IMPLEMENTATION OF ACTIVE LEARNING APPROACHES IN GRADE TEN MATHEMATICS IN GOVERNMENT SECONDARY SCHOOLS OF ADDIS ABABA

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This is to certify that the thesis is prepared by Wondwosen Abebayehu entitled: *Implementation of Active Learning Approaches in Grade Ten Mathematics in Government Secondary Schools of Addis Ababa* and submitted in partial fulfillment of the requirements for the degree of Masters of Education (M.Ed) in Mathematics Education complies with the regulations of the university and meets the accepted standards with respect to the originally and quality.

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ACRONYMS

ETP	Education and Training Policy
MOE	Ministry of Education
ICDR	Institute of Curriculum Development and Research
IER	Institute of Educational Research
NCTM	National Council of Teachers of Mathematics
NRC	National Research Council
TESO	Teacher Education System Overhaul

ABSTRACT

The purpose of the study was to assess the status and implementation of active learning approaches in mathematics in government secondary schools of Addis Ababa. Attempts have been made to assess the extent to which active learning approaches have been practiced at classroom levels, the approaches of the new mathematics textbook and teacher's guide towards active learning, the attitudes of secondary school teachers and students towards active learning,the support and materials provided for the implementation of active learning and factors affecting active learning approaches .To this end, a descriptive survey was used as a method of study. The data was collected from 576 sample students and 33 sample mathematics teachers in twelve secondary schools of Addis Ababa City. Respondents were selected by using simple random sampling, systematic sampling and convenient sampling techniques. Questionnaires, observations, interviews and documents were used as data gathering instruments. The data were analyzed both quantitatively and qualitatively. Accordingly, the result of the study revealed that the extent of practicing active learning approaches in the secondary schools was moderate. The approaches of both student textbook and teachers' guide were found based on active learning approaches in spite of their content width. The majority of the respondents had positive attitudes towards the approaches. Furthermore, the support of the administrators and materials provided in implementation of active learning were found to be very low. Among factors that influence effective implementation of active learning: Classroom situation, arrangement of chairs and tables, the width and depth of the content, lack of technical and material supports and shortage of time and finances were the major ones. Consequently, there is a gap between what is intended in the study and its implementation in the government secondary schools. Hence, it needs conducting an extensive study at national level.

CHAPTER ONE

1. INTRODUCTION

1.1 Background of the Study

Research shows that active learning approaches seeks to engage a greater range of students in effective mathematics learning. In line with this, mathematics teaching at secondary schools asks for constructivist based instruction using problem based teaching method in which the students' own production and construction play a central role (NCTM, 2000:31).The constructivists' view of learning emphasizes on active learning approaches. They stress that in the process of learning; there should be active role of students for understanding and discovery. They believe learning is more than conditioning or acquired knowledge. Rather, learning is a constructed knowledge that occurs when learners can interpret information in the context of their experience. They also emphasize on active learning than active teaching; the learner is in focus than the teacher. The learner is actively constructing his /her own knowledge out of the materials that are around. Thus, the teacher acts as a facilitator who provides an environment that is rich in materials for learning (Glasgaw and Seels, 1998:179).

According to Silberman (1996,4), real learning is not memorization due to the fact that most of what learners memorize is lost in hours; i.e. learning cannot be swallowed . Thus, to retain what has been taught, students must chew on it. They must put together what they hear and see in to a meaningful whole. They should get the opportunity to discuss debate, argue, do and perhaps even teach someone else so that long lasting and real learning occurs, which represents active learning. Consequently, the teaching methods that are implemented in mathematics instruction should incorporate and also make explicit intuitive ways of finding solutions, combined with opportunities for verbal interaction in small groups or in whole-class discussions. Hence, the suggestions put forward by Grouws and Cebulla (2000:75) reflect a view of the student as an active participant in the pedagogical processes in the classroom. Within the active learning approach, the students actively construct their understanding of mathematical concepts in an interactive fashion. Thus, the structure and content of the teaching process enhances

procedural (being sure of which steps to take) and conceptual (to know the meaning, to know why the steps are taken) knowledge simultaneously. Hence, a complex cognitive network of relationships between different pieces of mathematical information forms in the mind of the student. The cognitive network includes knowledge of both procedures and concepts, knowledge that is connected in ways that gives the students both a good intuitive feel for mathematics and a good problem-solving and answer-generating capacity (Daley, 2003:23-30; Leu, 2006:49-58; Roj-Lindberg, 2001:9).

Some of the key factors responsible for quality education include inputs made available; the way the teaching-learning process takes place, the extent to which teachers examine their own practice of teaching, the extent to which school supervision is directed towards helping teachers improve instruction and making the learning process active and learner-centered.

Under active learning approach, the teacher retains "control" of the classroom, but thought is regularly given to: (a) how well students will learn the material presented, and (b) the variety of pedagogically sound methods that may be employed to help the students better understand the core information to be learned. There is now strong empirical evidence that active involvement in the learning process is vitally important in two areas: (a) for the mastery of skills, such as critical thinking and problem-solving and (b) for contributing to the student's likelihood of persisting to program completion (Braxton, Jones, Hirschy, &Hartkey, 2008; Prince, 2004).Results of empirical research on and discussions about mathematics teaching during the last two decades support the view that an active and social approach to the teaching and learning of mathematics might be a way to prevent undesirable and negative attitudes towards mathematics (Seeger, Voigt & Waschescio in Eggen & Kauchak, 2001:23-24).

According to (Reid, 1995), teachers with an understanding of their students' learning styles are better able to adapt their teaching methods appropriately. Teachers who introduce a variety of appropriate teaching methods into their classes are more likely to motivate and engage students into learning (Wiggins, 1998). Students who learn about their own style become better learners, achieve higher grades and have more positive

attitudes about their studies, greater self-confidence, and more skill in applying their knowledge in courses (Ehrman& Oxford, 1995).

The status and implementation of active learning has a vital role in the teaching learning process in mathematics instruction in order to make the learners active participants. In line with this, elements like textbook, and teachers guide should be designed in such a way that they could help students to do more activities consistently.

In short, naturally, after a new curriculum or teaching method has been introduced as Lewy (1977:156) elaborates, it is essential to undertake regular and systematic assessment on its effectiveness. Thus, it is the intention of this study to assess the status and implementation of active learning approaches in the government secondary schools of Addis Ababa city.

1.2 Statement of the Problem

As indicated in the Ethiopia Education and Training Policy document, the previous curriculum design and instructional process suffered from old and traditional approach (TGE, 1994). In its explanation the teaching learning process in most schools in Ethiopia has persisted to be teacher dominated. Most classes are characterized by a situation where students are made listen to their teachers and copy notes from the blackboard.

Teachers dominated the classroom instruction, where students are passively listening. This encourages the concept of banking information into the brain of the learner. In other words, how much information retained was the intention than to what extent it became meaningful and related to the past experience of the learner. In this teaching method, learning by doing, problem solving, cooperative learning and group approaches are limited. This indicates that little attention has been given to the implementation of active learning approaches in mathematics classes. In addition to this, other empirical studies for instance (Jim Eison, 2010) conducted a research in using active learning instructional strategies to create excitement and enhancing learning. This study didn't identify factors that affect the implementation of active learning approaches and the attitude of teachers and students towards active learning. Moreover, a research which was conducted by (Jiwe, 2012) has also a research gap. The researcher didn't investigate that what

materials, technical support and supervision of department of mathematics education during the implementation of active learning approaches in Botswana secondary schools are needed. Thus, this study assess the extent to which active learning approaches implemented and a methodology that concentrates on active involvement and participation of students is needed as well as to assess the attitude of teachers and students towards the implementation of active learning, the availability and status of the new student textbook and teacher guide towards active learning approaches.

1.3 Objectives of the Study

1.3.1 General Objectives

The major objectives of this study are to understand the present situations of the school instructional practice employed and identifying the status and implementation of active learning approaches, in selected mathematics classes of government secondary schools of Addis Ababa city.

1.3.2 Specific Objectives

The specific objectives of the current study are to:

1. Assess the extent to which active learning approaches are implemented in mathematics instruction in some secondary schools of Addis Ababa.
2. Investigate the status of student textbook, teacher's guide and syllabus vis-à-vis active learning approaches.
3. Assess the attitudes of secondary school teachers towards active learning/student-centered approaches.

4. Assess the attitudes of secondary school students towards active learning.

5. Identify the major factors/challenges in implementing active learning approaches in mathematics instruction in some secondary schools of Addis Ababa.

Based on the above objectives, the study would answer the following research questions:

1. To what extent are active learning approaches implemented in mathematics instruction in some secondary school of Addis Ababa?
2. What are the statuses of new mathematics textbook and teacher's guide towards the implementation of active learning?
3. What are the attitudes of secondary school teachers towards active learning /student centered approaches?
4. What are the attitudes of secondary school students towards active learning approaches?
5. What support, conditions and material are provided for the implementation of active learning approaches in grade ten mathematics classes?
6. What are the major factors/challenges in implementing active learning approaches in some secondary schools of Addis Ababa?

1.4 Significance of the Study

The results of this study will provide information on the problems that are currently experienced in the implementation of active learning and teaching of mathematics at secondary schools because Ethiopian Education and Training Policy has widely been advocating active learning/student centered approaches (Melese,1999:15; MoE, 2002:40). Furthermore, the researcher believes that this study has the following significance:

1. The study provides information about the current status and implementation of active learning approaches.
2. The study may help teachers to improve their methods of teaching.
3. It will contribute to the improvement of instructional design in general and active learning process in the mathematics classroom in particular.
4. It can help students to understand issues related to active learning approaches which in turn has an impact on their performance.
5. The study will help to pin point pitfalls seen in the implementation of active learning approaches in mathematics classes.
6. The study will serve as a stepping-stone for further and more extensive research in the area of active learning/student centered approaches by identifying areas that need further research.

1.5 Delimitation of the Study

Even though the researcher believes that it would have been better to conduct the study in all grade level, this research was limited in its dimension to preparatory schools.

As to its area coverage, due to researcher's wider experience to secondary schools and due to various constraints, particularly time and other resources, the study was confined to only Addis Ababa city. Furthermore, the research was also delimited by the fact that the sample secondary schools were all government owned and did not include privately owned secondary schools.

1.6 Limitation of the Study

The Quality of the study was affected by lack of relevant data, time and finance. Moreover, the researcher faced shortage of relevant materials with respect to the topic under the study. Despite all these limitation the study was plainly managed and complete.

1.7 Conceptual Definitions of Terms

For terms to carry any meaning within a study, they need to be defined in a clear, non - ambiguous and agreed upon - way, concepts can be defined either in a conceptual or operational manner. Here, this process is understood as a "process defining concepts by set of other concepts" (Bless and Hughson - Smith 1995:36). The process of defining concepts is essential because it allows for specific contexts to be described and explained in a manner that pertains to the study.

Active learning: as the name suggests, is a process whereby learners are actively engaged (involved) in the learning process, rather than "passively" absorbing lectures. Students are rather encouraged to think, solve problems, do activities carefully selected by the teacher, answer questions, formulate questions of their own, discuss, explain, debate, or brainstorm, explore and discover, work cooperatively in groups to solve problems and workout projects. According to (Meyers & Jones, 1993, p. xi), it is also defined as talking, listening, reading, writing, and reflection through problem-solving exercises, and other activities all with the objective of requiring students to apply what they are learning.

A learning Approach: is an individual's mode of gaining knowledge, especially a preferred or best method. According to (Felder & Brent, 2001:69-74), it is a method, or a way of dealing with learning material to facilitate understanding.

Implementation: is how teaching learning activity put in to practice in out of a class room by teachers and students in their schools.

Government Secondary Schools: schools that run from grades 9-10 and are administered mainly by the government of Addis Ababa.

Status: the level of importance or progress in particular situation or discussion in relation to another or others, especially in regard to social or professional standing.

CHAPTER TWO

2. REVIEW OF RELATED LITERATURE

2.1 The Concept of Active Learning Approaches

Why is there so much attention to active learning nowadays? Several reasons have been put forward for greater emphasis on active as opposed to more passive forms of learning. These reasons have to do with learners, teachers, schools and society at large.

Active learning can be more attractive for learners than more passive forms of learning because they can become more motivated and interested when they have a say in their own learning and when their mental activity is challenged. Being involved in the decisions about learning they can connect to their prior knowledge and their own needs and interests. In finding out things independently, they can follow their own interests and motivation. In the process they can learn to make decisions and take responsibility.

Moreover, active learning is important because of opportunities for learning to learn. Students can learn how to learn by practicing how to do it. Giving them responsibility for parts of the decisions that can or should be made is one way to teach them how to learn. In earlier times, one thought that learning to learn and active learning were for the elite. Only the best students were expected to learn actively. For the weaker students highly structured forms of teaching were to be preferred, so was the conventional wisdom. However, in the "learning economy" this picture has changed. Several empirical studies have found that active learning and learning to learn and think are especially important for the weaker students. One reason why they are weak students turned out to be that they are not able to learn actively. When the weakest students learned how to learn and think, their learning performance improved drastically (see, for instance, Palincsar and Brown, 1984).

Active learning is also important for teachers. Motivational and burn out problems of teachers may disappear when students are more motivated and more active learners.

Besides, teaching will become more intellectually challenging when students are learning actively and independently.

2.2 Classification of Instructional Approaches

Different scholars use different types of classification when referring to instructional methods. Sometimes these different classifications are confusing and it is hard to differentiate. According to ICDR (1999:68), the following are among the common classification of teaching learning approaches.

- Teacher centered versus student centered.
- Direct instruction versus in direct instruction.
- Conventional versus non-conventional methods or
- Traditional versus non-traditional methods

However, the researcher only prefers to use teacher centered and student centered methods because these terms are commonly used.

2.2.1 Teacher Centered Method of Instruction

In the old model of instruction, often called teacher centered, the teacher is the center of classroom activity. The teacher has been thought to hold most of the knowledge necessary for students to be successful. In this model, the teacher used the lecture method chalk and talk or other methods of teaching in which he /she is active and the students remain passive. Here the teacher either writes notes on the board, which the students passively copy in their exercise books or the students memorize the information from their textbooks. When the teacher asks questions, the students were usually expected to recall or repeat information from the teacher or from the textbooks. This is thought to be the most effective method of teaching in order to get most of the information to the students (Borich, 1984).

In general, two specific assumptions are made in a teacher centered instruction methods. First, there is a common body of knowledge that all learners need to know and second, learners know about the same amount of materials as they enter the learning situations. But practically, the first assumption can easily meet, while the second is rare. Thus, if

teacher centered instruction is to be effective, the instructor must be certain that the learner is ready for the information he /she is going to teach.

2.2.2 Active Learning/ Student Centered Method of Instruction

The curriculum reform initiated in 1994 in Ethiopia the adoption of new education and training policy has led to extensive changes in education. One of the changes is the paradigm shift in the model of teaching and learning which involves the shift from a linear to an integrated curriculum (Leu, 1998:1). In connection to the significance of active or participatory learning, (Bon well and Eison, 2003) suggests that students must do more than just listen. They must read, write, discuss, or engaged in solving problems. In other words, to be actively involved in learning, students must engage in such higher order thinking tasks as analysis, synthesis and evaluation. According to the context of this research, instructional strategies that are promoting active learning can initiate students to involve in activities, or doing thing and critically thinking about what they are doing that reveals the real learning. Moreover, when students involved in activities that lead them to discuss, question, and clarify concepts that they develop thinking abilities. Students must encouraged not only to learn facts but also to investigate, to understand the world around them, to analyze , draw conclusion and communicate; in other words, to think deeply (ICDR, 1998: 65-66).

2.3Advantages and Disadvantages of Active learning

2.3.1 Advantages of Active Learning

The most important value of active learning is that it increases students' retention and comprehension of the course material. Active learning utilizes the students' data and knowledge base. Students have an opportunity to provide personal insights and interpretation. The process allows students to experiment with ideas, to develop concepts, and to integrate concepts into systems. Research shows that active learning seeks to engage a greater range of students in effective mathematics learning. Furthermore, it positively affects the attitude of students toward self and peers in mathematics learning process. Active learning develops social experiences between students and between teacher and students. It can build community within the class room. The following are

other key advantages of the active learning approaches, which are summarized by different authors, (Duffy & Kirkley, 2004:21-42; Kane, 2004:275-286; Kim, 2005:10-18):- For example, high level of participation encourages students to engage more with the subject matter. Besides, adoption of new perspective and positions like the opportunity to discuss topics with other and listen to address other points of view may often lead to the revision of existing perspectives and enhance learning opportunities. As active teaching and learning approaches have openness with respect to learning outcomes, they will often yield unanticipated outcomes. Unanticipated outcomes that has not been (and could not have been) planned may exist and there will be same learning that takes place and this can be rewarding for both students and teachers. Moreover, they can create opportunities for more peer support and peer learning by establish collaborative activities (such as group work or simulations for students to learn from and support each other in ways that are not facilitated by more formal teacher centered approaches). Active learning approaches help learners for developing critical reflection on action and experience by making them take a different perspective on a particular topic (example, in a debate). They also may learn to reflect critically on the things they do and say. In addition to this, the approaches may encourage students to become more self-directed and self-motivated. By taking on a more enquiring and autonomous role, students are more likely to develop a sense of owner ship and responsibility for learning.

2.3.2 Disadvantages of active learning

Some of the key drawbacks in using active learning methods may include shortage of time, dysfunctional groups and a decrease of students' access of teachers' expertise. Shortage of time occurs when active learning dominates as it may take more time than other methods. The other drawback as mentioned above is dysfunctional of groups. This happens when students bring personal issues, during group work, to the learning contexts that disrupt the learning experience for others. Therefore, all students are not considered as expert collaborators. During active learning students access to teachers' expertise may be decreased since the adoption of more student centered approaches in secondary school will effectively limit the access that students have to teachers' knowledge and expertise in the subject. This may represent constraints on the adoption of such approaches.

2.4 Teaching Method that Influence Active Learning

The purpose of this part is to examine teaching methods that influence learning in mathematics instruction. Effective learning is the act of developing and refining knowledge not only mentally, but also physically, cognitively and emotionally. It is an active process of internalizing knowledge through inquiry and experience (Santrock, 2001:58).

The challenge in education today is to effectively teach students of diverse ability and differing rates of learning. There is a need to adopt some of the recent reform-based active learning approaches, along with some teacher -centered practices. Such practices include individual exploration, peer interaction and small group work, each of which emphasizes the use of multiple approaches to problem solving, active student inquiry, and the importance of linking mathematics to students' daily life experiences (Beard & Wilson, 2005:11-12). A key component in reform is the movement from teacher-centered to active learning practices in mathematics. It is important to examine the effects and relationships among different types of instructional practices and the resulting achievements of students and their attitudes towards mathematics. Studies on active learning practices and academic achievement have suggested that the quality of teachers' instructional messages affects students' task involvement and subsequent learning in mathematics (Steckol, 2007:14-15). According to Robertson (2005:186-188), students who experience active learning are encouraged to explore, develop conjectures, prove and solve problems. The assumption is that students learn best by resolving problematic situations that challenge them through conceptual understanding. In the study by Smith (1999:108-110), he/she investigated the use of enhanced instruction as a means of building student capacity for mathematics thinking and reasoning. The conclusion was that students must first be provided with opportunities, encouragement and assistance before they can engage in thinking, reasoning and sense making in the mathematics classroom. Consistent engagement in such thinking practices should lead students to a deeper understanding of mathematics as well as an increased ability to demonstrate complex problem solving, reasoning and communication skills on assessment of learning outcomes. The tasks used in the mathematics classroom highly influence the kind of

thinking processes students employ, which in turn influence learning outcomes. Perhaps this is the reason why the mode of questioning in mathematics classrooms becomes relevant. It is therefore imperative for teachers to appreciate and inculcate in students positive attitudes towards mathematics by using improved and appropriate instructional strategies. It is believed that the lack of appropriate teaching methods has one way or the other hindered learning achievement among students. To be effective teachers must use different active learning methods. Because, current thinking going and practice in mathematics classes highly advocates the need to actively involve the learners in a different active learning techniques. To this end, there are a wide range of methods and techniques for active, learner centered learning. The major methods were explained below.

2.4.1 Co-operative Learning

Cooperative learning is defined as students working together to "attain group goals that cannot be obtained by working alone or competitively" (Johnson, &Holubec, 1986). The main purpose of cooperative learning is to actively involve students in the learning process; a level of student empowerment which is not possible in a lecture format.

Cooperative learning is a methodology that employs a variety of learning activities to improve students' understanding of a subject by using a structured approach which involves a series of steps, requiring students to create, analyze and apply concepts (Kagan, 1990). Cooperative learning utilizes ideas of Vygotsky, Piaget, and Kohlberg in that both the individual and the social setting are active dynamics in the learning process as students attempt to imitate real-life learning. The use of cooperative learning also helps students clarify concepts and ideas through discussion and debate. Because the level of discussion within groups is significantly greater than in instructor led discussions, students receive immediate feedback, thus advancing the level of discussion. It is through this process of interacting with students of differing viewpoints that cognitive growth is stimulated. Emphasis is placed on learning how to cooperate in order to find the best possible solution to a problem. According to the constructivist approach, when students formulate their own solutions in this manner, they are truly thinking critically (Davis, Mahler &Noddings, 1990).

2.4.2 Problem based Learning Method

Problem-based learning is one of the most important active learning/student-centered approaches that promote students' problem solving abilities. The problem-based learning ability enables the students to find appropriate solutions to problems that confront them (Hmelo-Silver, 2004:258). It is a technique whereby the teacher and students attempt in a conscious, planned and purposeful effort to arrive at some explanation or solution to solve some educationally significant difficulty (Achike& Nain, 2005:308-310). It is a process of producing or closing a perceived problem gap. This technique involves providing students with content-related problems to find some answers or find reasons why the problem exists. Problem-based learning, widely used in mathematics, frequently is built around collaborative learning methods. Dewey endorsed discussion-based teaching and believed strongly in the importance of giving students direct experiential encounters with real-world problems. Guided design, case studies and simulations are all forms of problem-based learning, which immerse students in complex problems that they must analyze and work through (McConnell, 2005:35). These approaches develop problem-solving abilities, understanding of complex relationships and decision making in the face of uncertainty. While problem solving has long been a focus of professional education, it is increasingly regarded as an important aspect of teaching (Savin-Baden &Wilkie, 2004:27-34). Given that problem centered learning is a very engaging, motivating and involving form of experiential learning; students are often very close to the immediate details of the problem and the proposed solution.

According to Miller (2004:578-579), when using problem solving techniques, the following steps have to be implemented:

1) defining and delimiting the problem
2) gathering evidence that may help to solve the problem
3) formulating hypothetical solutions to the problem and
4) testing the hypotheses, solving the problem and restarting the process if the problem has not been solved

This shows that problem-based learning is an instructional active learning/student-centered approach that empowers students to conduct research, integrate theory and practice, and apply knowledge and skills to develop a viable solution to a defined problem. Critical to the success of the approach is the selection of ill-structured problems (often interdisciplinary) and a teacher who guides the learning process and conducts a thorough debriefing at the conclusion of the learning experience.

2.4.3 Inquiry-based Learning Method

Inquiry-based learning is an active learning/student-centered method focused on questioning, critical thinking and problem solving. Inquiry-based learning activities begin with a question followed by investigating solutions, creating new knowledge as information is gathered and understood, discussing discoveries and experiences, and reflecting on new-found knowledge. Inquiry-based learning is frequently used in mathematics education (Bissell & Lemons, 2006: 66-72) and encourages a hands-on approach where students practice the mathematical method on authentic problems (questions).

Inquiry learning begins when students are presented with questions to be answered, problems to be solved, or a set of observations to be explained (Dochy, Segers, Van den Bossche & Gijbels, 2003:556).

If the method is implemented effectively, the students should learn to "formulate good questions, identify and collect appropriate evidence, present results systematically, analyze and interpret results, formulate conclusions, and evaluate the worth and importance of those conclusions" (Karagiorgi & Symeou, 2005:34). The same statements could also be made about problem-based learning, project-based learning, discovery learning, certain forms of case-based instruction and student research. Thus, inquiry learning may be considered an umbrella category that encompasses several other inductive teaching methods. Lee (2004:32) makes this point, observing that inquiry is also consistent with interactive lectures, discussion, simulation, service learning and independent study, and in fact "probably the only strategy that is not consistent with inquiry-guided learning is the exclusive use of traditional lecturing" (Karagiorgi &

Symeou, 2005:24). In this study, the researcher will use the term inquiry learning to refer to instruction that uses questions and problems to provide contexts for learning and does not fall into another more restrictive inductive learning category. The inquiry-based teaching method is a method where active processes of seeking understanding occur. It produces new ideas, which contribute to human civilization. Every person has the potential to create new ideas and the process of inquiry is both an individual and interpersonal adventure. Students are naturally curious and eagerly seek to understand the world around them. This is the essence of inquiry.

The main aim of inquiry teaching is to stimulate or promote independent resourceful thinking. Involving students in the inquiry method is one of the most effective ways to help them to develop their higher order critical thinking skills for students' inquiry involves learning through explanation and investigation (Clark & Starr in Feden& Vogel, 2003:37-39).

In inquiry, experiences can take place in the classroom, in interaction with the literature or outside during a field trip. While inquiring, the student uses sight, smell, touch and the kinesthetic sense to gain general and specific information that will help to form concepts and categories for making sense of experiences.

The activities and assignments in an inquiry-based learning mathematics classroom can be designed in such a manner that students work individually or together to solve problems involving both in-class work and fieldwork. While the method is meant to be highly student-focused, the extent of teacher-directed vs. student-directed learning can vary depending on the level of the students in their course and their understanding of the inquiry process.

Other than increasing student motivation, one of the main reasons to use inquiry-based learning for mathematics teaching is because it provides an effective means to actively involve students in the mathematics learning process. Inquiry-based learning gives teachers the opportunity to help students learn the content and course concepts by having them explore a question and develop possible answers. This gives mathematics students

more opportunity to reflect on their own learning, gain a deeper understanding of the course concepts in an integrated fashion and become critical thinkers.

2.4.4 Peer Teaching

Peer teaching is a participatory, active and democratic strategy integrated in to the students own experience that results in deep learning. Peer teaching involves occasional use of students in the class who have experience because of their good background in particular area. The merit of peer teaching is that each group or member benefits from each other's activities, sharing the experience. Peer teaching can solve the problem of large class size and it may release teacher's time for personal research or for producing resource based learning materials (Bennetetal., 1996:38).

2.4.5 Project Work

Project work can bring in to the class room aspect and dimensions of life that the text books or other instructional materials do not. A project can emanate from the classroom or at home depending on the role that the teacher plays in the origin of the project. In other words, whatever the original conception of the material that goes in to project belongs to source outside the classroom. In project method, tasks or topics are selected, worked, organized and presented to the class. Thus, project does the function of brining in to the class room aspects and dimensions of experiences (Dewey, 1949) that are no ordinarily to the classroom. The teacher may employ project method to directly enhance classroom teaching when he /she chooses areas that are part of his / her work in the class (Mukalel, 1998:77)

2.4.6 Role Play: role play is all unrehearsed dramatization, which involves presenting a small spontaneous play that describes possible real life situations. In role play, the students rely on information in classroom and real life (Melese Bedane, 1999). Players in role play try to act out what they would do and how they would feel in a certain situation. It is particularly useful for motivating and developing learners' feeling and attitudes. Role play could also be seen as part of the simulation method (Heinich, et al., 1996).

In the concept of active learning, unless the activities that a learner does seen to be individually important and are believed to possess purpose or those student's ideas, contributions and findings are valued , the learner will learn little of benefit. In other words, learning is active to the extent that the learner is an active partner throughout the activity within the class and outside the class room. In line with this, Silberman (1996:ix) states that when learning is active, students perform most of the activities or the works , use their brains, analyzing ides , solving problems and applying in their daily life what they have learned . He further extended his explanation that active learning is interactive, supportive, fun, and fast-paced and personally engaging ever learner thus become effective when employed.

2.4.7 Discussion Method

Discussion is a kind of teaching method that often involves solving problems that students have identified and chosen. It is tied with the discovery method, which requires students to find their own concepts, principles and solutions, not to adopt them from a teacher.

In this method, problems may also be presented by the teacher for students to discuss in small groups and report the results. In comparison with the teacher method, discussion yields better retention, higher order thinking, better attitudes and motivation (Ainsworth, 2006:96-97). Group discussions can help students increase their subject matter knowledge; learn skills in leadership and in sharing with others. The discussion method develops higher level thinking skills (McConnell, 2005:36). Pairs and or larger groups of students working together represent the most effective form of interaction (Mayer, 2005:37-38). When mathematics students work in pairs and or larger groups, one person is listening while the other partner is discussing the question under investigation. Both are developing valuable problem-solving skills by formulating their ideas, discussing them, receiving immediate feedback and responding to questions and comments (Miller, 2004:578-580).

In general, in the active, leaner – centered method , the learner has the responsibility for his /her learning the content has relevance and meaning for the learner, the involvement

and participation of the learner in learning is mandatory and the teacher acts as a facilitator , than as a controller . In active learning, the students are not passive recipients of knowledge rather they are active learners. They not only receive information from teachers and books, they also rearrange systematically, discuss, compare analyze draw concession and communicate.

2.5 Student Textbook and Teacher's Guide in Relation to Active Learning Approaches

Textbooks are very important tools in the teaching learning process. Jarvis (1996:422) mentions that they are used because they have designed to present subject matter in sequential manner in grade series accepted by educators. He also explains the three views regarding textbooks. It may be summarized as follows. The first view is that a textbook is actually a complete teaching learning situation in print. It is not mere book, but is a carefully deliberately designed book intended for specific school use. The second point holds that a textbook is a general outline for a course of study rather than a complete teaching learning instrument. The third view maintains that the textbook is simply a cyclopedia book containing authoritative information in certain branches of knowledge. It is identical with any other book of factual or specialized nature suitable for pupils of varying abilities, and should be used as library reference to helpful some purpose of the learner.

In general, the three views as may be related with the way different countries and different schools use in classroom situation. Some school may use textbooks that have guide lines while others reference materials. However, in Ethiopia it seems that text books are carefully deliberately designed for specific subject and grade levels. Specially, in primary and secondary school where other resources and additional materials are not available textbooks play paramount role. Without textbooks where other educational materials are no available, it is unthinkable to run schools. This is clearly observed in school of remote areas where textbooks and teacher's guides were not available.

Textbooks have several advantages. They are most inexpensive means of getting instructional materials in to hands of pupils. The students take them to their homes read

them and do home works, actively participate in a classroom with the guide lines and approaches of the activities. Well prepared texts often provide important structural frame work for much of what goes in the classroom. They have a very great power to attract learners toward learning. The way the textual materials are written; their appearance, their content and the way they arranged, and the illustrations all affect the quality of the book (MOE, 1989:6). If textbooks have good quality, students will be motivated towards learning. On the contrary, if textual materials are not constant and logically ordered and arouse only shallow interest, students will be left with insufficient knowledge of the subjects (MOE, 1989:6).

The new published mathematics Teacher's guide also recommended the following possible teaching approaches (Teachers guide, 2010: 2):-

1) Engage students in more relevant and meaningful activities than just listening.

2) Including learning materials having examples that relate to students life, so that they can make senses of information.

3) Let students be involved in dialog, debate, writing, and problem solving as well as higher order thinking.

4) Encourage students' critical thinking and inquiring by asking them thoughtful, open ended questions, and encourage them to ask question to each other.

5) Giving them to arrive at an understanding of new mathematical concept, formula, theorem, rule or any generalization, by themselves.

6) Let them frequently work in peers or groups working with other learners give learners real life experience of working in a group, and allows them to use their Meta cognitive skills. Learners will also be able to use the strengths of other learners and to learn from others.

2.6Factors Affecting the Implementation of Active Learning Approaches in Mathematics Classes

It is common that like any other educational issue in the teaching learning process, active learning to may come across constraints during its implementation in the real classroom conditions. Some of them include classroom situation, teachers and students attitude and shortage of instructional materials and administrative support.

2.6.1 Classroom Situation

Silberman (1996:9) points out that the physical environment in the classroom can make or break active learning. Of course, no one set up or class arrangement is ideal rather there are many options. The interior decorating of active learning is fun and challenging especially when the furniture is less than ideal. In some cases, furniture can be easily re-arranged to create different setups. If the furniture is movable, it could be possible to use different logouts for active learning. Silberman (1996:9) as suggested ten different types of classroom logout's which facilitate active learning approach. These layouts include: Conference table, u shape, team style, circle, group- on- group work station, breakout groupings, chevron arrangement, traditional classroom, and auditorium.

Similarly as Amare Asegdom (1998, 294) explains, over crowdies of classroom is one of the two highly observed critical problem of education in Ethiopia context.

2.6.2Attitudes of Teachers and Students towards the Implementation of Active Learning

2.6.2.1 Attitude of Teachers

Anastasi (1957) defines attitude as tendency to react in a certain way towards a designed class of stimuli. Attitude has been defined as a mental and neutral state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related.

People's attitudes towards their profession have an effect on their performance. This case is also valid for the profession of teaching. According to Bradley (1995), inadequate

funds of schools, lack of parent and community support, and insufficient salaries are examples of those factors.

Marchant (1992) added the role of experience to the factors influencing teachers' attitudes for their profession. Dodeen et al. (2003) found that female teachers have more positive attitude than male teachers.

The attitude and expectation of society in general and of the family of the learner in particular affect how learning is viewed and how teaching is organized. These attitudes and expectations vary from society to society and attempting to copy learning and teaching strategy from one society into another, without trying to adapt into the local conditions may not be successful (Derebssa, 2006). Studies have pointed out that teacher's negative personal and professional behavior and poor social image of the teacher and teaching profession are serious factors responsible for teacher's low status.

Awanbor (1996) reported that teacher trainees had a negative attitude towards teaching and those teacher trainees who had positive attitude towards teaching did so with strong reservation which range from the poor social image to the teaching profession, the comparatively poor financial remuneration for the teacher, to the general lack of encouragement by educational authorities. The attitude of teachers comes to the fore as they reflect upon the language that they use in teaching. Consciously or unconsciously, their attitudes play a crucial role in language's "growth or decay, restoration or destruction" (Baker 1988). Their attitudes, too, as part of their cultural orientation, influence heavily their younger students (Shameen 2004). There has been a general agreement that the attitude of teachers towards teaching is significantly correlated with teaching success. In general, it may be concluded that there are indications that teacher's attitudes have a positive relation with success in teaching. Researchers identified many factors and situations that influence the development of attitudes are: type of schooling, the parental attitudes, and the attitude of friends, teachers, and siblings. The negative attitude of teachers has been documented in many studies (Houck 1992; Lobosco& Newman 1992; Allred, Brullle& Shank 1990). Another important factor is attitude or belief towards the subject. Callahan and Clark (1988) indicate that one can facilitate development of attitude by providing conducive atmosphere and models. Development of

understanding may enhance the development of attitudes just as value clarification, role playing, and discussion of dilemmas may enhance the development of values and morals. Teachers can have general attitudes towards students. According to Brophy (1974), general attitudes stem from the teacher's personality and definition of his role as a teacher. Many attitudes are the results of deliberately planned education and religious training and influences and propaganda. Person-oriented teachers are likely to enjoy their contacts with students and to hold generally favorable attitudes towards them. In contrast, introvert and withdrawn teachers may prefer to minimize social contacts with students and more likely to develop neutral or relatively negative attitudes towards them. Teachers' attitudes can affect teacher-student interaction. That is, once a teacher forms a particular attitude toward an individual student, the teacher is likely to begin to treat this student in individualized way. Thus, attitudes have the potential for affecting students and for functioning as self-fulfilling prophecies.

2.6.2.2 Attitude of Students

Effective implementation of active learning approaches enables students to acquire deep understanding of mathematical concepts and problem-solving skills which are essential to identify and tackle real problems employing appropriate mathematical methods. This approach has positive effects on students' academic achievement. Besides from promoting academic achievement, students should be inculcated with attitudes and values that are appropriate to their lives as students and for career development. If active learning is properly implemented in mathematics education, students become successful in their learning. On the other hand, ineffective use of this approach brings academic failure.

This in turn affects students' attitudes towards active learning methods and the subject. Thus, student's attitude towards mathematics education could be enhanced by using effective active learning and teaching methods (Olowojaiye, 2000:129).

Other researchers who studied active learning approaches in mathematics education have also shown that the implementation of active leaning methods develops positive attitudes in students towards the approach. For instance, the study conducted by Zan and Martino

(2007:159-164) indicates that students in the experimental group held positive attitudes towards active learning in mathematics education. Niess (2005:509-523) also finds that students in the experimental group held positive attitudes toward mathematics education. Mathematics students' interests and attitudes towards active learning affect their learning (NCTM, 2000:37). Students with positive attitudes to the teaching and learning methods and those who show interest in the subject will score high grades and succeed.

CHAPTER THREE

3. RESEARCH DESIGN AND METHODOLOGY

3.1 Research Methodology

The intention of this research is to collect the empirical data specific to the status and implementation of active learning approaches in mathematics classes of government secondary schools of Addis Ababa city. The focus of the research is also to discover something about a large group of students by studying a smaller group of students with the intent of generalizing from a sample to a population. The specific type of research design that is used for the quantitative approach of this study is a descriptive survey and supported by qualitative data. In descriptive survey research, the researcher selects a sample of subjects and administers questionnaire to collect data (Creswell 2009:36).

3.2 The Source of Data

In the selected secondary schools, the primary sources of data were teachers and students of grade ten through questionnaire. Additional data were also gathered from the same source through open ended interviews to strengthen the information. Moreover, the researcher made observation when the students were engaged in different individual and group activities in the classroom, in the library and in the pedagogical center. Thus, the researcher believes that these primary sources of data help to get firsthand information and enable to draw valid inferences. In line with this, secondary sources of data were obtained from documents like student textbook and teacher's guide.

3.3 Sampling Technique and Sample Size

The sampling technique applied for the selection of secondary schools was convenient sampling because those secondary schools have larger number of sections. This increases the representativeness of the data. The total number of schools that would be selected for this research were twelve though the number of sub-cities in Addis Ababa were ten. Two additional secondary schools were included as two of the sub-cities contain larger number of secondary schools when compared to the others. Thus, the study included 33 teachers of grade ten that were selected randomly from the twelve secondary schools because

random sampling technique increases representativeness and decrease biases. The study also included 576 students which were selected using systematic random sampling technique. The researcher took homeroom teachers students list and select one student from the first five students in their roll number randomly from each sections as the number of students in the secondary schools were too large. Moreover, all homeroom teachers and department heads were very co-operative and positive in the selection process.

3.4 Instruments and Procedures of Data Collection

3.4.1 Instruments

3.4.1.1 Questionnaires

In this study, the questionnaire was used as main data collection instrument because the numbers of respondents were large (33+576), which made appropriate and mandatory to use it. So, the required and reliable information could be obtained from such a large number of respondents through the questionnaire. Although English is a medium of instruction in secondary schools of Addis Ababa, it was necessary to administer the questionnaire in the Amharic language on the presumption that students have better understanding on its purpose and contents. This also helps the respondents to fully understand and properly complete the questionnaire. The questionnaire includes two sets which were teachers' questionnaire and students' questionnaire. There were two parts in each sets of questionnaire. The first part of the teachers' questionnaire consists five items and the second part consists forty items while the first part of students' questionnaire contains six items and the second part contains 30 items. All of them were close ended. The nature of the responses were choice type, "yes" or "no" type and scale type.

3.4.1.2 Interview

In this research, interview were used for collecting information regarding the nature of the teaching learning process in line with active learning approaches and the major problems that teachers and students experience at secondary schools. There were two sets

of interview questions for both teachers and students which contain 8 items in each set and all of them were unstructured.(See appendix-D and E)

Four teachers and two students were interviewed individually. All of the interviewees were so cooperative that challenges were not faced during the interview session. Each interview sessions took 15-30 minutes and the voices of each interviewee were recorded in audio CD.

3.4.1.3 Observation

The researcher observed teachers while they were attending the class and observing students activity. In doing so, two types of check list were prepared namely 'lesson presentation variables' and 'instructional consideration' of the teacher.

In total of 20 observations (10 teachers) were twice observed from each sub cities which were selected randomly.

3.4.1.4 Documents

Documents like student textbook and teacher's guide were also consulted to get information on the implementation of active learning approaches. The researcher took grade 10 mathematics student textbook and teacher's guide to assess the extent to which active learning approaches relates to those books.

3.4.2 Procedures

According to the information obtained from the Education Bureau of Addis Ababa City Administration, there were 56 government secondary schools in 2012 /13. Among these, 12 secondary schools were selected by convenient sampling. In the present study, there were a total of 33 teachers and 576 students. The teachers were selected using random sampling and students were selected using systematic random sampling technique. The sample size, therefore, constituted almost 10% from each school of the entire grade ten teachers and students for the main study. The data were collected and administered by the researcher with the help of department heads and homeroom teachers. This minimizes the possibility of researcher bias. Before going to the main study, a pilot study was conducted

in order to test and make improvement on the instruments (specially the attitude scale along the questionnaire). Moreover, unstructured interview to both teachers and students were made. In addition to this, observation of teachers and referring documents were also made.

3.5 Pilot Study

The researcher in "Sedil Le Ethiopia" secondary school conducted a pilot study. The objective of this pilot study was to improve the instruments of data collection and create a working condition with the study site. The questionnaire was tasted with a total of 10 teachers and 30 students which were selected randomly. The reliability of the questionnaires was calculated statistically by means of cronbach alpha and the average reliability coefficient for the teachers' questionnaire was 0.81. Similarly, the average reliability coefficient for the students' questionnaire was 0.8. According to cronbach alpha interpretation, both groups of respondents' questionnaire were good. In addition to this, both the literature and the items in the questionnaire were covering the full breadth of the research content and the stated objectives.

3.6 Techniques of Data Analysis

In this study, quantitative and qualitative research methods of data analysis were employed. Data gathered through questionnaires and observation was analyzed using quantitative method and the data gathered through interview was analyzed using qualitative method of data analysis. The quantitative data which were obtained from mathematics teachers and students through the questionnaires was analyzed by using frequencies, percentages and mean values. The researcher used a Likert type five point scales, ranging from 'strongly disagree' to 'strongly agree' in order to examine the status and implementation of active learning approaches in mathematics classes. (See Appendix A and appendix C)

Moreover, the data in the questionnaire has also been collected and analyzed through a three point scale, namely, 'frequently', 'rarely' and 'not at all'. Similarly, two types of observation check lists were prepared, namely 'lesson presentation variables' and 'instructional consideration of the teacher'. (See appendix F)

CHAPTER FOUR

4. ANALYSIS AND INTERPRETATION OF DATA

This chapter presents analysis and interpretation of data. In doing so, the data collected through questionnaires and observation are presented with the help of tables. Data obtained through interview is expressed in words by giving a false name to the interviewee. It also presents the findings on the extent to which secondary school mathematics teachers and students implement active learning approaches and factors/challenges in implementing active learning approaches in secondary schools of Addis Ababa city. Moreover, it mentions the attitudes of both teachers and students towards active learning approaches, the statuses of new mathematics textbook and teacher's guide towards the implementation of active learning and the support as well as materials provided for the implementation of active learning approaches.

4.1 The Analysis of Data

The purpose of this part of the study was to assess the nature of the teaching-learning process in line with the active learning/student-centered approaches in mathematics classes in government secondary schools of Addis Ababa city with specific reference to grade ten. As it was mentioned earlier, the tools that were used to gather data were questionnaires, classroom observations, interviews and examining documents like mathematics textbook and teacher's guide. Based on these tools, an attempt has been made to give answer the six basic research questions raised in chapter one.

4.1.1 The Practice of Active Learning

Table 4.1: teachers and students rate 'the value of teaching mathematics through active learning'

No.	The value of teaching/learning mathematics through active learning	Low		Moderate		High		Very high	
		f	%	f	%	f	%	f	%
1	Teachers	1	3	17	51.6	8	24.2	7	21.2
2	Students	0	0	167	29	152	26.4	257	44.6

According to table 4.1, 51.6% of the teachers rated the value of teaching mathematics through active learning, in moderate way. But most of the students, 44.6% gave a very

high value for active learning approaches. Hence, the data show that active learning approaches have got acceptance both by students and teachers in teaching/learning mathematics. This can help both the teachers and students to establish interest in performing active learning in a sustainable manner in their classrooms.

Table 4.2: teachers and students responses regarding the implementation of active learning approaches in their mathematics classes

No.	The implementation of active learning in mathematics classes	Always		Sometimes		Rarely		Not at all	
		f	%	f	%	f	%	f	%
1	Teachers	10	30.3	18	54.5	5	15.2	0	0
2	Students	203	35.2	281	48.8	92	16	0	0

As table 4.2 shows, most of the teachers (54.5%) and students (48.8%) replied that sometimes they implement active learning in their mathematics classes. But 30.3% of the teachers and 35.2% of the students always implement active learning approaches in mathematics classes. This data indicates that most teachers and students accept and implement active learning approaches but there are many problems and obstacles that hinder the implementation of active learning approaches. However, the extent to which the implementation of active learning approaches in mathematics classes were viewed in a positive way.

Table 4.3: the implementation of active learning methods in mathematics classes by teachers

No.	Teachers' use of active learning methods in mathematics classes.	Strongly Disagree(1)		Disagree(2)		Undecided(3)		Agree(4)		Strongly Agree(5)		Mean
		f	%	f	%	f	%	f	%	f	%	
1	I arrange students into groups for mathematics team work.	0	0	1	3	5	15	19	57.7	8	24.3	4.3
2	I think teachers dominated classes are the best way to teach students to solve mathematics problems.	11	33.4	2	6	6	18.2	10	30.3	4	12.1	3.2
3	I encourage students to ask questions.	0	0	0	0	1	3	6	18.2	26	78.8	4.8
4	Variable teaching methods are not suitable to implement active learning approaches in mathematics classes.	8	24.3	13	39.4	4	12.1	7	21.2	1	3	3.6
5	I discourage students to explore their current beliefs.	14	42.5	8	24.3	5	15	3	9.1	3	9.1	3.8
6	I discuss mathematics worksheet results with students.	0	0	1	3	2	6	17	51.6	13	39.4	4.2
7	I think a well-prepared lecture can stimulate students to solve mathematics problems.	3	9.1	2	6	1	3	10	30.3	17	51.6	1.9
8	I think that inquiry learning is effective to involve students in mathematics classes.	1	3	0	0	6	18.2	18	54.5	8	24.3	4
9	Active learning approaches are not suitable to students.	17	51.6	12	36.3	3	9.1	0	0	1	3	4.3
10	I often make students feel comfortable while they solve problems.	0	0	1	3	5	15	17	51.6	10	30.4	4.1
11	I think that the approaches in the new mathematics book do not invite students to make discussion.	16	48.6	7	21.3	5	15	4	12.1	1	3	4
12	I encourage students to deduce general principles from practical experience.	0	0	1	3	8	24.3	14	42.4	10	30.3	4
13	I encourage students to forward their opinion about active learning approaches.	0	0	2	6	3	9.1	19	57.6	9	27.3	4.1
14	I think that discussions between students in mathematics classes create disturbance.	10	30.4	12	36.3	4	12.1	4	12.1	3	9.1	3.7
		Grand Mean = 3.9										

According to table 4.3, most teachers arrange students into groups for mathematics team work. Of the respondents 82% (24.3% and 57.7%, mean 4.3) strongly agree and agree with this statement respectively. Teachers were seen giving orders to their students to

arrange their seats and encouraging their students while they are dealing with their class work in order to make them feel easy and comfortable97% (78.8% and 18.2%, mean 4.8).In addition to this, 91% (39.4% and 51.6%, mean 4.2) of the respondents strongly agree and agree in discussion mathematics worksheet results with students.

The approaches in the new mathematics book invite students to make discussion (see item 11 of table 4.3), 69.9% (21.3% and 48.6%, mean 4) of the respondent support the idea, the contribution of both textbook and the teacher's guide leading them towards active learning is very vital. Accordingly, they responded positively on the item that checks whether a well prepared lecture stimulates students to solve mathematics problems or not (item 8).

As the above table reveals, most teachers 66.7% (30.4% and 36.3%, mean 3.7) strongly disagree and disagree on the statement that discussions between students in mathematics classes create disturbance. Most of the teachers seem to realize the importance of active learning approaches (87.9%, mean 4.1).

Regarding the effectiveness of teacher dominated classes to solve mathematics problems (item 2) 39.4% strongly disagree (mean 3.2) and 42.4% strongly agree (mean 3.2). This data was supported by some teachers when the researcher interviewed them. One of the mathematics teacher, Tesfaye Adugna has the following personal communication:

> *"I have taught mathematics for 20 years and I have always preferred to encourage students to learn through active learning rather than passive listening and note taking. Teachers should differentiate students learning abilities and try to give lessons based on their needs and interests".*
>
> *April 20/2013*

Some teachers were negative about active learning approaches. For example:

Fekadu Belay has a personal communication, in that:

> *"When I tried active learning in one of my classes, many of the students hated it. Some refused to cooperate and made their hostility to the*

approaches others use for side talk beyond their duties and for this reason most of the time I use explanation and description of the steps for each problem''.

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The grand mean 3.9, confirms that relatively most of the teachers use different active learning approaches and have the concept of implementation of active learning in mathematics classes.

Table4.4: students current practice in mathematics classes

No.	Students current practice in mathematics classrooms	Strongly Disagree(1)		Disagree(2)		Undecided(3)		Agree(4)		Strongly Agree(5)		Mean
		f	%	f	%	f	%	f	%	f	%	
1	I do my homework regularly.	12	2.1	24	4.2	78	13.5	234	40.6	228	39.4	4.1
2	I bring all my learning materials in mathematics classes.	18	3.1	78	13.5	99	17.2	207	36	174	30.2	3.8
3	I do not always actively participate in my mathematics classes.	152	26.4	198	34.4	78	13.5	88	15.3	60	10.4	3.5
4	I do assignments and project work.	39	6.8	33	5.7	90	15.6	216	37.5	198	34.4	3.9
5	I always be seated in the same seat.	33	5.7	36	6.3	39	6.8	168	29.2	300	52	1.8
6	I do not work sheet papers.	108	18.7	144	25	107	18.5	135	23.5	82	14.3	3.1
7	Group discussion helps me to solve mathematics problems.	51	8.9	33	5.7	72	12.5	183	31.8	237	41.1	3.9
8	Arrangement of chairs and tables are not suitable for the implementation of active learning.	66	11.5	168	29.2	73	12.7	124	21.5	145	25.1	2.8
9	I have lack of time to complete my class work.	99	17.2	153	26.6	60	10.4	180	31.3	84	14.5	3
10	I have a good idea in implementing active learning approaches.	30	5.2	51	9	105	18.2	220	38.1	170	29.5	3.8
11	An active learning approach helps me in constructing new knowledge.	15	2.6	30	5.2	27	4.7	198	34.4	306	53.3	4.3
12	I do not prefer to discuss mathematics problems which have risen by group members.	231	40.1	219	38	57	9.9	39	6.8	30	5.2	4

Grand Mean = 3.5

As the above table reveals, 80 %(39.4% and 40.6%, mean 4.1), 66.2 %(30.2% and 36%, mean 3.8) of the students did their homework regularly and bring their learning materials in mathematics classes respectively.

Accordingly, they responded positively on the items that state group discussion as it helps them to solve mathematics problems. They confirmed that active learning approaches are also helpful for them in constructing new knowledge (item 7 and 11).

In item 8, of Table 4.4, the majority of the respondents 46.6% (25.1% and 21.5%, mean 2.8) indicate that arrangement of chairs and tables are not suitable for the implementation of active learning.

Classroom observation also indicates that the classroom seating arrangement does not allow both teachers and students to employ active learning approaches because all the desks are attached with the benches and are heavy to move from place to place within the given time.

Regarding doing assignments and project work (items 4), about 71.9 %(34.4% and 37.5%, mean 3.9) strongly agree and agree respectively. Respondents that account 60.8% (34.4% and 26.4%, mean 3.5) strongly agree and agree that they always actively participate in their mathematics classes. This means most students implement active learning approaches. Moreover, the grand mean (3.5) confirms that over half of the students practice active learning in their mathematics classes.

Table 4.5: observational analysis of the instructional consideration of teachers

No.	Instructional Consideration	Not at all (1)		Rarely (2)		Frequently (3)		Mean
		f	%	f	%	f	%	
1	The teacher implements active learning approaches in lesson presentation.	0	0	3	30	7	70	2.7
2	The teacher uses group activities for collaborative learning.	2	20	1	10	7	70	2.5
3	The teacher guides the students during group work.	1	10	6	60	3	30	2.2
4	The teacher asks questions to check whether the students understand the lesson or not.	0	0	1	10	9	90	2.8
5	The teacher uses different instructional methods and techniques in lesson presentation.	0	0	4	40	6	60	2.6
6	The teacher goes round the class and look at the learners' activity.	1	10	3	30	6	60	2.5
7	The teacher uses instructional aides which are appropriate to the lesson.	8	80	2	20	0	0	1.2
8	The teacher relates the lesson to the students' real life situation.	7	70	2	20	1	10	1.4
9	The teacher gives feedback to students' work.	1	10	6	60	3	30	2.2
	Grand Mean = 2.3							

As can be seen from the table 4.5, item 1, 70% and mean value 2.7 of the observed sessions indicates that the observed teachers frequently used active learning approaches. Regarding item 2, 70% of the observed sessions shows that teachers frequently encourage the students to participate in collaborative learning. However, 60% of the observed sessions revealed that teachers did not guide the students during group work.

For item 4, in 90% and mean 2.8 of observed sessions, the teachers frequently ask questions to check whether the students understand the lesson or not .

Table 4.5 shows, for item 5, 70% and mean value 2.7 of the observed sessions indicate that teachers frequently used variety of instructional methods during lesson presentation.

As the observed session reveals, 60% and mean 2.5, teachers go round the classes and look at the learners' activity. However, 80% and mean value 1.2 indicate teachers did not use teaching aids which were appropriate to the lessons.

For item 8, in 70% of the observed sessions, teachers did not relate the lesson to the student's real life situation.

According to table 4.5, 60% of the observed sessions indicate that teachers rarely gave feedback to students' work. The grand mean (2.3) shows that teachers' classroom instructional activities were moderate in relation to implementation of active learning approaches.

Table 4.6: observational analysis of the lesson presentation variables of teachers

No.	Lesson Presentation Variables	Yes		No	
		f	%	f	%
1	The teacher has the weekly or daily lesson plan with him / her.	8	80	2	20
2	The lesson plan matches with actual presentation of the lesson.	4	40	6	60
3	The teacher specifies the objectives of the lesson clearly.	3	30	7	70
4	The teacher checks the previous home work.	7	70	3	30
5	The teacher revises the previous lesson before starting the new lesson.	7	70	3	30
6	The teacher checks arrangement of chairs and tables.	3	30	7	70
7	The teacher encourages the students to use the textbook in the class room.	8	80	2	20
8	The teacher gives class work, homework and assignment.	10	100	0	0
9	The teacher summarizes the main points of the lesson.	4	40	6	60
10	The teacher evaluates students work.	8	80	2	20
	Mean of percentage		62		38

Table 4.6 depicts that, 80% of observed session indicates that the observed teachers prepare weekly or daily lesson plan. However, 60% of observed sessions confirmed that the lesson plan did not match with the actual presentation of the lesson.

As can be seen in the table, 70% of the teachers did not specify the objectives of the lesson to the students. Besides, 70% of the observed sessions indicate that teachers check the previous homework and revise the previous lessons before starting the new lessons.

According to table 4.6, 70% of the observed sessions indicate that teachers did not check arrangement of chairs and tables. During observation sessions teachers were seen encouraging their students to use the textbook in the classroom. And at the end of each

lesson all of the observed teachers gave class work, homework and assignments for students. Therefore, 80% the observed sessions shows that teachers evaluate students work. However, teachers were lack summarizing the main points of the lesson. Finally, the mean percentage (62%) of observed sessions of lesson presentation indicates that teachers have positive views on the implementation of active learning approaches in mathematics classes.

4.1.2 The Status of New Mathematics Textbook, Teacher's Guide, and Syllabus towards the Implementation of Active Learning Approaches

In the Ethiopian context the previous curriculum design and instructional process suffered from the old traditional approach (Moe, 2002:56-58).Hence, continual curriculum revision have been made and different programs were designed by the new education and training policy of the country to offer quality training and to make the active learning approaches practical at different levels of the country. Therefore, the Federal Democratic Republic of Ethiopia, Ministry of Education, and the General Education Quality Improvement Project published a new student textbook, teacher's guide and syllabus in 2010.

4.1.2.1 Student Textbook

The researcher has tried to see the status of active learning approaches in the implementation of new mathematics textbook. Therefore, unit one of grade ten mathematics lessons that is polynomial function is chosen for discussion. The textbook states all the out comes in a specific way. The unit starts by revising and asking questions on the concept of function and the students try to recall what they have learned in grade nine. It also defines what is meant by a polynomial function with examples and gives activities which should be done by students in a group discussion using their prior knowledge (Mathematics text book, 2010:2-5).

4.1.2.2 Teacher's Guide

It was important to see the implementation of active learning approaches in the teacher's guide. It was stated as follows:

A rote learning paradigm has been replaced by the student centered model. Student centered class room stimulates student inquiry and the teacher serves as a mentor who guides students as they construct their own knowledge base and skills.

One of the teaching goals is particularly fostered by the student oriented approach. Because it is planned to make students develop personal qualities that will help them in real life.

For example, student oriented teachers encourage students' self-confidence and their confidence in their knowledge, skills and general abilities. This helps to motivate students to express their ideas and observations with courage and confidence. Because it makes them feel comfortable in addressing individuals and groups and to present themselves and their ideas well. It also gives them safe opportunities to stand before the class and present their work.

Team work is also emphasized in a student centered classroom. For example, the teacher creates favorable condition for students to come together in groups and exchange ideas about what they have learned and about material they have read. In this process, the students are given many opportunities to openly discuss the knowledge they have acquired and talk about issues raised in the course of the discussion. Thus, the design of the course materials (student textbook and teacher guide) envisages active learning to be dominantly used. With this strategy, it is intended to help students understand the concepts through relevant, meaningful and concrete activities (Teacher's guide, 2010: III).

In relation to polynomial function of the first unit, the teacher's guide begins with discussing the concept of function and special types of function such as constant function, linear function and quadratic function which are special cases of the general class of polynomial function. It also provides students with definition of polynomial function and operations on polynomials like addition, subtraction multiplication and division of polynomial functions. The teacher may ask students to describe constant function, linear function and quadratic function which they studied in grade nine. After deliberation by students, the teacher may start a lesson by discussing the formal definition of constant,

linear and quadratic function given in the student textbook and illustrate with examples. The above discussions and examples indicate how the teacher's guide is interrelated deeply through active learning approaches. Moreover, the syllabus also emphasizes on the teaching /learning activities and the task of students. It also mentions that the task of the teacher is to facilitate in selecting and arranging the order of the problems as well as helping and motivating students to solve the problems by themselves in a planned and organized way (syllabus, 2010:232).But, the time allotted to each lessons is minimum and the content is also wide to implement active learning.

Finally, the statuses of active learning approaches are highly integrated with mathematics textbook, teacher's guide and syllabus.

4.1.3 Attitudes towards Active Learning

4.1.3.1 Teachers Attitude

To examine this question, 14 items were presented to the teachers followed by classroom observation and interviews. The results obtained appear in Table 4.9.

Table 4.7: teachers' attitudes towards active learning

No.	Attitude of teachers	Strongly Disagree (1)		Disagree (2)		Undecided(3)		Agree(4)		Strongly Agree(5)		Mean
		f	%	f	%	f	%	f	%	f	%	
1	I encourage students to reflect ideas during the implementation of active learning.	0	0	0	0	3	9.1	14	42.4	16	48.5	4.4
2	I try to create a competitive class room environment in solving mathematics exercises.	0	0	0	0	3	9.1	18	54.5	12	36.4	4.3
3	I prefer classes in which students are quite.	7	21.3	3	9.1	4	12.1	11	33.3	8	24.2	2.7
4	I motivate students to participate actively in my class.	0	0	0	0	3	9.1	12	36.4	18	54.5	4.5
5	I believe active learning enhances students' learning of mathematics.	0	0	1	3	2	6	16	48.5	14	42.5	4.3
6	Students dislike participating in mathematics classes.	3	9.2	11	33.3	11	33.3	4	12.1	4	12.1	3.2
7	I have lack of time to provide students with constructive feedback on their work.	2	6	8	24.3	7	21.3	14	42.4	2	6	2.8
8	Active learning offers students' opportunities for quick progress.	0	0	2	6	5	15	17	51.7	9	27.3	4
9	Giving feedback is impractical in large classes.	4	12.1	5	15	8	24.3	10	30.4	6	18.2	2.7
10	In active learning my responsibility is to facilitate students' learning.	0	0	4	12.1	4	12.1	19	57.6	6	18.2	3.8
11	When I teach mathematics, students mostly remain silent.	0	0	11	33.3	2	6	16	48.6	4	12.1	2.6
12	When students forward feedback, I react quickly.	1	3	4	12.1	4	12.1	16	48.5	8	24.3	3.8
13	Students do not participate in different activities in my mathematics classes.	4	12.1	9	27.3	5	15	13	39.4	2	6	3
14	I believe that mathematics classes at secondary school level should be teacher centered.	7	21.2	12	36.4	7	21.2	4	12.1	3	9.1	3.5
					Grand Mean = 3.5							

According to Table 4.7,(90.9% , mean 4.4) of teacher respondents encourage students to reflect ideas during the implementation of active learning and try to create a competitive class room environment in solving mathematics exercises. Moreover, 57.5% (24.2% and

33.3%, mean 2.7) of the respondents strongly agree and agree that they prefer classes in which students are quite.

As the data reveals, most of the respondents (mean 4) replied that active learning approach enhances students' learning of mathematics and offers students' opportunities for quick progress.

As can be seen in table 4.7, 48.4% (6 % and 42.4%, mean 2.8), of the teachers agree that they have lack of time to provide students with constructive feedback. Furthermore, they replied that, it is also impossible to give feedback in large classes.

As depicted in the above table, 75.8% (18.2% and 57.6%, mean 3.8) of the respondents facilitates students' learning rather than giving lectures. Moreover, they strongly believe that mathematics classes at secondary school level should be student centered.

Finally, the grand mean (3.5) indicates that the overall attitudes of the teachers towards the implementation of active learning approaches were positive.

During the interview session, the teachers were asked what they think about the gap encountered during mathematics classes, one of the interviewee, Ahmed Abdu who has taught mathematics for five years in secondary school has a personal communication:

> *"I have positive views on active learning approaches for mathematics teaching and yet do not implement this approach always as needed in my own classes for reasons like, large class size, shortage of time, the depth and breadth of the content and workload" .*
>
> *April14/2013*

4.1.3.2 Students Attitude

Table 4.8: students attitudes towards active learning

No.	Attitude of Students	Strongly Disagree(1)		Disagree(2)		Undecided(3)		Agree(4)		Strongly Agree(5)		Mean
		f	%	f	%	f	%	f	%	f	%	
1	I think group work encourages mathematical insight.	18	3.1	36	6.3	39	6.8	196	34	287	49.8	4.2
2	I have lack of interest in active learning approaches.	246	42.7	198	34.4	48	8.3	45	7.8	39	6.8	4
3	There is no time for reflection of our new knowledge.	84	14.6	225	39.1	141	24.5	78	13.5	48	8.3	3.6
4	I believe students learn mathematics more through repeated practice.	21	3.6	18	3.1	42	7.3	156	27.1	339	58.9	4.3
5	I prefer to be fine listener rather than discussing in a group.	72	12.5	132	22.9	114	19.8	132	22.9	126	21.9	2.8
6	It is possible to implement active learning in large classes.	114	19.8	202	35.1	98	17	98	17	64	11.1	2.6
7	I like working individually rather than in groups.	129	22.4	200	34.7	84	14.6	103	17.9	60	10.4	3.4
8	I always attend mathematics classes.	26	4.5	24	4.2	66	11.4	180	31.3	280	48.6	4.2
9	I have knowledge in implementation of active learning approaches.	16	2.8	78	13.5	189	32.8	215	37.4	78	13.5	3.5
10	I prefer to learn mathematics with lecture rather than participating in a group.	170	29.5	195	33.9	98	17	63	10.9	50	8.7	3.6
		Grand Mean = 3.6										

Table 4.8 shows that group work encourages mathematical insight (item1).This idea were supported by83.8% (49.8% and 34%, mean 4.2) of the respondents. Moreover, 77.1% (42.7% and 34.4%, mean 4)strongly disagree and disagree on the statement that most students have lack of interest in active learning approaches.

As the data reveals, most students (86%) replied that they learn mathematics more through repeated practice and also strongly agree (54.9%)that implementing active learning in large classes were difficult, this statement was also supported by interviewed

students. Moreover, 57.1% (22.4%and 34.7%, mean 2.3) of the respondents strongly disagree and disagree on the point that working mathematics problems individually rather than in groups respectively. But item 8 indicates, 79.9% (48.6% and 31.3%, mean value 4.2) attend mathematics classes regularly.

Regarding knowledge in implementation of active learning approaches 50.9% (37.4 and 13.5, mean 3.5) of the respondents support it. Nevertheless, 44.8% (22.9% and 21.9, mean 2.8) prefer to be fine listener rather than discussing in a group. To this end, the grand mean (3.6) also shows that students have positive attitudes toward the implementation of active learning approaches.

Table 4.9: students feeling when they get involved in active learning in mathematics classes

Students feeling when they get involved in active learning in mathematics classes	Very satisfied		Satisfied		Not satisfied		Un decided	
	f	%	f	%	f	%	f	%
	284	49.2	220	38.2	36	6.3	36	6.3

According to table 4.9, 49.2%, 38.2% of the respondents were very satisfied and satisfied when they got involved in active learning approaches in mathematics classes respectively. These percentages show that many students have a positive attitude towards active learning approaches.

4.1.4 The Support and Materials Provided to Implement Active Learning

Table 4.10: the extent to which students have access to textbook and reference book to implement active learning in mathematics classes

Students access to textbooks and reference books to implement active learning in mathematics classes	Very adequate		Adequate		Not adequate		Not very adequate		Not available	
	f	%	f	%	f	%	f	%	f	%
	72	12.5	242	42	180	31.3	47	8.2	35	6

According to table 4.10, 42% + 12.5% of the students replied that they have adequate text books and reference books to implement active learning approaches.

When students were asked to forward their suggestions during the interview session about the problems they face to implement active learning approaches in their mathematics classes. From grade 10 section E, Yordanos Hagos, has the following to say:

> *''In my mathematics classes there is no regular and continuous feedback given from the administration (Woreda and Sub city).In my suggestion every stakeholders should create awareness about active learning''.*
>
> *April16/2013*

4.1.5 Factors Affecting Implementation of Active Learning

In order to address this question, 12 items were presented to mathematics teachers.

Table4.11: factors that hinder the implementation of active learning approaches in some secondary schools

No.	Influencing factors which were viewed by teachers	Strongly Disagree (1)		Disagree (2)		Undecided(3)		Agree(4)		Strongly Agree(5)		Mean
		f	%	f	%	f	%	f	%	f	%	
1	Active learning approaches help me to manage my class room.	2	6	1	3	5	15	16	48.6	9	27.4	3.9
2	It is difficult to cover the daily lesson if students ask many questions.	4	12.1	7	21.2	8	24.3	7	21.2	7	21.2	3
3	Active learning approaches are difficult to implement in large classes.	4	12.1	3	9.1	3	9.1	11	33.4	12	36.3	2
4	There is adequate time to make students participate actively in my classroom.	6	18.3	7	21.2	1	3	14	42.5	5	15	3.2
5	The amount of content that has to be covered hinders the implementation of active learning in the classroom.	3	9.1	4	12.1	4	12.1	15	45.5	7	21.2	2.4
6	I think students have positive attitude towards active learning.	2	6	5	15	9	27.3	11	33.4	6	18.3	3.4
7	I think plasma lessons are convenient to implement active learning approaches.	7	21.2	4	12.1	6	18.2	13	39.4	3	9.1	3.1
8	Lack of resource hinders the implementation of active learning.	1	3	4	12.1	3	9.1	13	39.4	12	36.4	2.1
9	New mathematics student textbook and teacher's guide are suitable to implement active learning.	0	0	1	3	6	18.3	14	42.4	12	36.3	4.1
10	Involving students with active learning adds work load.	7	21.2	7	21.2	6	18.3	8	24.3	5	15	3.1
11	I feel that other subject teachers have positive attitudes towards group work.	0	0	2	6	12	36.4	12	36.4	7	21.2	3.7
12	I think that lack of administrative support like finance inhibits the implementation of active learning.	1	3	5	15	9	27.3	12	36.4	6	18.3	2.5
Grand Mean = 3												

Table 4.11 depicts that, most of the respondents strongly agree and agree in the statements that states factors that hinder the implementation of active learning

approaches. From the factors:- large class size 69.7% (33.4% and 36.3%, mean 2),the amount of content that has to be covered 66.7% (45.5% and 21.2%, mean 2.4) , lack of resource 75.8%(39.4% and 36.4%, mean 2.1), lack of administrative support and lack of finance54.7% (36.4% and 18.3%, mean 2.5).

As can be seen in table 11, 78.7% (42.4% and 36.3%, mean 4.1) of the teachers strongly agree and agree that new mathematics student textbook and teacher's guide are suitable to the implementation of active learning. They also strongly agree and agree that student centered approaches helps the teacher to manage the classroom condition (27.4% and 48.6%, mean 3.9).

During the interviews, sample teachers were asked the problems they experienced regarding the implementation of active learning approaches. The first interviewee, who has taught mathematics for 20 years, Merga Ayalew, has the following personal communication:

> *"I think many active learning approaches require group interaction. For groups, adaptive classroom environments with movable chairs and tables work better than fixed seats and tables. In my school, one of the problems that affect the use of active learning approaches is the classroom furnishing and layout, because the classrooms are filled with fixed seats and tables''.*
>
> *April20/2013*

Mesfin G/Medihin, also has the following personal communication:

> *"Theoretically active learning is very useful, but practically impossible for a number of reasons like large class size, work load of teachers, lack of teaching material, lack of interest and some complaints of both the teachers and students''.*
>
> *April 8/2013*

In order to answer the research question, 8 items were also presented to secondary school students.

Table 4.12: factors that hinder the implementation of active learning approaches

No.	Influencing factors which were viewed by students	Strongly Disagree(1)		Disagree(2)		Undecided(3)		Agree(4)		Strongly Agree(5)		Mean
		f	%	f	%	f	%	f	%	f	%	
1	Active learning approaches create disturbance or noise in classes.	100	17.3	180	31.3	126	21.9	90	15.6	80	13.9	3.2
2	There is enough time to implement active learning.	120	20.8	170	29.5	75	13	145	25.2	66	11.5	2.8
3	The amount of content that need to be covered hinders the implementation of active learning in mathematics class.	54	9.4	201	34.9	114	19.8	129	22.4	78	13.5	3
4	I think plasma lessons hinder the implementation of active learning approaches.	90	15.6	188	32.6	70	12.2	99	17.2	129	22.4	3
5	New mathematics textbook is suitable to implement active learning.	18	3.1	34	5.9	50	8.7	204	35.4	270	35.9	4.2
6	I think co-operative work contributes to efficient work in mathematics class.	15	2.6	51	8.9	39	6.8	207	35.9	264	45.8	4.1
7	I think lack of resource hinders the implementation of active learning.	66	11.5	120	20.8	75	13	159	27.6	156	27.1	2.6
8	The school administration observes the implementation of active learning approaches.	170	29.5	145	25.2	90	15.6	110	19.1	61	10.6	2.6
		Grand Mean = 3.2										

According to table 4.12, 48.6% (17.3% and 31.3%, mean 3.2) of the students strongly disagree and disagree on (item 1).For these students' active learning approaches do not create disturbance or noise in classes. But (50.3%) believe that there is lack of time to implement it. And, half of the student respondents (mean 3) replied that the amount of content that has to be covered and plasma lessons hinder the implementation of active learning in mathematics class. This information was confirmed by students who were interviewed.

Table 12 also depicts that most of the students 54.7% (27.6% and 27.1%, mean 2.6) strongly agree and agree respectively on item (7) that lack of resource hinders the implementation of active learning approaches. In the same table, (82.3% mean 4.2) of the respondents strongly agree that the approach in new mathematics textbook is suitable to implement active learning. In addition to this students (81.7%), strongly agree that cooperative work in groups is good for efficient learning (see item 6 of Table 4.12).

Regarding item 8, most of the students 54.7% (29.5% and 25.2%, mean 2.6) strongly disagree and disagree that school administration observes the implementation of active learning approaches. This indicates that school administrators were not committed to check the implementation of active learning approaches. Therefore, the task is entirely left for subject teachers.

4.2 Discussion of Results

In this part of the study the discussion of the results are presented in relation to the major research objectives of the study. Therefore, teachers use of active learning/ teaching methods in mathematics classes, major factors affecting the implementation of active learning approaches, attitudes of teachers and students towards the issue, the statuses of new mathematics textbook and teacher's guide, the adequacy of materials and the support they receive to implement active learning approaches. The discussion of the results is strengthened with reviews of literature that include views of scholars and other research findings.

4.2.1The practice of Active Learning

To assess the extent to which student centered/active learning approach has been practically exercised in government secondary schools of Addis Ababa city and substantiate the data the respondents reacted through questionnaire, interview and observation was the primary concern of this study.

The result of this study indicates the extent to which secondary school teachers (54.5%) and students (48.8%) implement active learning approaches is moderate. Accordingly, most of the students (46.6%) give a very high value and teachers (51.6%) give a moderate value. However, during their interview session they gave a high value for active

learning approaches in mathematics classes. As the data also shows, the majority of teachers arrange students in group for mathematics team work.

Table4.3 also shows that the majority of the sample teachers thought that a well prepared lecture could stimulate students to solve mathematics problems

Furthermore, active learning/student-centered approaches such as the inquiry method, group work and peer teaching which foster the critical thinking and problem-solving capacity of students were widely employed. In active learning classrooms, students are engaged in activities like dialogue, debate, writing, discussion and problem solving as well as higher order thinking such as analysis, synthesis and evaluation. Table 4.3 shows that discussion between students increases their problem solving skill. The discussion method develops higher level thinking skills (McConnell, 2005:36). Pairs or larger groups of students working together represent the most effective form of interaction (Mayer, 2005:37-38). When students work in pairs or larger groups, one person is listening while the other partner is discussing the question under investigation. The second group of respondents i.e. students were asked 12 items to know their current practice during mathematics classes. According to table 4.2, most of the students did their class work, homework and project work but there was shortage of time to complete all of the tasks. Even if students want to discuss with their group members, arrangement of chairs and tables were not suitable for this purpose.

4.2.2 Student Textbook and Teacher's Guide

Well prepared texts often provide important structural frame work for much of what goes in the classroom. They have a very great power to attract learners toward learning and teachers to teach all activities. The way the textual materials are written; their appearance, their content and the way they arranged, and the illustrations all affect the quality of the book (MOE, 1989:6). If textbooks have good quality, students will be motivated towards learning. On the contrary, if textual materials are not constant and logically ordered and arouse only shallow interest, students will be left with insufficient knowledge of the subjects (MOE, 1989:6). According to the literature review explained above, textbooks should be published in relation to active learning approaches. So, the

documentary analysis shows that the new grade 10 mathematics and teacher's guide were published based on active learning approaches.

4.2.3 Teachers Attitude towards Active learning

The main intention here is that there is a strong tie between teachers' attitude and their effort to implement or practice active learning approaches. Different educators also argued that teacher's attitudes affect the effectiveness of the implementation of active learning (Zan& Martino, 2007:157-168; Lea et al., 2003: 321-334).So in order to implement active learning, the implementers should develop the necessary positive attitude towards student centered methods. To this end,14 items were presented for the teachers to assess their attitude towards active learning in mathematics classes .In the findings, it was appeared that, the majority of the teachers create competitive classroom environment and encourage students to reflect their ideas as well as motivating them to participate actively in a group. They also believe that active learning offers students' opportunities for quick progress (Table 4.7).

As depicted in the study, most teachers (57.6%) believed that mathematics classes at secondary school level should not be teacher centered. During the interview, they seriously criticized their tendency to teacher centered approach.

Similarly, literature review shows that, active learning approaches demand teachers not only to be experts in their fields, but also in their understanding of how students learn. Without such understanding, it is not easy to motivate teachers to participate in active learning/student- centered approaches (Derebssa, 2006:136).

In general, it may be conclude that there are indications that teacher's attitude have a positive relation with success in teaching.

4.2.4 Students' Attitude towards Active learning

Effective implementation of active learning approaches enables students to acquire deep understanding of mathematical concepts and problem-solving skills which are essential to identify and tackle real problems employing appropriate mathematical methods.

Literature review indicates that, Mathematics students' interests and attitudes towards active learning affect their learning (NCTM, 2000:37). If active learning is properly implemented in mathematics classes, students become successful in their learning.

As the findings depicts in table 4.8, almost all(83.8%) of the respondents had a positive attitude towards group work and are interested to learn mathematics through repeated practice with their group members.

As can be seen in table 4.9, (87%) of the students were satisfied when they got involved in active learning in mathematics classes. This data indicates they have knowledge of implementing the approaches.

However, interviewees indicate that, some students preferred to sit passively and listen to lecturers rather than being actively involved in activities they view teachers as spoon-feeders. These findings are consistent with the findings of other authors. For example, some students wish others would do the work for them. These kinds of students prefer traditional /lecture-centered methods which emphasis imitation, practice, feedback on success and habit formation (Steckol, 2007:24-25).

4.2.5The Support and Materials Provided to Implement Active Learning

Mukalel (1998) states that teaching materials play a major role in effective teaching practices, in that these materials have a multi-dimensional function to perform. This implies that the nature and quality of the teaching materials considerably affect the learning process in the classroom and the achievement of the learners whatever creative and resourceful the teacher may be. Similarly, Temesgen Engida (2002) in his research commented that lack of appropriate and relevant activities in the curricular materials was found as one of the factors that aggravate the already existing problem in the Ethiopian situation to implement active learning.

The data presented in table 4.10 revealed that, students had adequate number of textbooks and reference books to implement active approaches in mathematics classes. During interview session students replied that there were no regular support and feedback given

from the administrations which includes the Woreda and Sub city administrations and other stakeholders.

4.2.6 The Major Factors Influencing the Implementation of Active Learning Approaches

According to Table 4.9 and 4.10, many teachers and students believe that lack of classroom space and large classes minimize group work. In addition, the following factors prevent active learning from being implemented appropriately. These are:- lack of time to actively involve students in teaching, rigidity of the time table, the amount of content to be covered, lack of resources, lack of instructional materials and lack of administrative support. All the above constraints were confirmed by the interviewees.

Furthermore, as mentioned in the literature review, the role of the students in active learning/student-centered approaches is learning by doing. So as to engage students in learning activities, the classroom should be well equipped with furniture and there should be movable desks for every student to use in different layouts in the classroom. As described by Arias and Walker (2004:311-329), the activity may require the students to move around the classroom. Therefore, the classroom setup should be conducive for learning and the teacher should stimulate learning through different methods such as problem solving and cooperative learning. From this point of view, the arrangement of desks and tables should allow movement and should be changed whenever necessary. The data obtained from classroom observation also show that the classroom seating (the front to back arrangement) does not allow teachers to employ active learning approaches. The desks and tables in most of the classrooms were heavy and could not easily be moved. In addition to this, content coverage was a high priority for teachers, especially for mathematics teachers as they are expected to have more exercise and problems. Although some teachers indicated that they covered some or most content with active learning approaches, other adopters of active learning approaches indicated that they covered less content when they teach with active learning. During interview session both groups of respondents replied that teachers' focus is on portion coverage. They think that applying active learning now and then would hinder them from covering portion as scheduled by the school.

Interviewees also indicate that one of the factors that influence the implementation of active learning approach is interpersonal relationships or interactions among individuals. Active learning/student-centered approaches are characterized by "empathic, supportive relationships which free students to discuss their feelings and experiences" so that students are "actively involved in learning through the given opportunities to predict, infer, generalize, and evaluate" (Duffy & Kirkley, 2004:44). The data presented in table 4.11 reveals that, Plasma lessons also hinders the implementation of active learning approaches because it uses almost half of the given time in one period but the researcher observed that most of the teachers have not used it yet.

The curricular materials and classroom environment were also factors that played a role. As mentioned in the literature review, in adequate funds of schools, lack of parent and community support, and insufficient salaries are examples of those factors (Bradley 1995).

CHAPTER FIVE

5. SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

The primary objectives of this study was to assess the status and implementation of active learning approaches, the implementation of the new mathematics textbook and teacher's guide, teachers and students attitude towards active learning, the support and materials provided in the implementation of active learning and identifying the major factors in implementing active learning approaches in some government secondary schools of Addis Ababa city.

In order to achieve the above objectives the following basic research questions were formulated:

1. To what extent are active learning approaches implemented in mathematics instruction in some secondary schools of Addis Ababa?
2. What are the status of new mathematics textbook and teacher's guide towards the implementation of active learning?
3. What are the attitudes of secondary school teachers towards active learning /student centered approaches?
4. What are the attitudes of secondary school students towards active learning approaches?
5. What support, conditions and material are provided for the implementation of active learning approaches in grade ten mathematics classes?
6. What are the major factors/challenges in implementing active learning approaches in some secondary schools of Addis Ababa?

In the academic year 2012/13 there were 56 government secondary schools in Addis Ababa. Thus, twelve secondary schools were selected randomly. Furthermore, a total of 10 teachers and 30 students were selected for the pilot study using purposive sampling. To this end, 33 representative sample teachers were selected using simple random sampling and 576 students were selected using systematic random sampling technique for the final study.

Questionnaires, observations, interviews and documents were used as means of data gathering instruments. The questionnaire items were tested in the pilot study and some necessary adjustments have been performed to improve their validity and reliability. The reliability of the pilot study was tested by cronbach alpha. The researcher has found the overall reliability of attitude scale of the teachers (0.81) and students (0.80).

The quantitative data were analyzed using frequency, percentage and mean values. Also, qualitative analyses were done. Finally, the analysis yielded the following results:

1) The practices of active learning approaches in secondary schools of Addis Ababa were found to be moderate.(Grand mean =3.9 out of 5)

2) The new mathematics textbook and teacher's guide were implement active learning approaches. (See section 4.1.2.1 and 4.1.2.2)

3) The majority of teachers and students had positive attitude towards active learning.

4) The overall supervision, technical and material support of the administrations and other stakeholders were very low.

5) Large classroom size, arrangement of chairs and tables and width of contents were found to be the major factors that affect the implementation of active learning approaches in mathematics classes.

5.2 Conclusions

Based on the major findings of the study, the following conclusions were drawn:

- The mathematics teachers and students moderately apply active learning approaches in their classrooms.
- The status of the new mathematics textbook and teacher's guide were found to be suitable for the implementation of active learning approaches.
- In spite of different factors, both groups of respondents, namely, teachers and students witnessed that they have developed positive attitude towards active learning instructional approaches.
- The lack of support of the administrations including (Woreda and Sub city) education departments in providing instructional materials, supervisions and finance adversely affects the implementation of active learning approaches.
- Shortage of time, workload of teachers and some complaints of both the teachers and students were the major drawbacks to implement active learning approaches.

5.3 Recommendations

Based on the findings of the study and the conclusions drawn, the following recommendations are formulated:

- To ensure students' effective learning of mathematics, teachers ought to motivate students involve in their own learning by employing variety of instructional strategies in the classroom that make students active participants.
- The status and implementation of active learning approaches are related to the student textbook and teacher's guide but some teachers and students complain in the implementation of the approaches. To alleviate those implementation problems, the width of the content need to be minimized and the time given to practice classroom activities need to be maximized.
- Even if teachers have positive attitude towards active learning, the efforts were not as expected. Therefore, to increase their efforts to maximum level, teachers should not be assigned to teach more than 12 credit hours in a week because they cannot effectively carry out active learning instructional approaches with high work load by its very nature. In line with this, students should also develop the habits of working in groups.
- The overall technical and material supports of the administration towards the implementation of active learning approaches are very low. Therefore, to minimize those problems, the school administrators, supervisors including Woreda and Sub city and other stakeholders should be oriented to the implementation of active learning and give various forms of supervisory guidance to teachers and students.
- The classroom seating arrangement does not allow teachers to employ active learning approaches. It could have been better if all of them were arm chairs. In addition, MOE could prepare less bulky content and allocate sufficient implementation time in accordance to the regular academic calendar.
- Further research is needed to examine the causes, effects and solutions of the status and implementation of active learning approaches in mathematics classes.

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APPENDIX-A

Addis Ababa University College of Education and Behavioral Studies
Department of Science and Mathematics Education

Teachers' Questionnaire

Dear, Teachers,

This questionnaire is designed to collect information about the status and implementation of active learning approaches in your school.

The information is going to be used only for research to be under taken in Addis Ababa government secondary schools. Therefore, your assistance, co-operative and genuine responses are valuable to complete the study.

No need of writing your name.

Thank you for your genuine response.

Back ground Information

a) **Location:** Sub City _____ Wereda_____

School _____

b) **Sex:** Male ☐ Female ☐

c) **Age:** 29 years and below ☐

30-39 years ☐

40-49 years ☐

50 years and above ☐

d) **Experience in teaching mathematics:**

Less than one year ☐ 6-10 years ☐

1-5 years ☐ 11-15 years ☐

More than 15 years ☐

e) **Education qualification:**

Diploma (10+3/12+2) ☐

Degree (BED/BSC) ☐

Masters (MED/MSC) ☐

f) **Average number of students in your classes':**

40 and less ☐ 51-60 ☐

41-50 ☐ More than 60 ☐

Part- One

Direction: - Please respond to the following questions by writing a complete answer on the space provided or by circling the letter of your choice.

1. How many periods do you teach in a week? _____

2. Do you think the number of periods you teach in a week has any impact on implementing active learning approaches? A) Yes B) No

3. If your answer on question number 2 is 'yes' explain how? _____

_____

4. How do you rate the value of teaching mathematics through active learning?

A) Very high B) High C) Moderate D) Low E) Very low

5. How often do you implement active learning in your mathematics classes?

A) Always B) Sometimes C) Rarely D) Not at all

Part -Two

Direction: To each of the following item, focus on the teaching of mathematics and the problems teachers experience in this regard. The meaning of the numbers is shown below.

1 = Strongly disagree **3 = Undecided** **5 = Strongly agree**

2 = Disagree **4 = Agree**

No.	Section I: Teaching methods	Scale
1	I arrange students into groups for mathematics team work.	1 2 3 4 5
2	I think teachers dominated classes are the best way to teach students to solve mathematics problems.	1 2 3 4 5
3	I encourage students to ask questions.	1 2 3 4 5
4	Variable teaching methods are not suitable to implement active learning approaches in mathematics classes.	1 2 3 4 5
5	I discourage students to explore their current beliefs.	1 2 3 4 5
6	I discuss mathematics worksheet results with students.	1 2 3 4 5
7	I think a well-prepared lecture can stimulate students to solve mathematics problems.	1 2 3 4 5
8	I think that inquiry learning is effective to involve students in mathematics classes.	1 2 3 4 5
9	Active learning approaches are not suitable to students.	1 2 3 4 5
10	I often make students feel comfortable while they solve problems.	1 2 3 4 5
11	I think that the approaches in the new mathematics book do not invite students to make discussion.	1 2 3 4 5
12	I encourage students to deduce general principles from practical experience.	1 2 3 4 5
13	I encourage students to forward their opinion about active learning approaches.	1 2 3 4 5
14	I think that discussions between students in mathematics classes create disturbance.	1 2 3 4 5

No.	Section II: Influencing factors	Scale
1	Active learning approaches help me to manage my class room.	1 2 3 4 5
2	It is difficult to cover the daily lesson if students ask many questions.	1 2 3 4 5
3	Active learning approaches are difficult to implement in large classes.	1 2 3 4 5
4	There is adequate time to make students participate actively in my classroom.	1 2 3 4 5
5	The amount of content that has to be covered hinders the implementation of active learning in the classroom.	1 2 3 4 5
6	I think students have positive attitude towards active learning.	1 2 3 4 5
7	I think plasma lessons are convenient to implement active learning approaches.	1 2 3 4 5
8	Lack of resource hinders the implementation of active learning.	1 2 3 4 5
9	New mathematics student textbook and teacher's guide are suitable to implement active learning.	1 2 3 4 5
10	Involving students with active learning adds workload.	1 2 3 4 5
11	I feel that other subject teachers have positive attitudes towards group work.	1 2 3 4 5
12	I think that lack of administrative support like finance inhibits the implementation of active learning.	1 2 3 4 5

No	Section III: Attitudes of teachers	Scale
1	I encourage students to reflect ideas during the implementation of active learning.	1 2 3 4 5
2	I try to create a competitive classroom environment in solving mathematics exercises.	1 2 3 4 5
3	I prefer classes in which students are quite.	1 2 3 4 5
4	I motivate students to participate actively in my class.	1 2 3 4 5
5	I believe active learning enhances students' learning of mathematics.	1 2 3 4 5
6	Students dislike participating in mathematics classes.	1 2 3 4 5
7	I have lack of time to provide students with constructive feedback on their work.	1 2 3 4 5
8	Active learning offers students' opportunities for quick progress.	1 2 3 4 5
9	Giving feedback is impractical in large classes.	1 2 3 4 5
10	In active learning my responsibility is to facilitate students' learning.	1 2 3 4 5
11	When I teach mathematics, students mostly remain silent.	1 2 3 4 5
12	When students forward feedback, I react quickly.	1 2 3 4 5
13	Students do not participate in different activities in my mathematics classes.	1 2 3 4 5
14	I believe that mathematics classes at secondary school level should be teacher centered.	1 2 3 4 5

APPENDIX-B

Addis Ababa University College of Education and Behavioral Studies
Department of Mathematics Education

Students' Questionnaire

Dear, Students,

This questionnaire is designed to collect information about the status and implementation of active learning approaches in mathematics classes.

The information is going to be used only for research to be under taken in Addis Ababa government secondary schools. Therefore, your assistance, co-operative and genuine responses are valuable to complete the study.

No need of writing your name

Thank you for your genuine response

Back ground Information

a) **Location :** Sub city_____ Wereda_____

School _____

b) **Sex :** Male ☐ Female ☐

c) **Age** _____

d) **Grade level you are currently learning** _____

Part- One

Direction: Please respond to the following questions by circling the letters of your choice or by writing a complete answer whenever it is necessary.

1. How many mathematics periods do you have in a week? _____

2. Do you think the number of periods in a week have any impact on implementing student centered/active learning approaches/? B) Yes B) No

3. If your answer on question number 2 is "yes" explain how? _____

_____

4. What do you feel when you get involved in active learning in mathematics classes?

A) Very satisfied B) Satisfied C) Not satisfied D) Undecided

5. If your answer to question number 4 is "Not satisfied", explain why? _____

_____

6. To what extent do students have access to text books and reference books to implement active learning in mathematics classes?

A) Very adequate B) Adequate C) Not adequate D) Not very adequate E) Not Available

If any other, specify

_____

_____

Part -Two

Direction: To each of the following item, focus on the learning of mathematics and the problems that you experience in this regard.

The meaning of the numbers is shown in the table below.

1 = Strongly disagree **3 = Undecided** **5 = Strongly disagree**

2 = Disagree **4 = Agree**

No.	Section I : Current Practice	Scale
1	I do my homework regularly.	1 2 3 4 5
2	I bring all my learning materials in mathematics classes.	1 2 3 4 5
3	I do not always actively participate in my mathematics classes.	1 2 3 4 5
4	I do assignments and project work.	1 2 3 4 5
5	I always be seated in the same seat.	1 2 3 4 5
6	I do not work sheet papers.	1 2 3 4 5
7	Group discussion helps me to solve mathematics problems.	1 2 3 4 5
8	Arrangement of chairs and tables are not suitable for the implementation of active learning.	1 2 3 4 5
9	I have lack of time to complete my class work.	1 2 3 4 5
10	I have a good idea in implementing active learning approaches.	1 2 3 4 5
11	An active learning approach helps me in constructing new knowledge.	1 2 3 4 5
12	I do not prefer to discuss mathematics problems which have risen by group members.	1 2 3 4 5
No.	**Section II : Influencing Factors**	**Scale**
13	Active learning approaches create disturbance or noise in classes.	1 2 3 4 5
14	There is lack of time to implement active learning.	1 2 3 4 5
15	The amount of content that need to be covered hinders the implementation of active learning in mathematics class.	1 2 3 4 5
16	I think plasma lessons hinder the implementation of active learning	1 2 3 4 5

	approaches.	
17	New mathematics textbook is suitable to implement active learning.	1 2 3 4 5
18	I think co-operative work contributes to efficient work in mathematics class.	1 2 3 4 5
19	I think lack of resource hinders the implementation of active learning.	1 2 3 4 5
20	The school administration observes the implementation of active learning approaches.	1 2 3 4 5
No.	**Section III: Attitude of students**	**Scale**
21	I think group work encourages mathematical insight.	1 2 3 4 5
22	I have lack of interest in active learning approaches.	1 2 3 4 5
23	There is no time for reflection of our new knowledge.	1 2 3 4 5
24	I believe students learn mathematics more through repeated practice.	1 2 3 4 5
25	I prefer to be fine listener rather than discussing in a group.	1 2 3 4 5
26	It is impossible to implement active learning in large classes.	1 2 3 4 5
27	I like working individually rather than in groups.	1 2 3 4 5
28	I always attend mathematics classes.	1 2 3 4 5
29	I have lack of knowledge in implementation of active learning approaches.	1 2 3 4 5
30	I prefer to learn mathematics with lecture rather than participating in a group.	1 2 3 4 5

APPENDIX-C

አዲስ አበባ ዩኒቨርስቲ ሥነ-ትምህርትና ጠባይጥናት ኮሌጅ የሳይንስና ሂሳብ ትምህርት ክፍል

የተማሪ መጠይቅ

ውድ ተማሪዎች!

ይህ መጠይቅ የተዘጋጀው በሂሳብ ክፍለ ጊዜ መምህራን ተማሪ ተኮር የማስተማር ዘዴን / Active learning / ለመተግበር በሚያደርጉት ጥረት ተማሪዉ ያለዉን የትምህርት አቀራረብ፣ ደረጃውንና አተገባበሩን በተመለከተ ያለዉን ሀሳብና የሚስጠዉን መረጃ ለመሰብሰብ ነው። መረጃው የተማሪ ተኮር / Active learning / አተገባበር አዲስ አበባ በሚገኙ የመንግስት ሁለተኛ ደረጃ ት/ቤቶች ምን እንደሚመስል ለማጥናት በመሆኑ እናንተ ተማሪዎች የምትሰጡዋቸው ትክክለኛ መልሶች ለጥናቱ ትልቅ ዋጋ ያላቸውና ጠቃሚዎች ናቸው።

በቅድሚያ ስለትብብራችሁ ከልብ እያመሰገንኩ መጠይቁን ስትመለከቱ ሁልጊዜ የሂሳብ ክፍለ ጊዜን ብቻ እንድታስቡ እጠይቃለሁ።

ስምመፃፍ አያስፈልግም።

<u>ማሳሰቢያ</u>፡- ከዚህ በታች የተገለጸውን ስለ ተማሪ ተኮር (Active learning) የማስተማር ዘዴ አጠር ያለማብራሪያ በቅድሚያ ይመልከቱ።

ተማሪተኮር የመማር ማስተማር ዘዴ ማለት ተማሪው ከመምህሩ የእለቱ ትምህርት ትውውቅ ከተደረገለትና የሚሰራውን ስራ አቅጣጫ ከተቀበለ በኋላ የቀድሞ እውቀትን በመጠቀም እና በመመራመር የተግባር ልምምድ የሚያደርግበት፣ የሂሳብ ፕሮብሌሞችን ለመፍታት የሚንቀሳቀስበት እንዲሁም ከክፍለ ጊዜው አብዛኛውን ጊዜ በራሱ የሚሰራበት የመማር ዘዴ ነው።

አጠቃላይ መረጃ

ሀ. አድራሻ ክፍለ ከተማ_____ ወረዳ _____

ት/ቤት_____

ለ. ፆታ ወንድ ☐ ሴት ☐

ሐ. ዕድሜ _____

መ. አሁን የምትማርበት/የምትማሪበት የክፍል ደረጃ _____

ክፍል አንድ

መመሪያ:- እባክህ/ሽ/ ለሚከተሉት ጥያቄዎች ከቀረቡልህ/ሽ ምርጫ መካከል መልሱን የያዘውን ፊደል በማክበብ መልስ/ሺ/:: በጽሁፍ መመለስ አስፈላጊ ከሆነ በተሰጠው ባዶ ቦታ መልስህን/መልስሽን/ ፃፊ::

1. በሳምንት ስንት የሂሳብ ክ/ጊዜ አለህ/ሽ/? _____

2. በሳምንት የተመደበው የክፍለ ጊዜ ብዛት ተማሪ-ተኮር /Active Learning/ የማስተማር ዘዴ በሥራ ላይ ለማዋል ተጽዕኖ አለው ብለህ/ሽ/ ታስባለህ/ሽ/? ሀ/ አዎ ለ/የለም

3. ለተራ ቁጥር 2 ጥያቄ መልስህ/ሽ/ አዎ ከሆነ እንዴት? አብራራ/ሪ/:: _____
_____
_____

4. ተማሪ-ተኮር የማስተማር ስነዘዴ ሂሳብ ትምህርትን ለመማር ያለውን ጠቀሜታ እንዴት አድርገህ/ሽ/ ትለልፀዋለህ/ሽ/?

ሀ/ በጣም ከፍተኛ ለ/ ከፍተኛ ሐ/መካከለኛ መ/ ዝቅተኛ ሠ/ በጣም ዝቅተኛ

5. ተማሪ-ተኮር የማስተማር ስነ ዘዴ በሂሳብ ክ/ጊዜ ምን ያህል ጊዜ ይተገበራል?

ሀ/ ሁልጊዜ ለ/ አልፎ አልፎ ሐ/በጣም በትንሹ መ/ አይተገበርም

6. በተማሪ-ተኮር የማስተማር ዘዴ በሚሰጥ የሂሳብ ትምህርት ውስጥ ተሳታፊ ስትሆን ምን ይሰማሀል?

ሀ/ በጣም ርካታ ለ/ ርካታ ሐ/ አልረካም መ/መወሰን አልችልም

7. ለተራቁጥር 6 ጥያቄ መልስህ/ሽ/ አልረካም ከሆነ ለምን? ግለጽ/ጪ/ _____
_____
_____

8. አንተ/አንቺ እስከ ምን ድረስ ነው መመሪያ መጽሐፍትንና አጋዥ መጽሐፍትን የማግኘት ዕድልህ/ሽ/ እነዚህንም በተማሪ ተኮር /Active Learning/ የሂሳብ ትምህርት አሳጣጥ ወቅት የምትጠቀምበት/ሚበት?

ሀ/ በጣም በቂ ነው ለ/ በቂ ነው ሐ/ በቂ አይደለም መ/ በጣም በቂ አይደለም

ሠ/ ማግኘት አይቻልም

ሌላ መልስ ካለህ/ሽ/ ዘርዝረው/ሪው/_____
_____
_____

ክፍል ሁለት

መመሪያ፡- ለሚከተሉት የጥያቄ ዓይነቶች መልስ ስትሰጥ/ጭ/ የሂሳብ ትምህርት ስትማር/ሪ/ ያጋጠመ ሁኔታዎችና ችግሮች ያለህን/ሽን/ ልምድ ታሳቢ በማድረግ ይሆናል፡፡
እያንዳንዱ ቁጥር የሚወክለውመልስ እንደሚከተለው ይሆናል፡፡

1= በጣም አልስማማም 3=ለመወሰን እቸገራለሁ
2= አልስማማም 4= እስማማለሁ 5=በጣም እስማማለሁ

ተ.ቁ.	ንዑስ ክፍል1፡- አሁን ያለው የትምህርት ሁኔታ	መመዘኛ
1	የቤት ሥራዬን አዘውትሬ እሰራለሁ፡፡	1 2 3 4 5
2	ሁሉንም የመማሪያ ቁሳቁሶች በሂሳብ ክ/ጊዜ ይገር እገኛለሁ፡፡	1 2 3 4 5
3	ሁልጊዜ በሂሳብ ክፍለጊዜ በንቃትለመሳተፍእቸገራለሁ፡፡	1 2 3 4 5
4	በመምህራን የሚሰጡትን ሌሎች ሥራዎች አከናውናለሁ፡፡	1 2 3 4 5
5	ሁልጊዜ በተመሳሳይ መቀመጫ ላይ እቀመጣለሁ፡፡	1 2 3 4 5
6	የሂሳብ መለማመጃ ጥያቄዎችን /Work Sheet/ አዘውትሬአልሰራም፡፡	1 2 3 4 5
7	የቡድን ውይይት የሂሳብ ጥያዌዎችን መመለስ እንድችል ይረዳኛል፡፡	1 2 3 4 5
8	የተማሪዎች መቀመጫና ማስደገፊያ አቀማመጥ ተማሪ-ተኮር /Active Learning/ የማስተማር ዘዴን ለመተግበር ምቹ አይደለም፡፡	1 2 3 4 5
9	የክፍል ሥራዬን ለመጨረስ የጊዜ እጥረት ያጋጥመኛል፡፡	1 2 3 4 5
10	የተማሪ-ተኮር የትምህርት አሰጣጥ ዘዴን ለመተግበር የሚያስችለኝ አቅም አለኝ፡፡	1 2 3 4 5
11	የተማሪ-ተኮር ማስተማሪያ መንገድ አዲስ ዕውቀት ለመገንባት ይረዳኛል፡፡	1 2 3 4 5
12	ተማሪዎች በሚያነሱዋቸው/በሚያመጡዋቸው/ የሂሳብ ፕሮብሌሞች ላይ ውይይት ማድረግን አልመርጥም፡፡	1 2 3 4 5
ተ.ቁ.	ንዑስ ክፍል 2፡- ተጽዕኖ ዓምጪ ምክንያቶች	መመዘኛ
13	ተማሪ-ተኮር /Active Learning/ የማስተማር ዘዴ በክፍል ውስጥ ረብሻና ጫጫታ ይፈጥራል፡፡	1 2 3 4 5
14	ተማሪ-ተኮር /Active Learning/ ለመተግበር የጊዜ እጥረት የለም፡፡	1 2 3 4 5
15	በዓመቱ የት/ጊዜ መሸፈን የሚገባው የትምህርት ይዘት መጠን ተማሪ-ተኮር /Active Learning/ በሂሳብ ክፍል ለመተግበር አያስችልም፡፡	1 2 3 4 5
16	የፕላዝማ ትምህርት ዝግጅት ተማሪ-ተኮር /Active Learning/ ለመተግበር አያስችልም፡፡	1 2 3 4 5
17	አዲሱ የሂሳብ መማሪያ መጽሀፍ ይዘት ተማሪ-ተኮር /Active Learning/ ለመተግበር ያስችላል፡፡	1 2 3 4 5
18	የትብብር ሥራ በክፍል ውስጥ የሚሰጡ ሥራዎችን በበቂ ሁኔታ ለመሥራት አስተዋጽኦ ያደርጋል፡፡	1 2 3 4 5
19	የቁሳቁስና የገንዘብ እጥረት ተማሪ-ተኮር የማስተማር ዘዴ /Active Learning/ ለመተግበር ዕንቅፋትይፈጥራል፡፡	1 2 3 4 5
20	የትምህርት ቤቱ አስተዳደር ተማሪ-ተኮር /Active Learning/ የማስተማር ዘዴ ሲተገበር ምልከታ ያደርጋል፡፡	1 2 3 4 5
ተ.ቁ.	ንዑስ ክፍል 3፡- ዝንባሌ	መመዘኛ
21	የቡድን ሥራ ለሂሳብ ትምህርት ዕይታን ለማስፋትና ለመገንዘብ ይረዳል ብዬ አስባለሁ፡፡	1 2 3 4 5
22	በተማሪ-ተኮር /Active Learning/ የማስተማርዘዴዎች የመማር ፍላጎት የለኝም፡፡	1 2 3 4 5
23	አዲስ ያገኘሁትን ዕውቀት መልሼ ለማንፀባረቅ በቂ ጊዜ የለኝም፡፡	1 2 3 4 5
24	ሂሳብን ለመማር ተደጋጋሚ ልምምድ ማድረግ ይረዳኛልብዬ አምናለሁ፡፡	1 2 3 4 5
25	በቡድን ውይይት ከመሳተፍ ይልቅ ማዳመጥን እመርጣለሁ፡፡	1 2 3 4 5
26	የተማሪውቁጥር ብዘ ብሆነበት ክፍል ተማሪ-ተኮር /Active Learning/ ለመተግበር ያስችላል፡፡	1 2 3 4 5
27	በበቡድን ከሌሎች ጋር ከመስራት ይልቅ በግሌ መሥራትን እመርጣለሁ፡፡	1 2 3 4 5
28	የሂሳብ ክፍለ ጊዜን አዘውትሬ እከታተላለሁ፡፡	1 2 3 4 5
29	ተማሪ-ተኮር /Active Learning/ የማስተማር ዘዴ ለመተግበር በቂ ዕውቀት አለኝ፡፡	1 2 3 4 5
30	እኔ እየተሳተፍኩ ከመማር ይልቅ መምህሬ ክፍለ ጊዜውን በሙሉገለፃ ቢያደርጉ በደንብ ይገባኛ ል፡፡	1 2 3 4 5

APPENDIX-D

BASIC GUIDING INTERVIEW QUESTIONS TO TEACHERS

1. For how long you have been teaching mathematics?
2. What are your personal views on active learning?
3. Explain how you implement active learning approaches in your mathematics classes?
4. What problems do you experience regarding the implementation of active learning approaches?
5. What do you think is the solution of those problems you have mentioned?
6. Teachers sometimes have positive views on active learning approaches for mathematics teaching and yet do not implement this approach in their own classes, what do you think is the reason?
7. What do you recommend that will enable teachers to implement active learning approaches in their mathematics classes?
8. Is there anything you would like to add?

APPENDIX-E

BASIC GUDING INTERVIEW QUESTIONS TO STUDENTS

1. Do you implement active learning approaches in your mathematics classes?
2. What are your personal views on active learning?
3. How do you implement active learning approaches in your mathematics classes?
4. What problems do you experience regarding the implementation of active learning approaches?
5. What do you think the solution of those problems?
6. What do you recommend that will enable students/teachers to implement active learning in their mathematics classes?
7. Is there anything you would like to add?

APPENDIX-F

OBSERVATION

Classroom Observations

Name of the school_____ Code of the teacher_____

Grade and section_____ Date of observation_____

Lesson topics _____

Period _____ Time, _____To_____

A/ Rating scale: 1= Not at all 3= Frequently

2= Rarely

No.	Instructional Consideration	1	2	3
1	How often the teacher implements active learning approaches in lesson presentation?			
2	How often the teacher uses group activities for collaborative learning?			
3	How often the teacher guides the students during group work?			
4	How often the teacher asks questions to check whether the students understand the lesson or not?			
5	How often the teacher uses different instructional methods and techniques in lesson presentation?			
6	How often the teacher goes round the class and look at the learners' activity?			
7	How often the teacher uses instructional aides which are appropriate to the lesson?			
8	How often the teacher relates the lesson to the students' real life situation?			
9	How often the teacher gives feedback to students' work?			

B/ Check List

No.	Lesson Presentation Variables	Yes	No
1	Did the teacher has the weekly or daily lesson plan with him / her?		
2	Is the lesson plan match with actual presentation of the lesson?		
3	Did the teacher specify the objectives of the lesson clearly?		
4	Did the teacher check the previous homework?		
5	Did the teacher revise the previous lesson before starting the new lesson?		
6	Did the teacher check arrangement of chairs and tables?		
7	Did the teacher encourage the students to use the textbook in the class room?		
8	Did the teacher give class work, homework and assignment?		
9	Did the teacher summarize the main points of the lesson?		
10	Did the teacher evaluate students work?		