child to feel in a family like atmosphere. Experiencing different teachers at lower age creates confusion to the child.
- It creates conducive condition for the teacher to understand the overall progress of the child and to identify the problem areas and what kind of care and support the child needs.
- In countries like Ethiopia where considerable number of children have no access to education, it is a means to broaden access to education. That is teachers who used to be assigned in one school can go to different schools in different places and hence create access to more children.

On the other hand, some educators have found that departmentalized organizational approaches offer distinct advantages for the student (e.g., Culyer, 1984).

- A teacher can not be all round to teach all subjects efficiently. Anderson (1962) presented a strong case for specialization when he reported that only 4 of 260 teachers considered themselves well prepared in all subject areas.
- There is a high probability that the students could be victims when the teacher in that section is not competitive enough or have personal undesirable characters.
- They lack the chance to enjoy the variety of experiences, approaches and methodologies of various teachers.

Teshome in his study indicated that the newly introduced self-contained class room management gives the teachers increased possibilities to learn to know their pupils better (Teshome, 2004). Those being the general discourses among educators, in this particular study it were found that teachers are reluctant to self contained class room management. There is a variation between what the educational directive states in the usage of self contained class room management and the opinion of teachers towards it. Even though, the educational system in Ethiopia takes the above mentioned advantages of a self contained class room management into consideration, the teachers who are the practitioners tend to prefer the departmentalized class room management. Almost all teachers who participated in this study agree that there is a problem in teaching in a self contained class. Various reasons such as large class size, non availability of assistant teachers, the competency and interest of teachers etc being some of the reasons given.

One of the main reasons why teachers dislike self contained class room management is because they believe it is tiresome and tedious. The availability of assistant teachers in each class would obviously lessen the burden of the main teacher. It would be more important in Mathematics class as the assistant teachers could help in giving feed backs to each individual child, give close support to children who require additional help and sometimes assist in teaching where the main teachers have a problem of teaching Mathematics. In fact I understand it requires additional budget, and the

economic constraint in Ethiopia is a barrier to alleviate this problem in a short time, but due consideration should be given to accomplish it gradually.

Mathematics achievement of teachers before they join the college and during their stay at the college was found to be unsatisfactory. For that matter it was found to be very poor. Besides, it was observed that most of the teachers are not satisfied with the training they had in the college. When all these facts i.e. that most of the teachers had poor Mathematics background in high school and during their stay in the college, the insufficient training they had and the grading system at the college, the reluctance of teachers towards self contained class room are put together and bearing also in mind that in the FGD teachers reviled that they do not like to teach Mathematics, one can see how the teaching of Mathematics could be highly affected. It is highly likely that the teachers do not give adequate time and effort to teach Mathematics.

In my opinion, as the children are becoming the victims of this situation, effort must be made to straighten things. Some possible measures could be discussion with teachers and create awareness and reach consensus on the pedagogical, social and economical advantages of self contained class room management, continuous effort in building the capacity of teachers, change the selection criteria of would be teachers and let academically competent teachers join the teaching profession that is those who join this teaching profession should have interest for the profession, should be academically competent, and improve the quality of education provided to them by the college to be adequate or as a last option to revisit the directives.

Teaching profession is a noble profession as it is dealing with children who are the future hopes of a country. The effort and dedication we employ in the education of children can be considered as decisive tool for the development and well being of the country and its people. This makes teacher's professional ethics, commitment and readiness very vital. There are many reasons that teachers could not be satisfied with their job economic, social, political and administrative drawbacks to mention some. However, while most teachers despite of all these problems try their best to fulfill

their responsibilities committed to the profession there are some teachers who are not fully committed. As it is mentioned by the students there are some teachers who are incompetent and irresponsible, who don't control their classes, don't use their time properly, who simply order their students to copy from their books with no explanation etc. These trends must be cut in short as they have impact in the quality of the education the children should have.

5.2.2 Child centered education

Even though the concept of student centered teaching approach is not understood fully, efforts are being done to change the existing teacher centered approach. In student centered teaching, we center our planning, our teaching, and our assessment on the needs and abilities of our students. The main idea behind the practice is that learning is most meaningful when topics are relevant to the students' lives, needs, and interests and when the students themselves are actively engaged in creating, understanding, and connecting to knowledge (McCombs & Whistler 1997).

Students will have a higher motivation to learn when they feel they have a real stake in their own learning. Instead of the teacher being the sole, infallible source of information, the teacher shares control of the classroom and students are allowed to explore, experiment, and discover on their own. The students are not just memorizing information, but they are allowed to work with and use the information alone or with peers. Their diverse thoughts and perspectives are a necessary input to every class. The students are given choices and are included in the decision-making processes of the classroom (Papalia 1996). Essentially, learners are treated as co-creators in the learning process, as individuals with ideas and issues that deserve attention and consideration (McCombs & Whistler 1997). Student centered teaching approach requires to understand the individual child's potentials and problem areas and act accordingly. Understanding of the needs of each individual child and preparing individual plan to meet these needs is essential.

In order to allow students to gain this power in the class, teachers cannot simply lecture and let students take a passive role. They must design activities that let students take initiative and that let students discover meaningful information for their own lives. They must also get to know the kids on an individual basis so that they can better respond to the individual needs and interests of the students. In general, teachers need to focus on the student's needs, abilities, and interests -- they need to "look at how kids learn, rather than at what there is to teach" (Aaronsohn, 1996).

Self contained class room management is suitable to meet the above core points of student centered education. As a teacher in self contained class is engaged with few students as compared to departmentalized class room management, there is a high probability for the teacher to identify the needs, interests and area of weakness and hence prepare suitable individual plan which takes into consideration different strategies and teaching methods to meet the needs and difficulties of the child.

In order to make individual plan according to the needs and interests of the child continuous assessment on the overall performance of the child is necessary. Continuous assessment shouldn't be a one time accomplishment; it has to be dynamic, on process evaluation. Continuous assessment must be done using different assessment methods from informal to formal. Different tools, such as check lists, dialog with the people, diary, observations, pupil works, screening tests and portfolio assessment must be implemented in the assessment process (Johnsen, 2001).

However, in the school selected for this research it seems the understanding of continuous assessment is misunderstood with continuous examinations. In the Ethiopian schools two major exams are administered in a semester in order to assess the educational performance of students. That is a mid semester exam out of 40% and a final exam at the end of the semester out of 60%. This way of assessment doesn't enable the teacher understand the weak and strong points of the child timely and besides it is unfair to judge the child by administrating only two exams in the whole semester.

It was also found that this assessment is focused only on the academic aspect of the child; it doesn't give considerations to other factors which influence the learning situation of the child. The needs and potentials of the child, frame factors such as convenience of class rooms and school compounds, socio economic situations of the society which can affect or support education of the child and other influencing factors are overlooked in the existing practice. Other important aspect of assessment that is determining what the child can perform by himself or with the help of peers or the subject teacher (ZPD) is not getting consideration.

Currently the school has devised different type of approach regarding examinations. They have started administering up to six exams in a semester. This gives the teacher a chance to follow the weak and strong point of the child and provides the necessary support timely; it is also advantageous to the children as they are taking the exams bit by bit which lessen the portion covered in the exam. However, there is confusion in understanding what really continuous assessment means. There is an understanding of continuous exam as continuous assessment, which is a broader concept beyond this understanding. The over all assessment of the needs and strengths of the child are not being dealt and the necessity of individual plan seems over looked.

The way and intentions that exams are prepared also requires a change. The trend which exists in preparation of exams is usually to examine what the students do not know rather than concentrating to assess how far they have understood what they have learnt. These kinds of exams force students to concentrate only in passing the exams. This doesn't enable them to get solid knowledge in the subject areas and other social values. Values such as collaborative work with their peers are overlooked as competition among them prevails.

5.2.3 Teaching methods

Due to various reasons such as difference in capacity, interest, needs children learn through different strategies, activities, media and methods. The method convenient for

one child may not be convenient for the other. Each child has his own preference and likes of teaching methods. The teacher is expected to adapt the learning environment, so that each learner is able to develop and use different learning strategies and methods that are suitable for him or her (Johnsen, 2001).

One effective method of teaching is involving the children in the teaching-learning process. The response given by teachers concerning involving their students in different class room activities was positive. They claim they encourage their students in class room activities. However, when it comes to actual practice that is not what the researcher observed in some classes.

The researcher had the opportunity of observing two teachers while they were teaching Mathematics in different grade four sections. The teacher in the first class had a very attractive and efficient way of teaching. He motivated his students by letting them sing a song, the class was very participatory, he gave his students a chance to do Mathematical problems in the black board, he asked each child by calling their names and he was following the attention of each child, even though the number of students in the class was a hindrance for the full participation of the students and movement of the teacher.

But, the situation in the second class was not as attractive as the first one. There were drawbacks regarding motivating students, class room control and involving students in different activities. The whole teaching method was dependent on the activities done by the teacher only.

The importance of doing home works and assignments and getting feed back from teachers has a big impact in improving students' achievement. Available research shows that homework facilitates achievement and attitudes of students, especially if teachers provide their feedback (Walberg et al, 1985). Home works and assignments have great significance in making students understand the subject matter fully. By

doing home works they can accomplish what they know and it creates an opportunity to learn from their mistakes, as the best way is to learn from our mistakes.

The efforts made to give home works 3-4 times a week is something to be appreciated; however the large class size and short contact hours are hindering teachers to give feed back to each individual child. The construction of additional class rooms is believed to solve this problem. According to the school principal these additional class rooms will reduce the class size from sixty nine to fifty and it will enable the school introduce a full day programme, which means the teacher will have few numbers of students and more contact hours. This will enable teachers attend the work of each child and give appropriate individual feed back.

5.2.4 Selection of teacher trainers

As it was shown in chapter four the Mathematics background of would be teachers selected to be trained at the college was very poor. The basic problem here is the way would be teachers are selected. Teaching profession is nowadays becoming the least wanted profession in Ethiopia. There could be various reasons as why this is so. Low payment, not conducive work situation, the social value of the profession by the society, disciplinary problems in schools etc are some of the possible reasons which make the teaching profession undesirable.

Due to this and other reasons except few, majority of the teachers join this profession because there is no alternative for them. When we see the assignment of students to various colleges, those who have a better academic achievement go to the universities and the least performers are those who are trained to be teachers at a certificate level. Those students who have good academic performance usually enroll in other colleges which lead to other professions. This is becoming a major obstacle in having competent, committed and knowledgeable teachers.

Even though, in the educational policy it is clearly stated that teacher trainers shall have the ability, diligence, professional interest, and physical and mental fitness

appropriate for the profession (Education and Training policy, 1994), there are problems when it comes to practical aspects. Due attention should be given and measures taken to overcome the existing problems related to the profession. Conducive work environment, economic condition of teachers, change of attitude of the society towards the profession etc must be dealt. As teaching profession is a profession which determines the fate of children who are the future hopes of the country, serious attention should be given towards this profession for teachers to join the profession with interest, be academically competent and motivated.

5.2.5 Capacity building programmes

The ministry of education has an in service programme to upgrade qualification of teachers in cooperation with the various universities in the country. Many teachers are using this access to improve their qualifications which I believe is very important in getting more professional and qualified staff. This can also be considered as a motivating factor for teachers to stay in that profession.

However, this should be accompanied by short term and continuous capacity building programmes which are pertinent to the methodology of teaching and their subject areas. Delivery of such programmes should be conducted in a planned and continuous way as they can bring tangible change in the teaching and learning process. Teshome agrees with providing on job training programmes for teachers to upgrade their skills in understanding the nature of children's learning and development, flexible and efficient assessment methods and increased awareness and skills in resource based communication and mediation/teaching (Teshome, 2004).

The fact that teachers in this school are ready to share their experiences and knowledge is something to be admired as a way of capacitating oneself. The success of teaching is not achieved by the effort of few or individuals rather it is a collaborative effect. In a society where asking others for their knowledge and experience is considered as if you are not competent, it is not easy to break the trend

and to be open to learn from others. It is this kind of belief that we see challenged in this school. This beginning should have to be strengthened more as teachers could be beneficiaries from this kind of experience. Generally all teachers have something to share while in particular junior teachers have a lot to gain from this kind of teamwork.

5.2.6 Tutorial programmes

The effort made by teachers to provide tutorial programmes to help their students in general and students with low Mathematics achievement in particular was found to be exemplary. These programmes have proved to be effective in improving Mathematics achievement of students. However, since these programmes are run by voluntary teachers in their spare time, in order for these programmes to continue all necessary support should be given by all concerned stake holders such as the sub city education department, school administrators, parents, NGOs etc. The school administrators should play the biggest role in coordinating and mobilizing these stake holders towards the success of such valuable programmes.

5.3 PARENT RELATED ISSUES

Even though the parents interviewed had low academic status and are in a low economic situation their need, commitment and dedication for the good future of their children was a surprise to the researcher. They clearly understand the key for the bright future of their children lies in education. Unlike the expectation of the researcher and the school community (Teachers and Administrators), parents give sufficient time to their children for their studies, they try to fulfill learning materials and create conducive condition for support by siblings and other family members as far as their economic condition allow them. I believe that this kind of readiness by parents will reduce educational wastage such as drop outs and detainees and will create favorable condition for the improvement of Mathematics achievement of students.

All interviewed parents don't wish their children to go through the miserable life they had. However, the limitation they have in their economic condition and poor academic background remains to be an obstacle for them to provide all necessary follow ups and support according to their wish.

The commitment and readiness of parents to help their children is not restricted to only fulfilling instructional materials. Majority of the students have the access of getting academic support in their Mathematics study, home works and assignments either from their parents or other relatives. It was remarkable to hear one of the parents saying if it hadn't for my economic problems I would have hired him a tutor at home which I think shows the depth of their readiness. As it is mentioned above the understanding of parents that education in general is the future of their children and Mathematics in particular has a great significance is becoming a leading conviction.

Education of children is not something accomplished by the effort of few stake holders. The involvement and cooperation of the school, teachers, students, parents, society, NGOs is essential. The education system in Ethiopia has formulated a mechanism where by parents and the society by large can involve in school activities. PTAs (Parent Teacher Associations) are supposed to be organized in every school to ensure the involvement of parents. Parents are expected to go to schools and discuss about the academic performance, behavioral issues etc of their children. The society by large is expected to contribute professional, academic, social and economical support for the improvement of the school.

However, due to reasons such as being engaged in work to win daily bread and wrong perception that teachers might not be interested to talk to them, the involvement of parents in school activities is not as expected. The rare cases where parents go to school are only when their children are engaged in some sort of disciplinary problems and asked to bring their parents. The unsatisfactory parent involvement in this school was also confirmed by other studies (Abebech, 2006; Belew 2005). In order to improve parent's involvement they suggest remedies such as improved

communication between parents and the school and strengthen parent teacher associations. In general the school administrators have to device mechanisms and opportunities to increase the involvement of parents and the society by large in school activities.

5.4 CURRICULUM RELATED ISSUES

Two major problems were raised in relation to grade four Mathematics syllabi. The first one is regarding teacher's involvement in the preparation of the syllabus and text books. Textbook preparation requires the collaborative efforts of a subject expert, a curriculum expert, and a subject teacher (Zelege, 2001). The current trend of preparation which doesn't involve subject teachers needs a change. As teachers are the ones who are doing the actual work of teaching this syllabus, teachers should be consulted for their opinions on what the syllabus should focus and how the text books should be prepared.

The second problem is the vastness of the syllabus to cover it in one academic year. Teachers complain that the text book is vast to cover it in one academic year and they are forced either to teach in their extra time or to rush with out giving due consideration to the understanding of their students. The construction of additional class rooms and introduction of full day programme is believed to lessen this problem. As beginning a full day programme means more contact hours with the students and hence it enables teachers to cover the portion in the given time with out any rush.

The school principal mentioned that the preparation of the text book lacks taking age of the children into consideration. As the best way to teach a child is through a form of a play, it would have been better if the approach was designed putting these approaches into consideration. The text books should be accompanied by pictures as the children can easily visualize and understand pictures more easily.

Curriculum should be flexible enough in order to meet the need of the individual child. In every class there most certainly is a need for high degree of flexibility in order to adopt the learning environment to the pupil's level of mastery, learning possibilities and barriers (Johnsen, 2001). However, in the Ethiopian schools the existing practice is to teach only according to the contents in the text book, there is no practice of adopting it to the needs and potentials of each individual child.

The exercise of adopting the curriculum could have been a solution to the above mentioned problems. The teacher can avoid redundancy which enables him to cover the portion, to present the content in a more suitable way where each individual child could benefit more, to include important points not included in the text etc. The necessity of adapting curricular materials to meet the needs of the child is one of the points recommended by Shimeles (2002).

5.5 RESOURCE RELATED ISSUES

The existence of large class size in this school is a long standing circumstance. In studies conducted by various researchers in the previous years it was shown that large class size is one of the problems faced by the school (Abebech, 2006; Solomon, 2006; Andnet, 2005; Belew, 2005; Teshome, 2004; Shimeles, 2002).

Most of the respondents in this study also have mentioned the problems created by large class size. It was understood that the average class size is sixty nine students in a class. Indeed it is true that large class size have various effects. Challenges such as hindering the teacher to give individual support to the child according to his/her needs, doesn't enable the teacher give feed back to each individual child and each item and hence is forced to give general correction to the whole class which doesn't create opportunity to each individual child to learn from his/her particular mistakes which is more observable in Mathematics class. It makes the class unmanageable to

control, difficult to entertain all questions raised by students due to shortage of time etc.

The regional government has taken the initiative of building 24 additional class rooms in the school selected for this study. This construction enables the school to provide a full day programme and entertain fifty students in each section. Due to shortage of class rooms students were forced to learn only in one shift (half a day) which has its own impediment in covering the text book in the given academic year. As Mathematics is the major subject victimized due to large class size, the construction of these additional class rooms will alleviate the problems mentioned above related to the teaching and learning of Mathematics.

Even though further efforts should be made to reduce class size more meaningfully, currently problems related to large class size are relatively getting solutions. In addition it is believed this construction of additional class rooms have significant contribution to expand access to education and provide quality education. In my opinion this initiative of building more class rooms by the government is a paradigm shift towards bringing quality of education.

Supporting teaching with teaching aid materials help students to visualize what they learn in a more concrete way. Particularly it has great significance to young children in primary schools. It helps them to grasp easily the subject matter and associate it with the experience they have in their daily life. The school has a relatively well furnished pedagogical center compared to other schools of the same standard. Even though, the teachers in the first cycle (1-4) complain that most of the teaching aid materials produced are for the second cycle (5-8) and there are less teaching aid materials for Mathematics compared to other subjects.

But, according to my visit to the school pedagogical center more or less it is well equipped and there are various materials which can be used even in the first cycle. Unless there are other factors which hinder them to participate in the production and usage of those teaching materials, it is the teachers with the cooperation of students

and the coordinator of the center who are expected to produce and use those materials. The coordinator of the pedagogical center also explains that teachers don't use them as they are expected.

The school is providing Mathematics text books to grade four students on one to one basis. The books are given to students for free to be used in one academic year and collected at the end of the academic year for further use in the coming years. This creates conducive situation for their studies and home works. However, attention should be given in allocating enough budgets in order for this trend to continue as some of the text books are worn-out and the text books are supposed to serve for only three years.

The school has a library built by missionaries which is in good status with sufficient light, curtains, chairs and tables and can accommodate up to 150 students at a time. But, the library has very few old issue books, there are no enough and up to date reference books to be used by students, teachers and the school community at large. Even some of the books are college level books which can't be used by the students. The school has no enough budgets to buy reference books and due to the unavailability of enough and current reference materials, students are forced to read only their exercise books and their text books in the library.

5.6 GENDER RELATED ISSUES

The perception that there is a gender difference in the achievement of Mathematics is prevalent among many scholars. Mathematics is considered as a male domain in various countries (Burton, 1979; Fennema, 1974; Fennema & Shermann, 1976; Jacobson, 1985). However, in this study it was found that in grade four there is no significant difference in their achievements, for that matter girl's Mathematics achievement was found to be slightly higher than that of boys. The notion that Mathematics is a male domain is wrong in this instance.

In my opinion the following could be some of the reason as why this is so; the condition that young girls are not exposed to different socio-emotional problems at this age, parents not forcing them to work at home, are not exposed for various abuses at this age. But, when they grow up physically and emotionally all kinds of problems start to flourish and hence become obstacle to pursue their education. Conditions such as being busy at home in helping parents in home duties and hence have no enough time for their study and home works, physical and emotional harassment or abuse by peers and other factors start to be obstacles for girls not to be successful in their education.

The perception of the participants in this study regarding the difference of Mathematics achievement of boys and girls vary largely. Most of the teachers have the understanding that boy's achievement is much better than that of girls. Majority of the students said there is no gender difference, but large number of students (38.2%) still believe boys excel girls in Mathematics performance. However, the empirical situation shows that there is no significant difference between the achievement of boys and girls.

5.7 CONCLUSION

This study was conducted using a mixed design of both qualitative and quantitative designs and various instruments were used to collect the necessary data from all concerned stakeholders in the teaching and learning of Mathematics. A triangulation of instruments (interviews, questionnaires, focus group discussion, record analysis and class room observation) was employed. Based on the data obtained from the participants the following general conclusion of the study is given.

One of the research questions posed in this study was what the Mathematics achievement of grade four students look like. Their Mathematics achievement was found to be low compared to other subjects they learn. However, it was also observed there is a tremendous improvement within the subject itself. Even though, further

efforts are required for the future, the change in achievement is promising compared to what students used to score.

The second focus point of the study was to assess the major barriers or possibilities which exist in the teaching and learning of Mathematics. The identified problems vary from social, economical, pedagogical aspects to attitude of students and teachers, involvement of parents, commitment of teachers etc.

Self contained being how classes are managed it was observed that there is a reluctance of teachers to accept it. Tendencies of teaching subjects which they feel have adequate knowledge is also observed. Due to poor Mathematics background of the teachers and unsatisfactory training they had in the college, teachers are overlooking the teaching of Mathematics. Other factors such as work load and large class size with no assistant teachers available are becoming hindrance for the teachers not to help each child according to his needs and give proper feedbacks timely.

Even though, there are some teachers who are not committed to the profession and are not doing what is expected from them, effort of majority of the teachers to help their students in different ways such as tutorial programmes and organizing study groups has a contribution to overcome the challenges faced by students in their learning of Mathematics.

The perception that Mathematics is a subject hard to understand is prevalent among the students. Much is expected from teachers and parents in overcoming this kind of thinking as it is becoming a major problem in the learning and understanding of the subject. Students have to develop the habit of doing their home works and assignments on regular basis, as it is only through involvement they can understand the subject matter more fully. Doing home works and getting appropriate feedbacks provides them with an opportunity to learn from their mistakes.

The commitment of parents to provide education for their children, their effort to fulfill school materials, their readiness to give ample time to their children to study is

something to be admired. However, parents should involve in school activities and should have close relationship with teachers and follow the progress of their children closely. Besides, their support in every aspect is vital for the accomplishment of the school objectives.

The preparation of text books requires involvement of teachers. The regional education bureau should design a mechanism where by teachers opinions are included in the preparation of the syllabus and text books. Through this involvement problems related to syllabus such as its vastness, relevance to daily life of the children, redundancy etc can be solved.

Teaching of Mathematics could be more successful if teaching is accompanied by teaching aid materials as it give the students a chance to visualize what they are learning and to associate it with things in their surroundings. In spite of the fact that the school has a well equipped pedagogical center, teacher's usage of teaching aid materials as it should be requires attention.

In this study significant difference in Mathematics achievement of boys and girls is not observed. As a matter of fact slightly girls excel boys, the efforts which are being done to help students in general and girls in particular should be intensified as Mathematics is becoming a filtering tunnel for girls not to join higher institutions (Zelege, 2001).

Finally the fact that various researches are not done in this area had been a problem to get sufficient back ground information to the researcher and I would like to remind readers that it is an open area to be explored for the future.

5.8 RECOMMENDATIONS

Based on the findings and my experience of work as a Mathematics teacher, school principal and head of a sub-city education department I would like to recommend the following points which I believe require attention.

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- In spite of the advantages of a self contained class room management it seems its acceptance by teachers is low. Discussion with teachers and attain a common understanding is essential. Effort should be made to lessen problems related to it such as having large class size, load of work, availability of assistant teachers and excellence of teacher's training.
 - The selection of would be teachers should be according to what is stated in the education and training policy (1994). Care should be taken in the recruitment of teachers for them to be competent, able and have professional interest.
 - Since there is un-satisfaction on the way teachers are trained, the college should evaluate and assess the whole process of training.
 - The sub-city education department shall exert effort to fulfill assistant teachers as one teacher per class than assigning one teacher for three classes.
 - In order to update the skills and knowledge of teachers, short and long term capacity building programmes should be made available at school or sub-city level.
 - Teachers must be accustomed with preparation of individual plan to meet the needs, interests and abilities of the child.
 - The on going tutorial programmes to children with low Mathematics achievement were found to be successful in improving students' Mathematics achievement. These programmes should be strengthened and continue. NGOs, parents, the school administration and teachers need to work hand in hand for this fruitful programme to be continuous and students benefit from the programme.
 - The trend of organizing study groups in the school is something which strengthens collaborative learning among the students. It creates an opportunity for slow learners to get help from their peers. I think the formation of such study groups in each class and their functioning as anticipated requires a day to day follow up and support of class teachers.

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- Effort must be made to change the understanding of what really continuous assessment mean. The miss-understanding of continuous exams to continuous assessment requires a change.
 - Teachers are expected to work against changing the perception of students and the society by large that Mathematics is a subject hard to understand.
 - Students are supposed to do their home works and assignment on regular basis and teachers should make all necessary follow ups and give feed backs.
 - The school pedagogical center is more or less well equipped. Teachers are expected to use those teaching aid materials already produced. They should also cooperate with the coordinator of the center and their students to produce additional teaching aid materials.
 - The regional education bureau should design a mechanism where by teachers have a say in the preparation of the text books.
 - Further effort should be made to reduce the class size to a more meaningful number.
 - The distribution of Mathematics text books is currently on one to one basis, however since there is a high possibility for these text books to be worn out and probability to be changed, enough budget should be secured to keep on distributing one Mathematics book to one student.
 - Even though the school has a library which is in good condition, means has to be found to equip it with relevant and sufficient reference books.
Allocating budget every academic year, contacting NGOs working in the area of education, consulting parents, contacting international organizations could be some of the measures which can be taken.

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APPENDICES

Appendix 1 - Questionnaire for teachers

I. Background information

1. Age

A. 16 – 20 B. 21 – 25 C. 26 - 30 D. Above 31

2. Gender

A. Male B. Female

3. Qualification

A. Certificate B. Diploma C. 12 + 3 D. Other _____

4. Service Years

A. 1 – 5 B. 6 – 10 C. 11 – 15 D. above 16

II. Main questions

All questions are related to the teaching and learning of Mathematics in grade four unless specified.

	Questions	Strongly Disagree	Dis Agree	Don't Know	Agree	Strongly Agree
1	The content of the Mathematics text book is within the level of mastery of the students.					
2	The content is relevant to the daily life of the students at home, play, surrounding etc.					
3	There is a difference between boys and girls in their Mathematics achievement.					
4	Students understand Mathematics as a very important subject.					
5	Students see Mathematics as an understandable subject.					

6	Students do their home works and assignments regularly.					
7	You encourage students to participate in class discussions.					
8	Learning Mathematics is important.					
9	Teachers use teaching aids when deemed necessary while teaching Mathematics.					
10	Teachers cooperate with other teachers within and outside the school.					
11	Parents help their children in					
11.1	Providing them with school materials.					
11.2	While they do their home works.					
11.3	Giving them sufficient time for study.					
12	Related to availability of school materials					
12.1	There are sufficient text books.					
12.2	There are enough reference books in the library.					
12.3	Number of desks is proportional to the number of students.					
12.4	Black boards are convenient to write.					
12.5	Class rooms are well lighted.					
13	Mathematical terms are barriers to the understanding of the subject.					
14	The contents in Mathematics have continuity from the previous grades.					
15	The student class ratio affects the learning of Mathematics.					

16	The training you had in teacher's college is adequate for your teaching profession.					
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17. Do you engage in extra activities to help your students in order to improve their performance in Mathematics?

- A. Yes B. No

18. If yes, what kinds of activities are you engaged in?

19. Do you manage to cover the portion expected to be covered in the regional Mathematics Syllabus during the academic year?

- A. Yes B. No

20. If no, do you think failure to cover the given contents has effects on students' Mathematics achievement?

- A. Yes B. No

21. If yes, what do you think are the effects?

22. How often are home works given in a week?

- A. 1 time B. 2 - 3 times C. 3 - 4 times D. daily

23. How often are feedbacks to home works given in a week?

- A. 1 time B. 2 - 3 times C. 3 - 4 times D. daily

24. Do you give individual feed back according to the need of each child?

- A. Yes B. No

25. Do you agree that compared to other subjects Mathematics achievement of students is low?

A. Yes

B. No

26. If yes, what do you think are the major reasons for low achievement?

27. Is there an additional help for the students by other institutions (NGO, education office etc)

A. Yes

B. No

28. If yes, please specify

29. What do you think are the major factors that affect the teaching and learning of Mathematics?

Appendix 2 - Questionnaire for Students

I. Background information

1. Age _____

2. Gender _____

II. Main questions

1. Do you think Mathematics is an important subject?

A. Yes

B. No

2. Do you think Mathematics is hard to understand?

A. Yes

B. No

3. Is the content of Mathematics you learn relevant to your daily life (play, home, surroundings)?

A. Yes

B. No

4. Do your previous Mathematics teachers apply corporal or emotional punishment?

A. Yes

B. No

5. If your answer to question no 4 is yes, does it make you hate the subject?

A. yes

B. No

6. Do you like Mathematics?

A. Yes

B. No

7. What do you think is the reason for your answer in question no 6?

8. Is the content of the textbooks within your level of mastery?

A. Yes

B. No

C. Other _____

9. Do you have adequate time for study at home?

A. Yes

B. No

C. Other _____

10. How often are home works given in a week?

- A. 1 – 2 times B. 3 – 4 times C. 5 times D. No home works

11. Do you do your home works and assignments regularly?

- A. Yes B. No C. Other _____

12. How often are corrections given to the home works and assignments you have done?

- A. Always B. Sometimes C. Never

13. Do students like learning Mathematics?

- A. Yes B. No

14. How does the school give you Mathematics text books?

- A. One to One basis B. In groups

15. If in group, what problems do you face?

16. Do you believe there is a difference between boys and girls in their Mathematics achievement?

- A. Yes B. No

If yes , why

17. Do teachers encourage you to participate during Mathematics class discussions?

- A. Yes B. No

18. Are there Mathematics tutorial programmes for you?

- A. Yes B. No

19. Do teachers use additional teaching aid materials while they teach Mathematics?

- A. Yes
- B. No

20. If your answer to question no 19 is yes, how often do they use them?

- A. Always
- B. Sometimes
- C. Never

21. Do your parents/guardians help you in fulfilling learning materials?

- A. Yes
- B. No

22. Do your parents/guardians encourage you to study Mathematics?

- A. Yes
- B. No

23. Do your parents/guardians help you in your Mathematics home works?

- A. Yes
- B. No

24. Is there anyone to help you in your study at home other than your parents?
(Brother, sister, a relative etc)

- A. Yes
- B. No

25. Do you agree that compared to other subjects Mathematics achievement of students is low?

- A. Yes
- B. No

If yes why do you think is so?

26. What do you think are the major factors that affect the teaching-learning of Mathematics?

Appendix 3 – Semi-structured Interview guide for the school principal

I. Background information

1. Age _____
2. Sex _____
3. Number of service years _____
4. Qualification _____

II. Main questions

1. What does the distribution of Mathematics text books look like? What impact do you think it has on the achievement of the students?
2. Do you believe the content of the text books is within the level of mastery of the students?
3. Do you think there is gender difference in the achievement of Mathematics?
If yes what do you think are the reasons?
4. What have been done to promote the capacity of Mathematics teachers?
5. Are there Mathematics tutorial programmes conducted in the school in order to help students?
6. Is the class student ratio above the standard set by the ministry of education?
If yes what do you think is its impact in the education of Mathematics?
7. Do you think that most students' Mathematics achievement is low? If yes what do you think are the main reasons?
8. What are the major factors that affect the teaching-learning of Mathematics?
9. As only one teacher is teaching all subjects in grade four, do you think there is a problem related to the ability and interest of the teacher to a particular subject?
10. Additional comment

Appendix 4 – Semi- structured Interview guide for parents

I. Background information

1. Educational background _____
2. Occupation _____

II. Main questions

1. How do you support your child in order to make him effective in learning Mathematics?
2. What barriers do you think exist in the learning of Mathematics of your child?
3. What do you think should be done to improve Mathematics performance of your child?
4. Do you give equal opportunity to boys and girls?
5. Do you give adequate time to your child to study at home?
6. Do you talk about the progress of your child with his/her teacher?

Appendix 5 - Focus Group Discussion Guide for Teachers currently teaching in grade four

1. What does the distribution of Mathematics text books look like? What impact do you think it has on the achievement of the students?
2. Do you believe the content of the text books is within the level of mastery of the students?
3. Are there Mathematics tutorial programmes conducted in the school in order to help students? If yes how effective are they?
4. Is the class student ratio above the standard set by the ministry of education? If yes what do you think is its impact in the education of Mathematics?
5. Do you agree that there is a gender difference in Mathematics achievement? If yes, what do you think are the main reasons?
6. Are school facilities full filled?
7. Do you agree with the idea that Mathematics achievement of most students is low? If so, why is it so?
8. What do you think are the major factors that affect the teaching and learning of Mathematics?
9. As only one teacher is teaching all subjects in grade four, do you think there is a problem related to the ability and interest of the teacher to a particular subject?
10. Additional comment

APPENDIX 6 - Questionnaire for teachers (Amharic)

መጠይቅ 1

በአስሎ ዩኒቨርሲቲ የልዩ ትምህርት ክፍል

በመጀመርያ ሳይክል መምህራን የሚሞላ መጠይቅ

የዚህ መጠይቅ አላማ በ4ኛ ክፍል ሒሳብ ትምህርት የመማርና የማስተማር ሒደት ላይ ያሉ ችግሮችን ለመለየትና ብሎም የመፍትሔ ሃሳብ ለማመንጨት ለሚደረገው ጥናት አጋዥ መረጃ ለማግኘት ነው። በመሆኑም ከእርስዎ የማገኘት መረጃ ለጥናቱ ከፍተኛ አስተዋፅኦ እንደሚኖረው በመገንዘብ በእውነት ላይ የተመሰረተ መረጃ ይሰጡኝ ዘንድ በአክብሮት እየጠየቅሁ ውድ ጊዜዎን መስዋዕት በማድረግ ለሚሰጡኝ መረጃ በቅድሚያ አመሰግናለሁ።

ማሳሰቢያ

1. ስም መጻፍ አያስፈልግም
2. መረጃዎችን የሚሰጡት በባዶ ቦታዎች በመሙላት ወይም ከተሰጡት አማራጮች አንዱን በመክበብ/በመምረጥ ይሆናል።

ሀ. ክፍል አንድ

1. ዕድሜ

ሀ. 16-20 ለ. 21-25 ሐ. 26-30 መ. ከ 30 በላይ

2. ያታ

ሀ. ወንድ ለ. ሴት

3. የትምህርት ደረጃ

ሀ. ስርተፊኬት/ሊ. ዲፕሎማ ሐ. 12+3 መ. ሌላ -----

4. የአገልግሎት ዘመን

ሀ. 1-5 ለ. 6-10 ሐ. 11-15 መ. ከ 16 በላይ

ለ. ክፍል ሁለት

ቀጥሎ የተዘረዘሩት ጥያቄዎች በተለየ መልኩ ካልተገለፀ በስተቀር የ4ኛ ክፍል ሒሳብ ማስተማር የሚመለከቱ ናቸው

	ጥያቄዎች	በጣም አልሰማ ማም	አልሰማ ማም	አላውቅም	እስማማለሁ	በጣም እስማማለሁ
1	የመማርያ መፅሐፉ ይዘት ከተማሪዎቹ የመቀበል አቅም ጋር ተመጣጣኝ ነው					
2	የሒሳብ ትምህርት ይዘት ተማሪዎቹ በዕለት ተዕለት ኑሮ አቸው በቤት፣ በጨዋታ፣ በአካባቢያቸው በሚጠቀሙበት ሁኔታ የተዘጋጀ ነው					
3	በወንድና ሴት ተማሪዎች መካከል የውጤት ልዩነት አለ					
4	ተማሪዎች የሂሳብ ትምህርት በጣም ጠቃሚ ነው የሚል ግንዛቤ አላቸው					
5	ተማሪዎች የሂሳብ ትምህርት ለመረዳት አስቸጋሪ አድርገው ያያሉ					
6	ተማሪዎች የሚሰጣቸውን የቤት ስራና አሳይንመንት በወቅቱ ይሰራሉ					
7	በሚያስተምሩበት ጊዜ ተማሪዎች በንቃት እንዲሳተፉ ያበረታታሉ					
8	ሂሳብ ትምህርት መማር ጠቃሚ ነው					
9	ሂሳብ ትምህርት በሚያስተምሩበት ጊዜ የትምህርት መርጃ መሰርያ ይጠቀማሉ					
10	መምህራን በትምህርት ቤቱና ከትምህርት ቤቱ ውጭ ከሚገኙ ሌሎች መምህራን ጋር መያወጥ ትብብር ያደርጋሉ					
11	ወላጆች ልጆቻቸውን መርዳት በተመለከተ					
11.1	የትምህርት መሳሪያዎች ያሟላሉ					
11.2	የቤት ስራቸውን ሲሰሩ ያግዛሉ					
11.3	በቂ የጥናት ጊዜ ይሰጣሉ					
12	የትምህርት ግብአት በተመለከተ					

12.1	በቂ የመማርያ መዓህፍት አሉ					
12.2	በቂ የማጣቀሻ መዓህፍት በቤተመዓህፍት ይገኛሉ					
12.3	በክፍል የሚገኙ የተማሪ መቀመጫ ዴስኮች ከተማሪ ቁጥር ጋር ተመጣጣኝ ናቸው					
12.4	ጥቁር ሰሌዳዎች ለመጻፍ ምቹ ናቸው					
12.5	የመማርያ ክፍሉ በቂ ብርሃን አለው					
13	በትምህርቱ ሂደት የሂሳብ ተርሞች ትምህርቱን ለመረዳት እንቅፋት ናቸው					
14	የ4ኛ ክፍል የተማሪዎች የመማርያ መፅሃፍ ካለፉት ክፍሎች የመማርያ መዓህፍት ጋር ተያያዥነት/ቀጣይነት አለው					
15	የተማሪ ክፍል ጥምርታ በሂሳብ ትምህርት የመማር ማስተማር ሂደት ላይ ጫና አለው					
16	በመምህራን ማሰልጠኛ የተሰጠው ስልጠና ለመምህርነት ሙያ በቂ ነው					

17. የተማሪዎች ውጤት የተሻሻለ እንዲሆን እርስዎ የሚሳተፉበት የተለየ
ፕሮግራም አለ?

ሀ. አዎ

ለ. የለም

18. የተራ ቁጥር 17 መልስዎ አዎ ከሆነ በምን አይነት ፕሮግራም?

19. በዓመቱ ሊሸፈን የሚገባውን የመፅሃፍ ይዘት ለመሸፈን ይችሉ ነበር?

ሀ. አዎ

ለ. አይደለም

20. የተራ ቁጥር 19 መልስዎ አይደለም ከሆነ በተማሪዎች ውጤት ላይ ተፅእኖ
ነበረው ብለው ያምናሉ?

ሀ. አዎ

ለ. አልነበረውም

21. የተራ ቁጥር 20 መልስዎ አዎ ከሆነ ተፅእኖው እንዴት ይገልፁታል?

22. የቤት ስራ በሳምንት ለምን ያህል ጊዜያት ይሰጣሉ?

ሀ. 1 ጊዜ ለ. 2 ጊዜ ሐ. ከ 3-4 ጊዜ መ. በየቀኑ

23. የቤት ስራ እርማቶች በሳምንት ለምን ያህል ጊዜያት ይሰጣሉ?

ሀ. 1 ጊዜ ለ. 2 ጊዜ ሐ. ከ 3-4 ጊዜ መ. በየቀኑ

24 የያንዳንዱን ተማሪ ፍላጎት በመለየት የግል እገዛ ያደርጋሉ?

ሀ. አዎ ለ. የለም

25. የተማሪዎች ሂሳብ ውጤት ከሌሎች የትምህርት አይነቶች ጋር ሲነፃፀር ዝቅተኛ ነው በሚለው ሃሳብ ይስማማሉ?

ሀ. አዎ ለ. አልስማማም

26. የተራ ቁጥር 25 መልስዎ አዎ ከሆነ ዋና ዋና ምክንያቶቹ ምንድናቸው ብለው ያምናሉ?

27. በሌሎች ድርጅቶች(መያድ፣ ትምህርት ቢሮ.. ወዘተ) ለተማሪዎች የሒሳብ ትምህርት በተመለከተ የሚደረግ እገዛ አለ?

ሀ. አዎ ለ. የለም

28. የተራ ቁጥር 27 መልስዎ አዎ ከሆነ ምን አይነት እገዛ?

29. በሒሳብ ትምህርት መማር ማስተማር ሂደት ላይ አሉ የሚሉዎቸው ዋና ዋና ችግሮች ምን ምን ናቸው?

APPENDIX 7 - Questionnaire for Students (Amharic)

መጠይቅ 2

በአስሎ ዩኒቨርሲቲ የልዩ ትምህርት ክፍል

በተማሪዎች የሚሞላ መጠይቅ

የዚህ መጠይቅ አላማ በ4ኛ ክፍል ሒሳብ ትምህርት የመማርና የማስተማር ሒደት ላይ ያሉ ችግሮችን ለመለየትና ብሎም የመፍትሔ ሃሳብ ለማመንጨት ለሚደረገው ጥናት አጋዥ መረጃ ለማግኘት ነው። በመሆኑም ከናንተ የማገኘው መረጃ ለጥናቱ ከፍተኛ አስተዋፅኦ እንደሚኖረው በመገንዘብ በእውነት ላይ የተመሰረተ መረጃ ትሰጡኝ ዘንድ በአክብሮት እየጠየቅሁ ውድ ጊዜያችሁን መስዋዕት በማድረግ ለምትሰጡኝ መረጃ በቅድሚያ አመሰግናለሁ።

ማሳሰቢያ

1. ስም መጻፍ አያስፈልግም
2. መረጃዎችን የምትሰጡት በባዶ ቦታዎች በመሙላት ወይም ከተሰጡት አማራጮች አንዱን በመክበብ ይሆናል።

ክፍል አንድ

1. እድሜ -----
2. ጾታ -----

ክፍል ሁለት

1. የሒሳብ ትምህርት ጠቃሚ ነው ብለህ/ሽ ታምናለህ/ሽ?
ሀ. አዎ ለ. አላምንም
2. የሒሳብ ትምህርት ለመረዳት የሚያስቸግር ትምህርት ነው?
ሀ. አዎ ለ. አይደለም
3. የምትማሩት የሒሳብ ትምህርት ይዘት በቤት፣ በጨዋታ፣ በአካባቢ/ሽ ..ወዘተ ልትጠቀምበት/ሚበት የምትችለው/ይው ነው?
ሀ. አዎ ለ. አይደለም
4. ባለፉት ክፍሎች ሲያስተምሩህ/ሽ የነበሩ የሒሳብ መምህራን አካላዊ ወይም ስነልቦናዊ ቅጣት (መምታት ፣ መሳደብ.. ወዘተ) ይፈፁ ነበር?
ሀ. አዎ ለ. አይፈፁም

5. የተራ ቁጥር 4 መልስ/ሽ አዎ ከሆነ የሂሳብ ትምህርት እንድትጠላው/ይው አድርጎህል/ሻል?

ሀ. አዎ ለ. አላደረገም

6. የሂሳብ ትምህርት ትወዳለህ/ትወጃለሽ?

ሀ. አዎ ለ. አልወድም

7. ለተራ ቁጥር 6 መልስ/ሽ ምክንያቱ ምንድነው?

8. የምትማረው/የምትማሪው የሒሳብ ትምህርት ይዘት ካንተ/ካንቺ መረዳት አቅም ጋር ተመጣጣኝ ነው?

ሀ. አዎ ለ. አይደለም ሐ. ሌላ ካለ ይገለፅ -----

9. በቤት ውስጥ በቂ የጥናት ጊዜ አለህ/ሽ?

ሀ. አዎ ለ. የለኝም ሐ. ሌላ ካለ ይገለፅ -----

10. በሳምንት ምን ያህል ጊዜያት የቤት ስራ ይሰጣል?

ሀ. 1 ጊዜ ለ. 2 ጊዜ ሐ. ከ3-4 ጊዜ መ. 5 ጊዜ ሰ. ምንም አይሰጥም

11. የቤት ስራና ሌሎች ተጨማሪ ስራዎች በወቅቱ ትሰራለህ/ሽ?

ሀ. አዎ ለ. አልሰራም ሐ. ሌላ ካለ ይገለፅ -----

12. ለምትሰራው/ለምትሰሪው የቤት ስራ እርማት በየሰዓት ጊዜው ይሰጣል?

ሀ. ሁልጊዜ ለ. አልፎ አልፎ ሐ. ምንም አይሰጥም

13. ተማሪዎች የሂሳብ ትምህርትን ይወዳሉ?

ሀ. አዎ ለ. አይወዱም

14. የሂሳብ ትምህርት የመማርያ መፅሀፍ ለሰዓት ተማሪ ይሰጣል?

ሀ. አንድ መፅሀፍ ለአንድ ተማሪ ለ. በቡድን

15. የተራ ቁጥር 14 መልስ/ሽ በቡድን ከሆነ አንድ መፅሀፍ ለሰዓት ይሰጣል? በመማሩ ሒደትስ ምን አይነት ችግሮች ያጋጥሙሃል/ሻል?

16. በወንድና በሴት ተማሪዎች የሂሳብ ውጤት ልዩነት አለ ብለህ/ሽ ታምናለህ/ሽ?

ሀ. አዎ ለ. የለም

መልስ/ሽ አዎ ከሆነ ምክንያቱ ምን ይመስልሃል/ሻል?

17. በሒሳብ ትምህርት ክፍለ ጊዜ ተሳትፎ እንድታደርግ/ጊ መምህርህ/ሽ ያበረታቱሃል/ሻል?

ሀ. አዎ ለ. አያበረታቱኝም

18. የሂሳብ የማጠናከርያ ትምህርት ይለጣችኋል?

ሀ. አዎ ለ. አይሰጥም

19. መምህራችሁ በሚያስተምሩበት ጊዜ የትምህርት መርጃ መሳርያ ይጠቀማሉ?

ሀ. አዎ ለ. አይጠቀሙም

20. የተራ ቁጥር 19 መልስ/ሽ አዎ ከሆነ ምን ያህል አዘውትረው ይጠቀማሉ?

ሀ. ሁሉንዬ ለ. አልፎ አልፎ

21. ወላጆችህ/ሽ ወይም አሳዳጊዎችህ/ሽ የትምህርት መሳርያዎችን በማሟላት ይረዱሃል/ሻል?

ሀ. አዎ ለ. አይረዱኝም

22. ወላጆችህ/ሽ ወይም አሳዳጊዎችህ/ሽ ለሂሳብ ትምህርት ትኩረት እንድትሰጡ/ጩ ያበረታቱሃል/ሻል?

ሀ. አዎ ለ. አያበረታቱኝም

23. ወላጆችህ/ሽ ወይም አሳዳጊዎችህ/ሽ የቤት ስራ በምትሰሩበት/ሪበት ጊዜ ያግዙሃል/ሻል?

ሀ. አዎ ለ. አያግዙኝም

24. ከወላጆችህ/ሽ ወይም አሳዳጊዎችህ/ሽ ሌላ (ወንድም፣ እህት፣ ዘመድ ..ወዘተ) በሂሳብ ትምህርት ጥናትህ/ሽ የሚያግዝህ/ሽ አለ?

ሀ. አዎ ለ. የለም

25. የተማሪዎች የሂሳብ ውጤት ከሌሎች የትምህርት አይነቶች ጋር ሲነፃፀር ዝቅተኛ ነው ብለህ/ሽ ታምናለህ/ሽ?

ሀ. አዎ ለ. አይደለም

መልስ/ሽ አዎ ከሆነ ምክንያቱ ምን ይመስልሃል/ሻል?

26. በሒሳብ ትምህርት የመጣር ሒደት ምን ችግሮች አሉ?

APPENDIX 8 - Semi-structured Interview guide for the school principal (Amharic)

መጠይቅ 3

በ4ኛ ክፍል የሂሳብ ትምህርት የመማር ማስተማር ሂደት ላይ ያሉ ችግሮችን ለማጥናት እንዲቻል መረጃ ለማሰባሰብ

ለርዕስ መምህሩ የተዘጋጁ የመወያያ ነጥቦች ክፍል አንድ

1. ዕድሜ -----
2. ፆታ -----
3. የአገልግሎት ዘመን -----
4. የትምህርት ደረጃ -----

ክፍል ሁለት

1. ለ4ኛ ክፍል ተማሪዎች የሚሰጥ የሂሳብ ትምህርት መማርያ መፃሕፍት ስርጭት ምን ይመስላል? በተማሪዎች ውጤት ላይ ምን አስተዋፅኦ/ጫና አለው ብለው ያምናሉ?
2. የ4ኛ ክፍል የሒሳብ የመማርያ መፅሕፍት ይዘት ከተማሪዎች የመረዳት አቅም ጋር ምን ያህል ይመጥናል ብለው ያምናሉ?
3. በወንድና ሴት ተማሪዎች መካከል የውጤት ልዩነት አለ ብለው ያምናሉ? የሚያምኑ ከሆነ ምክንያቶቹ ምንድናቸው ብለው ያምናሉ?
4. የሒሳብ መምህራን አቅም ለማጎልበት የተደረገ ጥረት ካለ ቢገልፁልኝ
5. ተማሪዎችን ለመርዳት የሚሰጥ የሒሳብ የማጠናከርያ ትምህርት አለ?
6. የተማሪ ክፍል ጥምርታ በትምህርት ፖሊሲው እንደተቀመጠው ነው? በሂሳብ ትምህርት ላይ ያለው ተፅእኖ ወይም ጠቀሜታ ምን ይመስላል?
7. የአብዛኛዎቹ ተማሪዎች የሂሳብ ውጤት ዝቅተኛ ነው በሚለው ሃሳብ ይስማማሉ? የሚስማሙ ከሆነ ዋና ዋና ምክንያቶቹ ምንድናቸው ይላሉ?

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8. በ4ኛ ክፍል የሒሳብ ትምህርት የመማርና ማስተማር ሒደት ላይ አሉ የሚባሉ ችግሮች ምንድናቸው?
 9. በአሐዳዊ ትምህርት ላይ አንድ መምህር የሚያስተምር እንደመሆኑ መጠን የመምህሩ/ሯ የሒሳብ ትምህርት ችሎታና ዝንባሌ መኖር ወይም አለመኖር በትምህርት ሒደቱ ላይ የሚፈጥረው ችግር አለ?
 10. በተጨማሪ ሊገልፁት የሚፈልጉት ሃሳብ ካለ

APPENDIX 9 - Semi- structured Interview guide for parents
(Amharic).

መጠይቅ 4

በ4ኛ ክፍል የሒሳብ ትምህርት የመማር ማስተማር ሂደት ላይ ያሉ ችግሮችን ለማጥናት እንዲቻል መረጃ ለማሰባሰብ ለወላጆች የተዘጋጁ የመወያያ ነጥቦች

ክፍል አንድ

1. የትምህርት ደረጃ -----
2. ሥራ -----

ክፍል ሁለት

1. ልጅዎ በሒሳብ ትምህርት ውጤታማ እንዲሆን የሚያደርጉለት ድጋፍ ምን ይመስላል?
2. በልጅዎ የሒሳብ ትምህርት ላይ ምን ችግሮች አሉ ብለው ያምናሉ?
3. የልጅዎ የሒሳብ ውጤት የተሻለ እንዲሆን ምን ቢደረግ ይሻላል ይላሉ?
4. ለወንድና ሴት ልጆችዎ እኩል ድጋፍ ያደርጋሉ?
5. ለልጅዎ በቂ የጥናትና የቤት ስራ መስርያ ጊዜ ይሰጣሉ?
6. የልጅዎን ትምህርት በተመለከተ ከመምህሩ ጋር ይነጋገራሉ?

APPENDIX 10 - Focus Group Discussion Guide for
Teachers currently teaching in grade Four (Amharic).

መጠይቅ 5

በ4ኛ ክፍል የሂሳብ ትምህርት የመማር ማስተማር ሂደት ላይ ያሉ ችግሮችን ለማጥናት እንዲቻል መረጃ ለማሰባሰብ 4ኛ ክፍል ከሚያስተምሩ መምህራን ጋር ለሚደረግ የጋራ ውይይት የተዘጋጁ የመወያያ ነጥቦች

1. በ4ኛ ክፍል የተማሪዎች የሒሳብ መፅሃፍ ስርጭት ምን ይመስላል? በተማሪዎች ውጤት ላይ ምን አስተዋፅኦ ወይም ጫና አለው ትላላችሁ?
2. የ4ኛ ክፍል የሒሳብ የመማር መፅሃፍ ይዘት ከተማሪዎች የመረዳት አቅም ጋር ምን ያህል ይመጥናል ብላችሁ ታምናላችሁ?
3. የ4ኛ ክፍል ተማሪዎች ለመርዳት የሚሰጥ የማጠናከርያ ትምህርት አለ? ካለ ምን ያህል ውጤታማ ነው ትላላችሁ?
4. የተማሪ ክፍል ጥምርታ በትምህርት ፖሊሲው እንደተቀመጠው ነው? በሂሳብ ትምህርት ላይ ያለው ተፅእኖ ወይም ጠቀሜታ ምን ይመስላል?
5. በወንድና ሴት ተማሪዎች መካከል የውጤት ልዩነት አለ ብላችሁ ታምናላችሁ? የምታምኑ ከሆነ ምክንያቶቹ ምንድናቸው ብላችሁ ታምናላችሁ?
6. የትምህርት ግብአቶች የተሟሉ ናቸው?
7. የአብዛኛዎቹ ተማሪዎች የሂሳብ ውጤት ዝቅተኛ ነው በሚለው ሃሳብ ትስማማላችሁ? የምትስማሙ ከሆነ ዋና ዋና ምክንያቶቹ ምንድናቸው ትላላችሁ?
8. በ4ኛ ክፍል የሒሳብ ትምህርት የመማርና ማስተማር ሒደት ላይ አሉ የሚባሉ ችግሮች ምንድናቸው?
9. በአሐዳዊ ትምህርት ላይ አንድ መምህር የሚያስተምር እንደመሆኑ መጠን የመምህሩ/ች የሒሳብ ትምህርት ችሎታና ዝንባሌ መኖር ወይም አለመኖር በትምህርት ሒደቱ ላይ የሚፈጥረው ችግር አለ?
10. በተጨማሪ ልትገልፁት የምትፈልጉት ነገር ካለ

Appendix 11 – SPSS analysis of student’s questionnaire

ACADAMIC * Question Cross tabulation

Q1. Do you think Mathematics is an important subject?

		Yes	No	Total
ACADAMIC	High achiever	19	1	20
	Medium achiever	20		20
	Low achiever	20		20
Total		59	1	60

Q2. Do you think Mathematics is hard to understand?

		Yes	No	Total
ACADAMIC	High achiever	7	13	20
	Medium achiever	5	15	20
	Low achiever	3	17	20
Total		15	45	60

Q3. Is the content of Mathematics you learn relevant to your daily life (play, home, surroundings)?

		Yes	No	Total
ACADAMIC	High achiever	8	12	20
	Medium achiever	11	9	20
	Low achiever	13	7	20
Total		32	28	60

Q4. Do your previous Mathematics teachers apply corporal or emotional punishment?

		Yes	No	Total
ACADAMIC	High achiever	5	15	20
	Medium achiever	2	18	20
	Low achiever	2	18	20
Total		9	51	60

Q5. If your answer to question no 4 is yes, does it make you hate the subject?

		Yes	No	Total
ACADAMIC	High achiever	1	17	18
	Medium achiever	1	14	15
	Low achiever	1	13	14
Total		3	44	47

Q6. Do you like Mathematics?

		Yes	No	Total
ACADAMIC	High achiever	18	1	19
	Medium achiever	19	1	20
	Low achiever	19	1	20
Total		56	3	59

Q8. Is the content of the textbooks within your level of mastery?

		Yes	No	Total
ACADAMIC	High achiever	14	6	20
	Medium achiever	14	6	20
	Low achiever	17	3	20
Total		45	15	60

Q9. Do you have adequate time for study at home?

		Yes	No	Total
ACADAM	High achiever	19	1	20
IC	Medium achiever	15	5	20
	Low achiever	16	3	19
Total		50	9	59

Q10. How often are home works given in a week?

		once	twice	3-4 times	5 times	none	Total
ACADAMIC	High achiever	2	4	8	4	2	20
	Medium achiever	2		11	7		20
	Low achiever	3	2	10	5		20
Total		7	6	29	16	2	60

Q11. Do you do your home works and assignments regularly?

		Yes	No	Total
ACADA	High achiever	18	1	19
MIC	Medium achiever	19	1	20
	Low achiever	18	2	20
Total		55	4	59

Q12. How often are corrections given to the home works and assignments you have done?

		always	sometimes	none	Total
ACADAMIC	High achiever	8	9	1	18
	Medium achiever	10	10		20
	Low achiever	11	9		20
Total		29	28	1	58

Q13. Do students like learning Mathematics?

		Yes	No	Total
ACADAMIC	High achiever	15	4	19
	Medium achiever	17	2	19
	Low achiever	13	7	20
Total		45	13	58

Q14. How does the school give you Mathematics text books?

		Yes	No	Total
ACADAMIC	High achiever	16	3	19
	Medium achiever	18	2	20
	Low achiever	18		18
Total		52	5	57

Q16. Do you believe there is a difference between boys and girls in their Mathematics achievement?

		Yes	No	Total
ACADAMIC	High achiever	10	8	18
	Medium achiever	6	12	18
	Low achiever	5	14	19
Total		21	34	55

Q17. Do teachers encourage you to participate during Mathematics class discussions?

		Yes	No	Total
ACADAMIC	High achiever	17	3	20
	Medium achiever	19	1	20
	Low achiever	16	4	20
Total		52	8	60

Q18. Are there Mathematics tutorial programmes for you?

		Yes	No	Total
ACADAMIC	High achiever	13	5	18
	Medium achiever	15	5	20
	Low achiever	13	7	20
Total		41	17	58

Q19. Do teachers use additional teaching aid materials while they teach Mathematics?

		Yes	No	Total
ACADAMIC	High achiever	16	4	20
	Medium achiever	17	3	20
	Low achiever	16	4	20
Total		49	11	60

Q20. If your answer to question no 19 is yes, how often do they use them?

		Yes	No	Total
ACADAMIC	High achiever	7	12	19
	Medium achiever	10	8	18
	Low achiever	7	11	18
Total		24	31	55

Q21. Do your parents/guardians help you in fulfilling learning materials?

		Yes	No	Total
ACADAMIC	High achiever	17	3	20
	Medium achiever	19	1	20
	Low achiever	19	1	20
Total		55	5	60

Q22. Do your parents/guardians encourage you to study Mathematics?

		Yes	No	Total
ACADAMIC	High achiever	17	2	19
	Medium achiever	16	4	20
	Low achiever	16	4	20
Total		49	10	59

Q23. Do your parents/guardians help you in your Mathematics home works?

		Yes	No	Total
ACADAMIC	High achiever	19	1	20
	Medium achiever	17	2	19
	Low achiever	12	8	20
Total		48	11	59

Q24. Is there anyone to help you in your study at home other than your parents?
(Brother, sister, a relative etc)

		Yes	No	Total
ACADAMIC	High achiever	14	6	20
	Medium achiever	13	7	20
	Low achiever	12	8	20
Total		39	21	60

Q25. Do you agree that compared to other subjects Mathematics achievement of students is low?

		Yes	No	Total
ACADAMIC	High achiever	7	13	20
	Medium achiever	6	14	20
	Low achiever	11	9	20
Total		24	36	60

Appendix 12 – SPSS Analysis of teacher’s questionnaire.

Q1. The content of Mathematics text book is within the level of mastery of the students.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	4	19.0	19.0	19.0
	disagree	7	33.3	33.3	52.4
	agree	10	47.6	47.6	100.0
	Total	21	100.0	100.0	

Q2. The content is relevant to the daily life of the students at home, play, surrounding ...etc.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	3	14.3	14.3	14.3
	disagree	7	33.3	33.3	47.6
	I don't know	1	4.8	4.8	52.4
	agree	10	47.6	47.6	100.0
	Total	21	100.0	100.0	

Q3. There is a difference between boys and girls in their Mathematics achievement.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	1	4.8	5.0	5.0
	disagree	3	14.3	15.0	20.0
	I don't know	1	4.8	5.0	25.0
	agree	10	47.6	50.0	75.0
	strongly agree	5	23.8	25.0	100.0
	Total	20	95.2	100.0	
Missing	System	1	4.8		
Total		21	100.0		

Q4. Students understand Mathematics as a very important subject.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree	1	4.8	5.0	5.0
	I don't know	1	4.8	5.0	10.0
	agree	12	57.1	60.0	70.0
	strongly agree	6	28.6	30.0	100.0
	Total	20	95.2	100.0	
Missing	System	1	4.8		
Total		21	100.0		

Q5. Students see Mathematics as a subject hard to understand.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree	3	14.3	14.3	14.3
	agree	15	71.4	71.4	85.7
	strongly agree	3	14.3	14.3	100.0
	Total	21	100.0	100.0	

Q6. Students do their home works and assignments regularly.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	1	4.8	4.8	4.8
	disagree	13	61.9	61.9	66.7
	agree	6	28.6	28.6	95.2
	strongly agree	1	4.8	4.8	100.0
	Total	21	100.0	100.0	

Q7. You encourage students to participate in class discussions.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	agree	11	52.4	52.4	52.4
	strongly agree	10	47.6	47.6	100.0
	Total	21	100.0	100.0	

Q8. Learning Mathematics is important.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	agree	5	23.8	23.8	23.8
	strongly agree	16	76.2	76.2	100.0
	Total	21	100.0	100.0	

Q9. Teachers use teaching aids when deemed necessary while teaching Mathematics.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	1	4.8	4.8	4.8
	disagree	1	4.8	4.8	9.5
	agree	11	52.4	52.4	61.9
	strongly agree	8	38.1	38.1	100.0
	Total	21	100.0	100.0	

Q10. Teachers cooperate with other teachers within and outside the school.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	2	9.5	9.5	9.5
	disagree	2	9.5	9.5	19.0
	agree	8	38.1	38.1	57.1
	strongly agree	9	42.9	42.9	100.0
	Total	21	100.0	100.0	

11. Parents help their children in

Q11.1 providing with school materials.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	2	9.5	10.0	10.0
	disagree	8	38.1	40.0	50.0
	agree	10	47.6	50.0	100.0
	Total	20	95.2	100.0	
Missing	System	1	4.8		
Total		21	100.0		

Q11.2 while they do their home works.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	6	28.6	30.0	30.0
	disagree	12	57.1	60.0	90.0
	agree	1	4.8	5.0	95.0
	strongly agree	1	4.8	5.0	100.0
	Total	20	95.2	100.0	
Missing	System	1	4.8		
Total		21	100.0		

Q11.3 giving them sufficient time for study.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	4	19.0	21.1	21.1
	disagree	12	57.1	63.2	84.2
	I don't know	1	4.8	5.3	89.5
	agree	2	9.5	10.5	100.0
	Total	19	90.5	100.0	
Missing	System	2	9.5		
Total		21	100.0		

12. Availability of school materials

Q12.1 There are sufficient text books.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	3	14.3	15.0	15.0
	disagree	11	52.4	55.0	70.0
	I don't know	2	9.5	10.0	80.0
	agree	3	14.3	15.0	95.0
	strongly agree	1	4.8	5.0	100.0
	Total	20	95.2	100.0	
Missing	System	1	4.8		
Total		21	100.0		

Q12.2 There are enough reference books in the library.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	3	14.3	15.0	15.0
	disagree	11	52.4	55.0	70.0
	I don't know	2	9.5	10.0	80.0
	agree	3	14.3	15.0	95.0
	strongly agree	1	4.8	5.0	100.0
	Total	20	95.2	100.0	
Missing	System	1	4.8		
Total		21	100.0		

Q12.3 Number of desks is proportional to the number of students.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	3	14.3	15.0	15.0
	disagree	6	28.6	30.0	45.0
	agree	7	33.3	35.0	80.0
	strongly agree	4	19.0	20.0	100.0
	Total	20	95.2	100.0	
Missing	System	1	4.8		
Total		21	100.0		

Q12.4 Black boards are convenient to write.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree	5	23.8	23.8	23.8
	agree	10	47.6	47.6	71.4
	strongly agree	6	28.6	28.6	100.0
	Total	21	100.0	100.0	

Q12.5 Class rooms are well lighted.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	3	14.3	14.3	14.3
	disagree	8	38.1	38.1	52.4
	I don't know	1	4.8	4.8	57.1
	agree	6	28.6	28.6	85.7
	strongly agree	3	14.3	14.3	100.0
	Total	21	100.0	100.0	

Q13. Mathematical terms are barriers to the understanding of the subject.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	3	14.3	15.0	15.0
	disagree	9	42.9	45.0	60.0
	I don't know	2	9.5	10.0	70.0
	agree	6	28.6	30.0	100.0
	Total	20	95.2	100.0	
Missing	System	1	4.8		
Total		21	100.0		

Q14. The contents in Mathematics text books have continuity from the previous grades.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	2	9.5	9.5	9.5
	disagree	2	9.5	9.5	19.0
	I don't know	4	19.0	19.0	38.1
	agree	12	57.1	57.1	95.2
	strongly agree	1	4.8	4.8	100.0
	Total	21	100.0	100.0	

Q15. The student class ratio affects the learning of Mathematics.

		Frequen cy	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	1	4.8	4.8	4.8
	disagree	3	14.3	14.3	19.0
	I don't know	2	9.5	9.5	28.6
	agree	9	42.9	42.9	71.4
	strongly agree	6	28.6	28.6	100.0
	Total	21	100.0	100.0	

Q16. The training you had in teacher's college is adequate for your teaching profession.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	4	19.0	19.0	19.0
	disagree	8	38.1	38.1	57.1
	I don't know	1	4.8	4.8	61.9
	agree	4	19.0	19.0	81.0
	strongly agree	4	19.0	19.0	100.0
	Total	21	100.0	100.0	

Q17. Do you engage in extra activities to help your students in order to improve their performance in Mathematics?

		Frequen cy	Percent	Valid Percent	Cumulative Percent
Valid	Yes	14	66.7	66.7	66.7
	No	7	33.3	33.3	100.0
	Total	21	100.0	100.0	

Q19. Do you manage to cover the portion expected to be covered in the regional Mathematics Syllabus during the academic year?

		Frequen cy	Percent	Valid Percent	Cumulative Percent
Valid	Yes	17	81.0	81.0	81.0
	No	4	19.0	19.0	100.0
	Total	21	100.0	100.0	

Q20. If no, do you think failure to cover the given contents has effects on students' Mathematics achievement?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	4	19.0	100.0	100.0
Missing	System	17	81.0		
Total		21	100.0		

Q22. How often are home works given in a week?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	twice	2	9.5	9.5	9.5
	3-4 times	13	61.9	61.9	71.4
	5 times	6	28.6	28.6	100.0
Total		21	100.0	100.0	

Q23. How often are feedbacks to home works given in a week?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	twice	3	14.3	15.0	15.0
	3-4 times	15	71.4	75.0	90.0
	5 times	2	9.5	10.0	100.0
	Total	20	95.2	100.0	
Missing	System	1	4.8		
Total		21	100.0		

Q24. Do you give individual feed back according to the need of each child?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	15	71.4	78.9	78.9
	No	4	19.0	21.1	100.0
	Total	19	90.5	100.0	
Missing	System	2	9.5		
Total		21	100.0		

Q25. Do you agree that compared to other subjects Mathematics achievement of students is low?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	13	61.9	61.9	61.9
	No	8	38.1	38.1	100.0
Total		21	100.0	100.0	

Q27. Is there an additional help for the students by other institutions (NGO, education office ...etc)

		Frequen	Percent	Valid	Cumulative
		cy		Percent	Percent
Valid	No	21	100.0	100.0	100.0

Appendix 13 - Letter of cooperation from the University of Oslo.



**UNIVERSITY
OF OSLO**

Department of Special Needs Education

P.O.Box 1140, Blindern
N-0318 Oslo
NORWAY

Your ref:
Our ref: 13/06 BHJ/db
Contact person: Denese Brittain d.a.brittain@isp.uio.no

Visiting address:
Helga Eng's Building
3rd and 4th floor

Date: June 21. 2006

Telephone: + 47 22 85 80 59
Telefax: + 47 22 85 80 21

FACULTY OF EDUCATION

TO WHOM IT MAY CONCERN:

This is to certify that **GEZAHEGN, Yohannes Bekelle**, date of birth 24.08.1960, is a full-time student pursuing a course of study at the Department of Special Needs Education at the University of Oslo, Norway, leading to the degree of Master of Philosophy in Special Needs Education (M. Phil. SNE).

This is a continuous two-year programme run on the "sandwich" principle, which involves periods of study and field work/research in both Norway and the home country. The student has concluded the initial 11-month period in Norway and will be returning to the home country in July 2006 to continue full-time studies/research until 1 January 2007 when s/he returns to Norway for the final part of the degree. The period of study will be completed at the end of May 2007.

The main responsibility for supervising the research, developmental work and thesis remains with the Department of Special Needs Education, University of Oslo, Norway. However, we would kindly request that the relevant authorities give the student the access required to the schools and educational establishments necessary in order to undertake field work and research. We would also be most grateful for any assistance that is afforded to the student which enables her/him to carry out this work, particularly the use of facilities such as access to telephone, fax, e-mail, computer services and libraries at the various educational establishments.

Yours sincerely

Associate Professor Berit Helene Johnsen (dr.scient.)
Academic Head of International Master's Programme
Department of Special Needs Education

Department of Special Needs Education
Faculty of Education
University of Oslo, Norway

Institutt for spesialpedagogikk
Det utdanningsvitenskapelige fakultet
Universitetet i Oslo
Norge

Appendix 14 - Letter of cooperation from the sub-city
Education Department.



በአዲስ አበባ ከተማ አስተዳደር ትምህርት ቢሮ
የተሰሉ ከደቡ ከተማ ትምህርት መምሪያ
City Government of Addis Ababa
Education Bureau
Gulele Kifle Ketema
Education Department

ቁጥር 717/ሠ/1901/34/98
ቀን 11/11/98

ጉዳዩ:- ትብብር ስለመጠየቅ

የክፍለ ከተማው ትምህርት መምሪያ ባልደረባ የነበሩትና በአሁኑ ሰዓት በውጭ ሀገር ትምህርታቸውን በመከታተል ላይ የሚገኙት አቶ ዮሐንስ በቀለ ለማስተርስ ዲግሪ ማሟያ በት/ቤቱ በሂሳብ ትምህርት የመማር - ማስተማር ሂደት ላይ ያሉ ችግሮች በሚል ርዕስ ጥናት ስለሚያደርጉ አስፈላጊው ድጋፍና የሥራ ትብብር እንዲደረግላቸው እናሳስባለን።



ከሠላምታ ጋር
Sumab
ጋሻው ካሜ ኃይሉ
መምሪያ ኃላፊ

ግልባጭ

ለጉሰሌ ክፍለ ከተማ ትምህርት መምሪያ
ለአቶ ዮሐንስ በቀለ
አዲስ አበባ።