



**ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES**

**EVALUATION OF THE IMPLEMENTATION OF
GRADE NINE MATHEMATICS SYLLABUS IN ADDIS ABABA
ADMINISTRATIVE REGION**

**A THESIS SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES OF
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**BY
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SCHOOL OF GRADUATE STUDIES

*Evaluation of the Implementation of
Grade Nine Mathematics Syllabus in Addis Ababa Administrative Region*

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ABSTRACT

This study was intended to evaluate the implementation of grade 9 mathematics syllabus in selected secondary schools of Addis Abba looking at whether or not the schools are in line with the demands of the syllabus, teachers' use of instructional guidelines as required and students' behavioral development towards learning mathematics as a result of the implementation process.

To this end, 40 grade 9 mathematics teachers, 142 students taught by these teachers (18 students from each of seven schools and 16 students from one school), and 8 school directors were included in the study. The teachers and student subjects were randomly selected from the randomly selected eight high schools functioning in Addis Ababa in 2003/4 academic year. The school directors were directors of these selected schools.

The study noted that the physical and instruction facilities available in the schools were found to be less suitable for effective implementation of the syllabus. The large number of factors were identified that seems to have hindered the proper implementation of the syllabus. Some of the factors are the overcrowdness of the classrooms, the trend of practicing the traditional method of teaching (teacher-centerdness) on the part of the teachers during classroom instructional activities, the poor communication system existing among teachers and teacher and other school community members to implement the syllabus, and lack of commitment by the teachers were identified as factors that contributed to the less effectiveness of the implementation of the syllabus. The study also indicated that students do not seem to have developed positive attitude towards learning mathematics as a result of the implementation process.

Based on the findings of the study, some recommendations were suggested at least to minimize the problems that were thought to have negative influence on the effective implementation of the syllabus.

CHAPTER ONE

1. INTRODUCTION

1.1 Background of the Study

Education is the modifying of the environment or the creation of a special environment fostered by a formal school. Education aims to influence man's personal development and process by which he/she transmits his/her experience to strengthen individuals and society's problem solving capacity (Shiundu and Omulando: 1992: 3; New Education and Training Policy, (NETP), 1994). As Daniel, T. et al (1975: 4) also stated, knowledge is not a mere end product of inquiry but it is a by product and resource for solving problems and producing intelligent action.

Thus the need to plan, organize, prepare, implement and evaluate a body of knowledge is found to be necessary for educators for the realization of educational aims. The changing nature of knowledge and the new demands of social life have necessitated the need for evaluation of the existing curriculum. Curriculum evaluation goes hand-in-hand with curriculum implementation evaluation.

Curriculum implementation is conceived by different educators in various ways. For example, some educators assume it to be simply as a step in the curriculum planning process, and expect it to proceed from the planning and designing stage. Others believe curriculum implementation to be a separate component in the curriculum action cycle. They see it as the logical step that follows the developing and piloting of a new programme. These people view implementation as a step which involves extensive

action by many parties and in which attempts are made to change individual's actions, knowledge and attitudes (Marew, 2000:12).

Even though there are divergent views on the definitions of curriculum and its implementation, with the understanding of one's own approach and the prevailing curriculum approaches, the need to design a curriculum and its implementation is inevitable. To this end various attempts have been made in Ethiopia to prepare mathematics curriculum for various educational levels to meet the general educational objectives of the country. In this regard, based on the policy statement and educational sector development program (ESDP, 1990), the Institute of Curriculum Development and Research (ICDR) is responsible for the preparation and distribution of the curriculum materials for schools. The draft syllabus and textbooks which are prepared by the experts in the ICDR are evaluated and improved by a group of participants selected from the regions. One of the materials is mathematics syllabus, which is aimed at promoting mathematical knowledge.

It is believed that mathematics has a very crucial role to play in one's academic life and in the life outside of the academic environment. For example, a pass in mathematics is a requirement for all students who wish to join a higher learning institute in Ethiopia. The effect mathematics has on a student's life is also given much attention during the student's choice of a field of study in a college or a university.

For these reasons, the foundation for later knowledge of mathematics needs to be laid earlier in the student's academic life.

Despite its crucial importance in students' academic life, it is a curious paradox to observe that there are a large number of students at every level of education who do not perform well in mathematics. This carries with it the implication that there is a felt need for information on how mathematics is taught at the classroom level. How teachers implement the content specified in mathematics syllabus. This is among the problem areas that need to be investigated during mathematics lesson. The purpose of this study is, therefore, to investigate the extent to which teachers in selected secondary schools of Addis Ababa implement the content of grade nine mathematics as suggested in the syllabus at the classroom level.

1.2 Objective of the Study

The main objectives of this study are:

- To evaluate the implementation of grade 9 mathematics syllabus.
- In particular, the study was concerned with investigating the extent to which teachers use the instructional methods and strategies as suggested in the guidelines.
- Investigating the extent to which grade 9 mathematics teachers implement the syllabus is another issue that this study concerned itself with.
- If the implementation of the syllabus is proved to be ineffective identifying the factors that hindered effective implementation was yet another objective this study was designed to achieve.
- Identify some factors which hinder the implementation of grade 9 Mathematics syllabus and how much the actual implementation process motivated the students' mathematics learning.

1.3 Statement of the Problem

Based on the objectives mentioned above, the study was planned to answer the following research question.

1.3.1 Broad Research Questions

Do grade 9 mathematics teachers implement the syllabus so as to develop better learning behavior in students towards mathematics?

1.3.2 Specific (Operational) Research Questions

1. Do grade nine mathematics teachers apply the methods and strategies as suggested in the syllabus?
2. To what extent do teachers follow the suggested methods and strategies closely?
3. Are there some factors which hinder the implementation of the syllabus?
4. How do students feel about learning mathematics?

1.4 Significance of the Study

This study is concerned with evaluating teachers instructional performances against the suggested guidelines in grade nine mathematics lesson. It is hoped that the findings of this study would help in the following instances.

1. The findings can benefit the curriculum planners in identifying the instructional strategies and methods that are functioning well from those that need to be improved or discard the ineffective ones.
2. The findings are also hoped to provide information for teachers, school principals and concerned school community members to improve the actual teaching-learning experiences.
3. The findings can benefit teachers to identify their strong and weak sides in their performances to implement the syllabus.
4. Moreover, the study can serve as a reference material whenever the need for further evaluation of curriculum implementation arises.

1.5 Delimitation of the Study

This study is delimited to some government schools in Addis Ababa Administrative region. Hence, the findings obtained will only reflect the case of implementation of grade 9 mathematics syllabus in Addis Ababa region.

Though there are many variables to be considered in the study of the implementation of grade nine mathematics syllabus, this study was limited to the following variables.

- Teachers instructional performance
- The school condition in implementing the syllabus
- The extent to which the actual implementation process enables the students to develop better feelings towards learning mathematics.

1.6 Limitation of the Study

The programme scheduled and the time allotted to undertake the research did not allow the research to collect enough information on the whole activities of the teachers throughout the academic year. Thus, much of the information (data) collected reflects the case during the second semester. For similar reasons, classroom observations were made for only 20 lesson sessions.

1.7 Definition of Terms

Abbreviation

- **Instructional performances:-** It is the capability of teachers in using the suggested instructional strategies to transform the contents of the syllabus.
- **Curricular materials:-** it involves the syllabi, teachers' guides and textbooks.
- **Syllabus implementation:** - It is the process of putting the design and specifications of the syllabus into the actual teaching-learning environment.
- **Effective implementation of the syllabus:-** It is the actual use of the requirement of the syllabus by implementers so that it is congruent to the intended or planned use.
- **Compatibility of the school organization:-** It is the appropriateness of the schools to hold their activities as to the requirements of the syllabus.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Curriculum Implementation

Different educators express curriculum implementation in different ways. For instance Shiundu and Omulando (1992: 224) expressed curriculum implementation as "the stage where the curriculum plan is translated into reality through instruction". Ornstein (1988: 224) defined it as the acceptance overtime of some specific items, an idea or practice, by individuals groups, other adopting units linked to specific channel of communication to a social structure and to a given system of values or culture. Similarly Marsh and Willis (1995: 205) expressed it as "putting into reality of a curriculum plan" Beauchamp (1968: 132) and Giroux (1981: 45-46) also defined it as simply putting the curriculum that was planned and developed into practice". For these educators, curriculum implementation is simply translating the curriculum plan to the actual teaching-learning environment regardless of other factors, which could influence the plan directly or indirectly. Thus, the decision of curriculum developers to introduce the developed curriculum into school on a large scale marks the beginning of actual curriculum implementation.

Others view curriculum implementation as a separate component in curricular activities. For these group of educators implementation involves extensive action by many parties requiring changing the individual's knowledge, actions and attitude. For instance Ornstein and Hunkins (1998: 292) viewed curriculum implementation as an interaction process between those who have developed the program and those who are charged

to deliver it. The authors further elaborated that successful implementation of curriculum results from careful planning, which intern focus on three factors. The people, programme and organization if an innovation or reform is to be fully implemented, at least the conditions of these three factors should be changed. Put differently, if implementation is to occur, change would likely to occur in curriculum materials, teaching practice, organizational structure, and belief or understanding about the curriculum and learning practice. Bishop G. (1986: 4-5) expressed that any process of innovation involves the four major areas; the change agent, the innovation or change itself, the user system (the person or group at which the innovation is directed or targeted) and time. To him implementation is a change in at least the four dimensions. Innovation that does not include change on these dimensions is probably not significant change. For instance the use of any alteration in teaching strategies is a minor change. Real change involves changes in conceptions and role behavior. The possible use of new teaching approaches and the possible alteration of beliefs on the part of teachers are the main components to be focused on in implementing any new curriculum or programme.

The use of a new material refers to the content of the curriculum that the teacher is expected to transmit to the students, to the order in which this content is to be transmitted and especially to the various materials required as transmitting medium. The use of new teaching approach include a concern in new teaching styles, new tasks, new role relationship between teachers and students, teachers and principals and the like. The alteration of beliefs deals with the knowledge and understanding that the teachers have about the innovation's various components such as its philosophy,

value, assumptions, objectives, subject matter, implementation strategies and commitment to implement the curriculum.

For implementation to occur, the behavior of all players in the curriculum game must be addressed properly. Curriculum developers, administrators, principals, teachers, and supervisors must be clear about the purpose, the nature and the real and potential benefits of the innovation. There must be a continuous two-way communication between the planners and the implementers of the curriculum. Lewy (1977), Fallan (1981), and Fullan (1991) have also pointed out the complex nature of innovation, in that it deals with the difficulties related to planning and coordinating a multi level social process involving thousands of people.

Regarding the problems and complexity of implementation process. Pratt (1980: 425) expressed his view by saying.

The voyage from the first identification of student's need to eventual learner achievements is often stormy, but more good curricula sink without tracer on the shoals of implementation than at any other point.

Thus as Fullan and Pomfrate (1977: 336) have pointed out, curriculum implementation has to be viewed as a phenomenon in its own right, rather than as a simple extension of planning and adoption processes. Ornstein and Hunkins (1998: 297) also viewed implementation as an essential part of curriculum development, which brings the anticipated changes into reality. This means in short, curriculum activity is a change activity. In addition to this, Fullan (1981: 310-311) and Gene (1995: 109-110) have also described implementation in the context of planned change.

Implementation is a means of achieving better learning outcome. It is the intervening variable, which is essential to achieving the intended consequence of a curriculum.

Although various reasons are suggested by educators the need for studying curriculum implementation, essentially four prominent reasons are considered. As Fullan and Pomfrate (1977: 336-339) suggest the following four reasons call for the need to study implementation.

1. To know what has changed it must be conceptualized and measured directly.
2. To understand why so many proposed educational changes fail, and identify the most problematic aspects of bringing about change.
3. To be aware of the activities of the implementers whether they are in line with the requirements of the program, and
4. To see what determines the implementation of a curriculum, or in short, to interpret learning outcomes and relate them to possible determinants.

Snyder et al (1996: 402-410) after reviewing the works of researchers on curriculum implementation for the past two decades have classified the studies of curriculum implementation into three approaches; called fidelity perspective, mutual adaptation and curriculum enactment. The three perspectives can be compared and contrasted with regard to their basic assumptions, curriculum knowledge, curriculum change, role of the teacher and the focus of evaluation.

Aspects	Fidelity	Mutual adaptation	Curriculum enactment
Basic assumptions	The desired outcomes of curricular change is fidelity to the original plan or implemented as intended	The implemented curriculum and the intended curriculum will not or should not match. (Implemented with adoption and decision made by the user)	Students and teachers in the classroom jointly create educational experiences
Curriculum knowledge	Primarily created outside the classroom by experts who design and develop the curriculum	Primary residing to the outside experts to be adapted by teachers to the local context	Is a personal construct, which must answer to both personal and external standards
Curriculum change	Is conceived as linear process, with teachers implementing the innovation as developed in the classroom	More unpredictable, less linear process with more consumers at the end of it	Not merely observable alternations but rather a personal development process both for teachers and students
Role of the teacher	Teacher is a consumer. Delivers the curriculum as it is planned	Active in shaping the curriculum to meet the demands of the local interest	Curriculum developer together with his/her students
Focus of the evaluation	To determine whether the planned outcomes have been achieved	To measure the extent to which the innovation is adapted during implementation	To describe and understand the meaning given to the evolving curriculum by those creating it (the teacher and the students).

Source: Adopted from Snyder et al (1996, 404-427)

In general the stress of the authors cited is on the need for committed and knowledgeable teachers, programme arrangements and organizational structure as essential constituents of implementation. Therefore, the close coordination of people, programme and organizational structure involved in the implementation process are typical features, which indicate the essence of success in curriculum implementation.

2.2 Evaluation of Curriculum Implementation

The concept of "curriculum evaluation" and "curriculum implementation evaluation" are used ambiguously in early literatures. However, in the area of evaluation research these concepts need clarification in order to handle the specific educational

phenomena under study. In this regard, Tamage and Scriven as cited in Ornstein and Hunkins (1998: 320-322) made a clear distinction between these two concepts. Curriculum evaluation refers to the study of the curriculum plan or the document itself and is concerned with examining the adequacy of the objectives with prescribed goals, the consistency between the objective and the contents of instructional materials and the significance of the content itself. But curriculum implementation evaluation deals with the question of whether what is planned in the curriculum document is put into action or use, to what extent the intended plan is translated into work. Similarly, Saylor Alexander and Lewis (1981: 317) indicated that the significant role of curriculum evaluation is determining the value of the curriculum. To these people, curriculum evaluation is concerned with investigating whether the curriculum planned is fulfilling its purpose and the appropriateness of the contents and instructional materials for the purpose envisioned. They also indicated that curriculum implementation evaluation is evaluating the merits of all the administrative arrangements, practices and the structure within which the educational institution itself operates.

Therefore, curriculum evaluation and curriculum implementation evaluation are two different but interrelated educational activities. Curriculum evaluation is concerned with the appraisal of the worth of the plan or document but curriculum implementation evaluation is concerned with the practicability of the curriculum plan as it is translated into practice. The results obtained through both evaluations serve for the purpose of improving the quality of education or curriculum activities of educational system of the society and thus, interrelated. Generally, curriculum implementation evaluation is the very important issue for educators for it is difficult to decide a curriculum plan is being implemented or not as it is intended. To this end, Marew (2000) in his course text

"curriculum Implementation and Evaluation' stated that the information gathered during evaluation enables the curricularists to check their programs and roles in line with the stated goals.

There are various aspects of a program to be evaluated in the process of curriculum implementation evaluation. Different scholars suggest different variables to be evaluated in curriculum implementation evaluation.

For instance, Dressel (1976: 6) suggests that information should be gathered regarding educational programs including the environment in which implementation proceeds; such as physical facilities and human resource and the curricular matter such as methods, student achievement, and instructional services, such as educational media and instructional materials.

Depending on the meaning they hold for curriculum implementation, educators developed different kinds of evaluation models. The models vary as to who conducts the evaluation, the major audience of revaluation results, the assumption that one makes as part of the evaluation process, the methods used in collecting data and the expected outcomes of the evaluation. However, all models come to focus on two contrasting areas of emphasis. These are; those who emphasize the program outcomes (behavioralists) and those who emphasize on both the process and product aspect of the program. The first group stress on the measurement of learning outcomes in terms of students abilities, skills and attitudes as the only indicator of curriculum implementation. This model was first originated by Tyler in 1930's and latter furthered by Mager and Popham in (1960), Bloom (1956), Cronbach (1963) all cited in Saylor Alexander and Lewis (1981: 320-322). Tyler defines education as change in behavior,

hence evaluation should consist of measuring the extent to which such changes had taken place consistent with the previously defined objectives of the educational program being evaluated. This model, which is also known, by "behavioral objective evaluation model" relies on quantitative and objective data. However, many educators criticize the behavioral objective model. For instance Cronbach (1963), Stufflebeam (1971), as cited in Ornstein and Hunkins (1998: 330 –331) and Saylor, Alexander and Lewis (1981: 310-317) Stufflebeam and Webster and Provus (1971), Popham (1969) all cited in Madaus et al (1983: 27) strongly criticized it for such studies lead to terminal information that is of little use in improving a program and that for it is too narrow in scope to constitute on sound basis for judging the worth of the program. According to these educators the model pays little attention or no effort is made to determine why a unit of educational activities or its appropriateness is meeting the particular need of the learners for whom it has been planned.

Actually it is meaningless only to determine the program outcomes if other parts of the program such as the input process and the impacts of the implementation are not included in the study. For instance, if the transactions occurring during the process are ignored evaluation of the outcome cannot tell what happened in the process and why that has happened during implementation.

To this effect, a number of models were developed focusing on different aspects of the program to be evaluated. One of the models was developed by Stufflebeam in 1971 as cited in Saylor, Alexander and Lewis (1993: 331) and Stufflebeam in Madaus et al (1983: 117-141). He defines curriculum implementation evaluation as; the process of delineating obtaining and providing useful information for judging decision alternatives.

The model requires four stages of program evaluation: 1) context evaluation 2) input evaluation, 3) process evaluation and 4) product evaluation. The model pays due attention to the process and product of the program to be implemented.

The other evaluation model originated by Provus (1971) cited in Ornstein and Hunkins (1998: 327), some what related to Stufflebeam's evaluation model, is the discrepancy model. The Provus model focuses on comparing the design with standard, the actual operation with respect to the characteristics of the people and material requirements, the activities of the program and the effect of the program with the given standard of the program. The result of the evaluation is thus used to change the program standard or the performance, or to continue the process if the standard and performance match. Provus' evaluation model in contrast to the behavioral model, focuses on both aspects of the implementation process, that is the process and the product.

The other evaluation model developed by Robert E. Stake (1969) in Madaus, et al (1983: 287-307), as cited in Saylor, Alexander and Lewis (1981: 325-332) and in Ornstein and Hunkins (1998: 321-330) is termed as "Stakes 'congruence-contingence evaluation model". Stake maintains that data can be organized into three bodies of information; antecedents, transactions and outcomes. Antecedents are any condition existing prior to teaching and learning, which may relate to outcomes. Transactions are; "the countless encounters of students with teachers, students with students, authors with readers, parents with counselors etc." and outcomes are; "abilities, achievement, affections and capabilities of students resulting from educational experiences". After data are filled in the three categories, the evaluator checks for the congruence between the "intents and observation". The intents of the program can be taken from the

curriculum guidelines or the syllabus and observations taken from classroom practices, achievements texts, interviews etc. Stake also insists that congruence would be an identical match between what is intended and observed. He further argues that congruence indicates only the degree of match and not the validity or value of outcomes. So the model also requires contingency. Contingence that is "the relationship among the variables in the three categories". The relationships among variables is evaluated as to whether or not the outcomes are the result of transactions. Stake's model briefs us that the evaluation of antecedents focuses on appraisal of the inputs of the particular innovation in terms of students' characteristics, teachers' characteristics, curriculum content, instructional materials, school organization and community context. Evaluation of transactions includes communication flow such as teaching methods, role relationships and time allocation where as evaluation of the outcome include students achievement and attitudes developed as a result of the process, the effect of the innovation on teachers, and the effect of teachers on the program.

Generally, as the literature above depicts, there are two broad categories of curriculum implementation evaluation. The former group (behavioralists) educators emphasize on the program outcomes and the other group emphasize on both the process and product aspect of the program.

Though, the later group of educators can be grouped in the same broad category, when the constituent of each model is observed there appears little difference as to how they use evaluation methods and the emphasis given to each variable.

2.3 Determinants of Curriculum Implementation

Due to the many facets of curriculum implementation there are numerous factors that could influence its realization. Educational innovation is not a simple event, rather it is a change process which involves new ideas and practices. The process of initiating these new ideas and practice can be affected by many variables. The source of most problems or factors affecting the realization or implementation is usually lack of emphasis given to implementation by policy makers. As O'Neill (1995:7) noted policy makers rarely develop a process for implementation of their formulations. They expect people on the receiving end of the policy to make it simply work in practice. It seems that usually policy makers tend to act on the assumption that change is an event, not a process. As the study made by Herman and Stringfield as cited in Fullan (1999: 19) indicates that indifference negative climate, neglect of implementation training and support, such as program specified, staff development and failure to build-in system and time for coordination and problem solving could kill implementation of any curriculum. Bishop G. (1986: 3) also indicates that any process of innovation involves the following major factors:

- 1) The change agent; the innovator, the person or group (e.g. the headmaster, or individual teacher, or local authority, or national government), that decides upon and initiates the innovation or educational change.
- 2) The innovation or change itself; (e.g. a new integrated approach to teaching-learning; or 'new' mathematics in place of the old; or a comprehensive system of education as against the more traditional tripartite system of grammar school etc).

- 3) The users system; the person or group at which the innovation is directed or targeted. To him ignoring or underestimating the importance of any one of these key factors would be courting trouble. It is important to bear in mind, too, that these three factors interact with, change and are changed by each other during the process of innovation.

Regarding this, Fullan (1991: 66-80) after reviewing a number of studies that have examined curriculum implementation as a change process, indicated that three major factors; (the nature of the change, change agents' role and the organization) which facilitate or hinder the implementation of new curriculum. Others also identified various variables, which influence the implementation process. For instance, Goodlad (1984: 168) indicated that there is no single variable to limit curriculum implementation. He argues that the circumstances under which teaching-learning occurs such as student-teacher ratio, member of hours students pass in the classroom, administrative controls etc, are some of the factors affecting implementation process. On the other hand, Majasan (1995: 143) identified the teacher, the pupil, the subject being taught, and the environment in which it takes place as determining curriculum implementation Dressel (1976: 186) also considered factors that determine curriculum implementation as range characteristics of facilities and equipments, institutional characteristics and people interaction in the environment in the implementation process.

Though, there are various factors identified which influence curriculum implementation as in the literature above, the human factor and organizational factors were given due attention.

2.3.1 Human Factor

Curriculum workers hold different views on what constitutes the curriculum and consequently on what determines the problem of changing in into practice. Those who define the curriculum as "the experience, which learners have under the direction of school" believe that implementing a new curriculum involves people. For instance, Mackenze and Lawter (1948: 274) noted that implementing a new curriculum is highly affected by people who implement it. They further argue that peoples value of the innovation must be modified because change in materials in the school bring about nothing unless they are changed in their value, attitude and knowledge. Similarly, Pratt (1980: 425) stressed that any attempt at change required people playing key roles.

2.3.1.1 The Teacher

The teacher is the important human factor, which strongly affect curriculum implementation. Regarding the vital roles played by teachers in curriculum implementation Shiundu Omulando (1992: 213) stated saying. "In curriculum implementation various personnel are involved, but perhaps the one whose role is most important in seeing that the programs are successfully implemented is the teacher." Many scholars consider teachers as those who organize learning experiences and manage the learning environment for the benefit of pupils who experience.

But, the extent to which teachers are capable of transforming the knowledge required by the program is also important in translating the planned curriculum. In this regard Ornstein and Hunkins (1998: 313) noted that teacher with knowledge and competence are and must continue to be central to any curriculum activities. Thus, there is no doubt

that teachers' role in teaching – learning activities influence students' learning and better teachers bring about better learners.

Teachers' role in curricular activities is not limited to implementation. The teachers' participation in curriculum development also remains significant which consequently facilitate successful implementation. To this end, Dorthick (1953) in Shiundu and Omulando (1992: 220 – 221) argued that the teachers' role is not only in effecting the planned curriculum but they should also play a significant role in developing the curriculum plan. Similarly, Gross and his associate (1975: 25) noted that participation of teachers in curriculum development activity would have great impact on the degree to which a curriculum is successfully implemented.

Although the importance of teachers' participation in curriculum development is unquestionable, it is unrealistic to involve each and every teacher in the curriculum development process, but their views and opinions can be incorporated in the curriculum by any available means like conducting workshops and seminars and any other means.

Generally, it can be observed from the above reviewed literature that teachers' roles in curriculum activities are central and will remain crucial. In addition, the teachers' knowledge and competence they should have is found to be an important aspect of teachers' quality for the successful implementation of curriculum.

2.3.1.2 The School Principal

Schools' human resources and material resources are very important for effective curriculum implementation. However, with out good management on the part of school principals, these human and organizational resources would not bring any important change. It is obvious that even the best designed program (curriculum) which is supposed to be practiced in a resourceful environment brings about nothing, if it is not supported by a good leadership. In this regard Snyder et al (1992: 417) remarked by saying that "the greater the active support of the principal the greater the degree of implementation".

Educators have different views on the role of school principal during curriculum implementation. For instance Hughes and Ubben (1970: 62) and Koermer and Crawford (1972: 13) viewed that principal's role as an initiator of educational innovation. When a new program is introduced, there seems to exist resistance among those who are directly involved in the implementation process. Therefore, the role of school principals in initiating the program is vital. In this regard Gross and his associates (1971: 37) indicated that the school principal above all others has the responsibility to persuade teachers in line with the requirements of the innovation. However, in most educational innovations this has not been observed. For instance, a case study conduct by Wossenu (2001: 52) in Assai public school is a good indicator of the shortcomings of principals in initiating the program. In the study teachers were asked to rate the kind of orientation provided by their principal. The study revealed that 66.7% of the respondents identified that their principal focused on orienting them about administrative routines and procedures and only 8.3% of the teachers responded on the initiation role of their principal.

Accordingly, although, the main focus of the principal should be on orienting teachers on the way they should conform to the innovation, the principal was busy orienting teachers about administrative routine and procedures which may help little as compared to innovation matters for successful implementation of the innovation.

On the other hand, some educators view the role of the principal as a facilitator and decision maker or leader of the innovation. For instance Fullan (1992: 161) expressed his view by stating. "The principal's role is shaping the environment and facilitating the implementation process."

Similarly, Kroemer and Crawford (1972: 13) and Hull and Dodds (1957: 121) expressed that the principal's role in initiating, facilitating or decision-making is vital for effective curriculum implementation to take place.

The intimate relation between the principal and teacher is one important factor for effective implementation. In this regard Stuart (1923) as cited in Hull and Dodds (1957: 121) argued by saying:

"If a teacher fails, the principal fails; if the teacher succeed, the principal succeeds". This implies the requirement of existence of strong relationship between principals and teachers to bring about effective implementation of planned curriculum.

Generally, it can be concluded that for an educational change to be successful the role of the principal in either initiating or promoting the new program and facilitating or making decision when required is crucial during implementation.

2.3.2 Organizational Factors

Although there are numerous organizational aspects, those aspects of organization that are directly related to implementation process are identified by educators such as Dressel (1978: 6), Seyfern as cited in Hughes and Ubben (1970: 347), and Pratt (1983: 430). They noted that the quality and quantity of staff development programs, compatibility of schools for the innovation, the communication channels that would allow continuous flow of information among people involved in the implementation and the availability and use of instructional materials are some of the factors to be considered. Besides, the relationship between the organization and community are also considered as important organizational factors. The type and nature of administrative support for staff development programs and the kind of communication existing with in the organization system could also be considered as the major variables during implementation of a new program. Administrative support starts with commitment on the part of the people responsible for facilitating and making decisions. Pratt (1983: 430) noted that unequivocal commitment to the innovation by administrators is an essential form of support to school personnel. He further indicated that any curriculum implementation requires a full-hearted administrators. The support provided by administrators is shown by provision of required resources moral and training programs etc. Pratt (1983: 43) noted that if teachers are not provided by materials and are not supported by in-service training, they will be likely to continue doing what they have done in the past with at most few surface change. Similarly Goodlad (1984: 176-177) after questioning students, teachers and observing several classrooms concluded conditions such as sensitive leadership and availability of help tended to be associated with greater enthusiasm and professionalism on the part of the teachers. Generally it

can be concluded that genuine administration support will always bring about effect implementation.

Compatibility of the school organization is also one organizational factor determining curriculum implementation. The school organization encompasses the infrastructure of the school such as classrooms, laboratories, libraries and school pedagogical centers. Because classrooms are places where children are motivated to grow physically, intellectually and emotionally, they should be appropriate and conducive for the teaching-learning activities. Regarding this, Majasan (1995: 48-49) noted that for an effective teaching-learning to occur classrooms should be organized properly because whatever clever the teacher may be if the classroom is disorganized or over crowded effective teaching will be hampered.

However, in our situation, with the growth of the need for education, schools and classrooms are over crowded and consequently our schools readiness in their infrastructure to implement the curriculum is not sufficient. The ESDP (1996) also indicated that currently the schools are overcrowded resulting in managerial and disciplinary problems. Goodlad (1984: 175) also indicated that over crowdedness of classrooms is one of the factors affecting curriculum implementation. He further argued that the overcrowdedness of classrooms results in frustration on the part of the teachers in their effort to perform their teaching roles. Moreover, an observation study in Addis Ababa schools by Birrara (2000: 114) revealed that the existing classrooms have very limited desks and no tables for teachers.

The availability and usage of instructional materials is also an important organizational factors influencing the implementation of curriculum plan. The term refers as mentioned by Birrara (2000: 101) to every thing under such title as teaching aids or audio-visual aids, educational media, educational technology, educational resource, instructional materials and communicative technology. Similarly, Amare (1999: 53) remarked saying "instructional materials can be concrete. (models, specimens, simulators); objects those that allow physical involvement of learners, or abstract; those that allow imaginative involvement of learners with the minimum effect of physical involvement or sensory involvement (learning with written or spoken words)". Accordingly, instructional materials encompass all visual and audio-visual aids, which are helpful during teaching-learning activities.

With the growth of science and technology and the corresponding effect of its development on educational activities call for the appropriate selection and usage of instructional materials for successful implementation of curriculum. The need for educational technology to facilitate learning was asserted in the New Education and training Policy (NETP) (1994) of Ethiopia. Many educators underlined the importance of instructional materials in curriculum implementation. For instance, Richardson and Bernard (1984: 324) noted that the use of materials familiar to the pupil is advantageous in transforming concrete knowledge to pupils. In contrast some educators argue the importance of learner's to engage in abstract concepts rather than concrete objects for it develops the learners ability to reason and manipulate complex ideas.

Instructional materials also constitute curricular materials such as textbooks. Callahn (1966: 216) noted that the textbook is a systematic arrangement of subject matter to assist teachers teaching particular content to students at specific grade level. Together with textbooks, curriculum guides are also important for curriculum implementation. Posner (1995:7) noted that the syllabus includes the goals or rationale for the course, topics covered, resources used, assignments given and evaluation strategies recommended. Therefore, curricular materials are useful in curriculum implementation for they provide guidance for the teaching-learning process.

The other aspect of organizational factor influencing curriculum implementation is the type and nature of communication channels existing among teachers, students and school principals. Snyder et al (1992: 417) noted that the greater the quality and quantity of sustained interaction among people involved in curricular activities, the greater the degree of implementation. Similarly Fullan (1991: 67-73) indicated that the most collegiality, trust, and interaction between teachers, the greater in the degree of implementation. This implies that frequent discussions about a new program among teachers, principals and curriculum workers is crucial for successful implementation of curriculum.

Therefore, from the reviewed literature above it is easy to understand that the study of any curriculum implementation should include organizational factors such as the physical facilities, instructional and curricular materials.

2.4 Teaching-Learning Mathematics

As S. T. Bajah described in "Connect" (Unesco International Science, Technology and Environmental Education Newsletter) vol. XXV. No 3-4 (2000: 5) "Mathematics, the world over has always been considered as a bridge not only between science and technology but also between all the subjects offered in our formal education system. Any one who is good in mathematics is presumed to be able to cope with other school subjects". This implies that leaning mathematics or the knowledge of mathematics can bring about awareness and growth in scientific and technological thoughts and activities. It also underlines the central role of mathematics knowledge in the rapid revolutionary activities in science and technology of the modern society. Therefore, the teaching-learning of mathematics in schools requires due attention on the part of the teachers and students school administrators and the community at large. Nacaro-Brown and his associates (1982:2) described that teaching embraces many kinds of processes, behavior, and activities that no single theory can explain it adequately. They defined teaching "as an attempt to help some one acquire some skill, attitude, knowledge, ideas or appreciation. This kind of approach to the meaning of teaching implies that the teacher's task is to create or influence desirable changes in behavior or in tendencies towards behavior in his students. Hence, the only valid criterion of success in teaching is the degree to which the teacher has been able to achieve this learning in his students. Concerning this, Douglas as cited in Nacaro Brown (1982:6) pointed out that the greatest single factor in the teaching process is the teacher. He further remarked that, no technique, no method, no device and no gadget can guarantee success other than the teacher. Stenhouse (1975: 24) also noted that teaching is not merely instruction, but the systematic proportion of learning by whatever

means. This shows that teaching strategy is an important aspect of curriculum development to realize the implementation of curriculum.

As in the case of mathematics teaching, Dossey (1992: 42) described his view saying:

The conception of mathematics held by the teachers may have a great deal to do with the way in which mathematics is characterized in classroom teaching. The subtle message communicated by children about mathematics and its nature may, in turn, affect the way they grow to view mathematics and its role in their world.

This shows how big and decisive is the teachers' attitude towards the subject and his ways of teaching in classroom to bring about change of behavior on the part of the pupils. Students learning difficulties of subject matter can be seen with respect to teachers' capabilities in using new and appropriate curricular materials and methodologies. Research on teaching and learning mathematics conducted in the United State of America (Carpenter, T. P and Romberg, T. A., 1986: 851) revealed that mathematics teachers are essentially teaching the way they were taught in school. Similarly, a synthesis of another three studies which was prepared by the National Council of teachers of Mathematics in 1979 revealed that the predominant pattern in teaching mathematics is extensive teacher directed explanation and questioning followed by students seat work on paper and pencil assignment. The focus of mathematics teaching should not be in teaching children mathematics, but rather in teaching how to learn mathematics. Using appropriate teaching methods that can facilitate students' understanding of the subject matter enhances the teaching-learning of mathematics. Fullan (1992: 37) indicated that teaching methodologies include providing opportunities for active involvement of the pupil using a variety of resources and techniques. Similarly, Majasan (1995: 42) indicated that teaching methodologies

are the main tools for the teacher with all other tools as support to make him sound. He has also recommended teachers to be aware of the value of the variety of teaching methods. Regarding mathematics teaching, Blenkin and Kelly (1994: 117-118) described that, mathematics should focus on practical and problem solving issues. It must be used in the day-to-day life of the learners for the societal need and activities at large. For mathematics to accomplish this task, it is of course necessary to change the traditional role of mathematics teachers. The role of mathematics teacher in the traditional classrooms is managerial or procedural in that their job is to assign a lesson to their students, to start and stop the lesson according to some schedule, explain the rules and procedures of each lesson, judge the action of each students during the lesson, and maintain order and control through out (Carpenter and Romberg, 1986: 851). Therefore, the attitude of mathematics teachers should shift from the traditional to modern approach. Regarding this, Tankhun and Ong EngTek in "connect" Vol. XXV. No. 3-4 (2000: 7) described that current trends in education towards the end of the nineties seem to perpetuate into the new millennium with regard to:

- The philosophical trend; in which students' meaningful construction of knowledge is given emphasis over the notion of knowledge transference from teachers to students,
- The curricula trend; which underlines the importance of balanced curriculum over the fragmented accumulation of facts. The central issue in this trend is the identification of key skills and abilities that each country feel its students should have acquired at the end of science and mathematics study at secondary school;
- The technological trend; which dominates the 21st century with the call to capitalize on the information and communication technology (ITC) to enhance

the teaching of science and mathematics as opposed to the traditional view of adoring the textbooks as the source of information,

- The pedagogical trend; which advocates the use of wide plethora of research validated teaching strategies, calling for a move from a teacher-centered continuum to a student-centered one emphasizing the promotion of three-way reciprocal hands-on (psychomotor), mind-on (cognitive) and heart-on (affective) learning activities, and
- The assessment trend; which emphasis the use of variety of testing instruments that gives a more complete, accurate, fair and holistic picture of students' knowledge, learning and progress.

Teachers should adopted new methods and strategies in mathematics instruction in order to facilitate the teaching-learning of mathematics. After reviewing the Nigerian primary school mathematics education, Adedoton (1990: 9-12) suggested the discovery-method, using questions, and using the group method for effective teaching-learning of mathematics. In he "discovery" method students are guided to discover principles, rules or results by carrying out relevant investigations or by studying mathematical patterns. Students who use the discovery method to learn not only have a better mastery of the content, but also become inventive. In the "use of questions" students will become more active and involved in a lesson. Students' answering of questions will also assist teachers to judge their level of their understanding and to assess their progress.

Some mathematical lessons lend themselves to group work. The teacher should use a "method of grouping" which is best suited to the need of the class such as forming groups of the same ability or mixed ability groups.

Rosenshine and Stevens (1986: 376-387) reviewed numerous studies, which are very much related to teaching-learning mathematics. There have been successful experimental studies of mathematics instruction in which teachers were trained to increase the academic achievement of their students. These studies revealed that the higher the teachers are trained, the higher the achievement and engagement of students in the classroom lesson. The authors generalized that the major components in systematic teaching of mathematics include: teaching in small steps with students practice after each step, guiding students during initial practice, providing all students with high level of successful practice.

Another major part of instruction in mathematics is demonstration. All teachers of course, demonstrate new skills and materials, but researchers have shown that effective mathematics teacher spend more time in demonstration than do less effective teachers (Everston, et al, Good and Grows, Stalling, et al cited in Wettrrock, (1986: 381)). The finding of these studies also revealed that effective mathematics teachers devote more time in guided practice. That is, they spent more time asking questions, correcting errors, repeating the new materials, and solving problems with teacher guidance. Although all mathematics teachers ask some questions, studies have shown that effective mathematics teachers asked many while the less effective ones asked few questions (Wettrrock, 1986: 353).

"Checking for understanding" is also necessary in teaching mathematics. This involves the frequent assessment of whether all students understand either the content or skill being taught, or steps in a process on the part of the teacher. Checking for understanding should take place frequently so that the teacher can provide corrections

and reteach when necessary. The wrong way to check for understanding is to ask only a few questions, call on volunteers to hear their (usually correct) answers, and assume that all of the class understands or has now learned from hearing the volunteer's response (Wettrick, 1986). Another is to ask, "are there any question?" and if there are not any, assume that every body understands everything.

The methods suggested by Adedotun (1990: 9-20) for mathematics instruction were emphasized by early and recent educators. For instance, Borich (1988: 183) noted that group discussion among students and teachers can be useful for encouraging average and lessable learners to become active learners. Similarly Gall and Gall (1976) Callahan (1966), Mekechie and Kulik (1975) as all cited in Borich (1988: 183) asserted the effectiveness of discussion method of teaching in promoting subject matter mastery, students to have positive attitude and motivation, and encourage the exchange of ideas. They further noted that group discussion, if properly organized and conducted would encourage mental activity helping students to think critically by examining alternatives, judge solutions, make predictions, and discover generalizations. Others, for instance Sunal and Sunal (2002: 4) and Saylor, Alexander and Lewis (1981: 296) emphasized that the effectiveness of any teaching depends on the degree to which students become engaged with learning opportunities.

Students involvement in the teaching-learning process is also realized through giving assignments or home works. Coulter (1987: 272) defined homework or assignments as "a school work formally assigned for completion outside the school time". He further indicated that homework embrace a number of activities including revision and preparation for future class work, extended research and private study. This implies

that homework includes any activity that is taking place outside the school directed by teachers for further inquiry by students which enables them to confront with several activities.

Therefore, as the studies cited and reviewed literature above indicate the teachers' attitude towards the subject, their training and abilities to use different methods, strategies and techniques in the classroom are decisive to realize the implementation of mathematics syllabus in the school.

CHAPTER THREE

METHODS AND PROCEDURES OF THE STUDY

3.1 Method Used

Among the various methods to be used in research work, a descriptive survey method of research was found to be appropriate for this study.

3.2 The Model used in the Study

From among the various kinds of models suggested by educators to evaluate the implementation of curricular, Stake's congruence-contingence evaluation model was found to be the most appropriate model that can suit this study (fig. 3.1). In using the model, the information obtained was analyzed in terms of the match and mismatch between what is intended and observed. The model is selected mainly because it gives due consideration for the objective, process, and product aspects of the study. It is the most comprehensive framework for evaluation (McCormick and James, (1989: 179) and Yeom and Beek, 1987: 30-301).

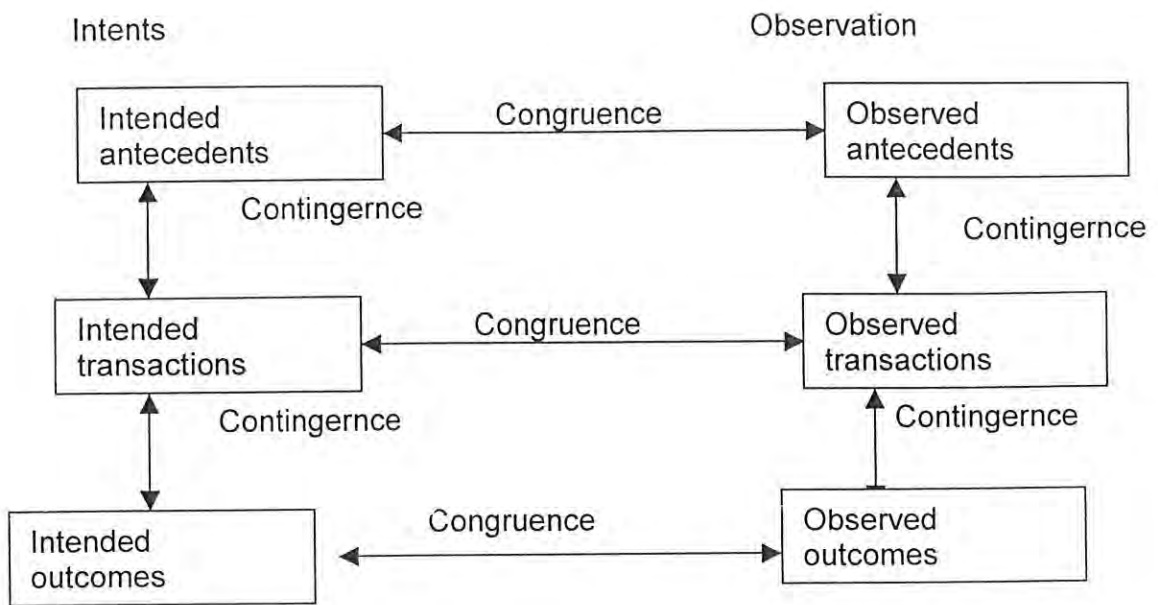


Fig 3.1: Stake's congruence-contingence evaluation model (Stake, 1967: 533 in McCormick. R and James. H. 1983: 178)

Though there are many variables that should be evaluated during the evaluation of implementation of a syllabus, due to limitation of time and finance it was not possible to consider all of the variables. Therefore, those variables that are found to be more important than others were identified.

According to Stake, (1967: 528) in McCormick R and James, M (1983: 177),

1. an "antecedent" is any condition existing prior to teaching and learning, which may be related to outcomes. There are several inputs of particular innovation such as students and teachers characteristics, curricula contents, instructional materials, school organization and community context. However, school physical facilities, curricular and instructional resources and the kind of support teachers are provided are offered as an input (antecedent) to the implementation process in this study.

2. "transactions" are countless encounters of students with teachers, students with students, authors with readers, educational personnel with members of the community etc. However, in this study teachers' communication flow such as teachers' classroom instructional performances as intended in the syllabus and teachers' guide and the kind of communication existing among teachers and teachers and directors are taken as transaction variables to be evaluated.
3. an "outcome" is a variable such as students' achievement and attitudes developed as a result of the process, the effect of the innovation teachers and the effect of teachers on the program. However, in this study only students' attitude developed towards mathematics learning as a result of the implementation process was taken to be evaluated.

3.3 Subjects and Sampling Procedures

Three groups of people were used as the subjects of this study. The first group consists of teachers who teach mathematics to grade 9 students in selected government schools in Addis Ababa in 2003/04 academic year. The second group comprised of grade 9 students. The 3rd group of the study comprised of directors of the school from which the teachers and the students were selected.

According to the statistical information obtained from Addis Ababa city government educational bureau, a total of 20 secondary schools (grade 9 inclusive) are functioning currently in 1996 academic year. The data obtained from the Education Bureau mentioned indicates that there are 91 teachers who teach mathematics in grade nine and the number of students learning in grade 9 in this academic year being 41,220.

Of the 20 government secondary schools, 8 schools were randomly selected for the study. These are Addis Ketema Secondary School, Ayer Tena, Dilachin S.S., Dilber S.S., Kolfe S.S., Medhanalem S.S., Minilik S.S and Tikur Anbessa. From these schools a total of 40 grade 9 mathematics teacher and 140 grade 9 students were randomly selected.

3.4 Data Collection Instruments

To obtain adequate information for the study three kinds of data collection instruments (questionnaire, classroom observation and interview) were employed.

3.4.1 The Questionnaire

Three sets of questionnaires were used to obtain information from the three groups of subjects described earlier.

1. The questionnaire for teachers.

This set of questionnaire contains background information of the teachers on the front page. The first part of the questionnaire was prepared to obtain information about teachers' activities, availability and utility of instructional materials, the communication existing between teachers and teachers, teachers and department heads, teachers and school principals, and the major problems that have been affecting the implementation process. The second part of the questionnaire was prepared to obtain information whether the teachers agree or disagree with the objectives, methods and strategies suggested in the. The third section of the questionnaire was prepared to obtain the teachers' opinion on selected factors

influencing the implementation of the syllabus. The fourth part was prepared to obtain information on the support school provides for the teachers. The last section of the questionnaire was planned to obtain information about the availability of classroom facilities.

2. The questionnaire for school directors.

The front page of the questionnaire was planned to obtain background information of the directors. The first section of the questionnaire, mainly focuses on information about the communication existing between teachers and directors, the availability of instructional resources, and the condition of their schools against the requirements of grade 9 mathematics syllabus. The second part was prepared to obtain information regarding the support the school provides for the teachers for the implementation process. The last section was prepared to get information about the number of grade 9 sections, average class size and average number of student's desks available in the classroom.

3. Questionnaire for students.

This questionnaire was prepared to obtain information about students' feelings regarding mathematics learning, students and teachers communication system during mathematics instruction in the classroom, and the attitude they developed towards learning ^{grade} 9 mathematics. The questionnaire was prepared in Amharic so as to avoid the students' mis-understanding of the question items. The questionnaire was given to two mathematics teachers who have M.SC degree in the subject for comments. After that the questionnaire was pre-tested in the schools selected for

the pilot study. Certain items which were found redundant, too general or vague were refined for the final use.

3.4.2 Classroom Observation

An observation checklist which had lesson presentation variables in the classroom and observation rating form regarding some instructional considerations were developed and used during classroom observations. The ideas used in the checklist and rating form arose from carefully studying the syllabus, the textbook and teachers' guide. The checklist and rating form were first given to two mathematics teachers for comments. They were then pretested in four sections in selected schools. Based on the feedback obtained during the pretesting, of the checklist and rating form were revised for the final use.

$4 \times 5 = 20$

For classroom observation, five teachers were randomly selected from two sampled schools, three from Addis Ketema Secondary School and two from Medihanalem S.S. Each of them was observed four times. Therefore a total 20 of mathematics periods were observed to gather data for this study.

3.4.3 Interview

Two sections of unstructured interviews were made. The first section was used with teachers whose lessons were observed while they were teaching, and the second section was used with five directors to obtain information that was relevant to the study.

3.5 Method of Data Analysis

The data obtained were expressed in percentage in table and descriptive statements were used to give answers to the basic questions set in the study. Thus each basic question raised in the study was answered based on the data obtained through the data collection instruments.

Regarding the first basic question the data obtained through questionnaire for both teachers and school directors were analyzed.

The data collected through classroom observation by rating scale and check list were analyzed to answer the second basic questions.

Regarding the third basic question the data collected through questionnaire were thoroughly analyzed to provide necessary answer.

The last basic question was answered, mainly through the analysis of the data collected from students questionnaire.

Furthermore, the data obtained from teachers, directors and students were substantiated with the data obtained through the interview made with the teachers who were observed in the classroom, and school directors where classroom observations were conducted.

CHAPTER FOUR

ANALYSIS AND INTERPRETATION OF DATA

In this chapter the data collected through different questionnaire, classroom observations and interviews are presented with the help of tables followed by descriptive statements for analysis to give answers to the four basic questions raised in the study. In most of the tables more than five items were placed according to relations they have in a particular sub-topic for collective discussion following the tables.

4.1 Teachers' Classroom Performances

Classrooms are places where most of instructional activities take place. One of the indicators of whether what is intended in the syllabus is implemented or not is teacher's classroom performances. In this regard, the actual classroom instructional performances of teachers with respect to the prescribed strategies were observed on a rating form showing the frequency of observation for each method and the strategy prescribed in the syllabus. Simultaneously teachers were also observed whether or not they done the activities as suggested in the guideline using a checklist. The data obtained by observation using the rating form and check list are presented in the following tables (4.1 and 4.2).

Table 4.1: Teachers' classroom observation behaviours regarding selecting presentation variables

S. N	Presentation variables	Check				Total sections observed
		Yes	%	No	%	
1	start the lesson by introducing?	7	35	13	65	20
2	attempt to use different instructional methods?	6	30	14	70	20
3	initiate the students to solve problems in the classroom?	8	40	12	60	20
4	check the classroom situation so that it is conducive for teaching and learning activities? [Ex. Chalk board usage, students' sitting arrangement etc]	3	15	17	85	20
5	give classroom and home work?	11	55	9	45	20
6	correct students' work?	2	10	18	90	20
7	make summary of important concepts of the lesson?	9	45	11	55	20
8	recommend additional reference materials related to conducted lesson topics?	1	5	19	95	20
	Average (mean) of percentage		29.38		70.62	

The table depicts that 65% of the teachers whose classes were observed did not start the lesson by first introducing the topic of their lesson for the day. The Table also shows that 70% of the observed teachers did not attempt to use different instructions methods. On the other hand in only 40% and 15% of the observed sessions the teachers were found initiating their students to solve problems in he classroom and check the convenience of their classrooms for effective teaching-learning activities respectively. Furthermore, during 90% of the observed sessions teachers were found not to be checking their students work. They were also found not recommending additional reading materials related to the lesson during 95% of the observed sessions.

It is only in 55% of the sessions observed that teachers were seen giving class and homework and in 45% of the observed sessions they were observed giving summary of important concepts of the lesson. As the average percentage of teachers' activities observed with regard to lesson presentation methods, in the 70.62% of the observed sessions the teachers were found not properly following the methods suggested in the guideline. Nacaro-Brown and his associates (1982: 2) defined teaching as an attempt to help some one acquire some skill, attitude, knowledge, ideas or appreciation. Accordingly, the teachers' task is to create or influence desirable changes in behavior on the part of their students. But in most of the observed sessions teachers were found following the traditional teacher-directed explanation and questioning methods followed by students seat work on paper and pencil assignment. Regarding this, Fullan (1992: 37) indicated that teaching methodologies include providing opportunities for active involvement of the pupil using a variety of resources and techniques.

Table 4.2: Teachers' Classroom behaviour with regard to some instructional considerations

S. N	Instructional considerations	Rating scales						Total sessions observed
		Frequently		Rarely		Not at all observed		
		No	%	No	%	No	%	
1	How often does the teacher encourage students to involve in discussion?	4	20	7	35	9	45	20
2	treat laws and principles sufficiently?	7	35	9	45	40	20	20
3	relate lesson to students' real-life situations?	3	15	7	35	10	50	20
4	make efforts to recapitulate students' misunderstandings and discuss or explain the unclear concepts?	5	25	10	50	5	25	20
5	provide answers to questions that students fail to answer?	12	60	5	25	3	15	20
6	guide the students to find solutions for mathematical problems by themselves?	3	15	8	40	9	45	20
7	forward cross questions to check students' understanding	4	20	7	35	9	45	20
	Average (mean) of percentage		27.14		37.85		35	

Table 4.2 (see above) presents data obtained through classroom observations with regard to seven instructional considerations that were considered in grade 9 mathematics syllabus and teachers' guide. The table shows how frequently the teachers practice the instructional considerations identified. As table 4.2 depicts in only 20% of the observed sessions teachers were observed frequently encouraging students to involve in discussions. In 35% of the sessions observed teachers were observed to treat laws and principles. In 45% of the observed session teachers were not found encouraging the pupils to be involved in discussion, whereas in 35% of the observed sessions they were found rarely encouraging the students. Similarly in 50% of the observed sessions the teachers were observed not relating the lesson to students real life situations and were observed rarely making efforts to recapitulate students' misunderstandings and discuss or explain the unclear concepts. On the other hand in 60% of the observed sessions teachers were observed providing answers to questions that students failed to answer, and in only 15% and 20% of the observed session were the teachers found guiding students to find solutions for mathematical problems by themselves and forward cross questions to check students' understandings respectively. They were also not observed guiding the students to solve problems by themselves (in 45% of the observed lessons) and not asking cross questions to check students understanding in (35% of the observed lessons). As the average of the percentage in the rating scales shown in the table, teachers were observed practicing the instructional considerations frequently in 27.14%, rarely in 37.85%, and not at all practicing in 35% of the observed sessions. This in general shows the extent to which the teachers are applying the methods and strategies suggested in the syllabus and teachers' guide and then answering one of the basic questions raised in the study. (i.e. "To what extent do teachers follow methods and

strategies suggested in the syllabus?") Regarding the teaching-learning of mathematics many educators argue that teachers should adopt new methods and strategies in mathematics instruction in order to facilitate students' learning of mathematics. For instance, Adedoton (1990: 9-12) suggested the discovery method, using questions, and group work methods for effective teaching and learning of mathematics.

Resenshine and Stevens (1986: 376-387), after reviewing numerous studies suggested that effective teaching involves teaching in small steps with students practice after each step, guiding students during initial practice, and providing all students with high level of successful practice in systematic teaching of mathematics. Similarly, Weltrock (1986) stressed the importance of "checking for understanding" in teaching mathematics. Still others, for instance, Coulter (1987: 272) emphasizes the role of homework and assignments as methods of teaching mathematics.

4.2 Compatibility of the School Organizations to Implement the Syllabus

In this study the presence of school physical facilities, the availability and usage of instructional resources and the support provided for teachers are identified as the major organizational factors determining the implementation of grade 9 mathematics syllabus. To this end the following 9 tables show data obtained from teachers and directors through questionnaires classroom observation data is also shown in the tables.

4.2.1 Availability of School Physical Facilities

From among the infrastructure of school, the basic facilities such as classroom, libraries and school pedagogical centers are considered for this study. Thus, the data in

the following tables show the availability of these facilities in the school for the implementation of grade 9 mathematics.

Classrooms are places where learners are motivated to grow intellectually and emotionally. Because of this they should be sufficiently available and convenient for effective teaching learning process. In this regard Majasan (1995:48-49) noted that if classrooms are overcrowded effective teaching will be hampered.

Table 4.3: Number of Students in a class and Student textbook ratio (As obtained from school directors).

School	Student class ratio	Student textbook ratio
Addis Ketema S.S	1:90	1:1
Ayer Tenna S.S	1:75	2:1
Dilachin S.S	1:85	1:1
Dilber S.s	1:89	1:1
Kolfe S.S	1:78	2:1
Medhanalem S.S	1:90	1:1
Minilik S.S	1:90	1:1
Tikur Anbessa S.S	1:87	1:1
Average student class ratio	1:85.5	

As table 4.3 above depicts the average student class ratio is 85.5:1 which is inconvenient for proper classroom management and effective teaching learning activities in the classroom. This can affect the implementation of grade 9 mathematics syllabus. Regarding this Goodlad (1984:175) noted that over crowedness of the classroom is one of the factors inhibiting curriculum implementation. The student textbook ratio as shown in the table is fair, except in the two schools where the ratio is 2:1.

Table 4.4: The Condition of School Infrastructures

Schools	Is there school pedagogical center?		Is there library?	
	Yes	No	Yes	no
Addis Ketema s.s	✓	-	✓	-
Ayer Tenna s.s	✓	-	✓	-
Dilachin s.s	✓	-	✓	-
Dilber s.s	✓	-	✓	-
Kolfe s.S	✓	-	✓	-
Medhanalem s.s	✓	-	✓	-
Minilik s.s	✓	-	✓	-
Tikur Anbess s.s	✓	-	✓	-

As shown in table 4.4 all the schools have school pedagogical centers and libraries. The existence of these facilities is encouraging. However, curriculum implementation requires the availability of adequate instructional resources in the libraries and SPC. The following two tables (4.5 and 4.6) show the data obtained from both teachers and directors on the availability of instructional resources in these two school facilities.

Table 4.5: The Availability of Instructional resources in the schools as rated by teachers.

Items	Alternatives	Teacher respondents	
		No	%
What is your opinion on the number of reference materials (books) in the library when seen against the number of students that would like to use the materials?	A. More than adequate	-	0
	B. Adequate	6	18.75
	C. Not adequate	26	81.25
	Total	32	100
Does your school have sufficient number of instructional materials relevant to teaching grade 9 mathematics?	A. Yes	6	22.2
	B. No	21	77.8
	Total	27	100

Table 4.6: The availability of instructional resources in the schools as rated by directors.

Items	Alternatives	Director respondents	
		No	%
How do you rate the availability of mathematics reference materials in your school library?	A. Excess	-	0
	B. Adequate	3	37.5
	C. Not adequate	5	62.5
	D. Non exist	-	0
	Total	8	100
How do you rate the availability of mathematics instructional materials in your school pedagogical center?	A. Excess	-	0
	B. Adequate	1	12.5
	C. Not adequate	7	87.5
	D. Non exist	-	0
	Total	8	100

As shown in tables 4.5 and 4.6 above 81.25% of the teacher respondents and 62.5% of director respondents reported that the availability of relevant mathematics reference materials in the school libraries is not adequate enough. Only 18.75% and 37.5% of teachers and directors respectively responded that the references books in the libraries are adequate.

Similarly, 77.5% and 87.5% of teacher and directors respectively responded that the amount of instructional materials relevant to mathematics available in their school pedagogical centers is not adequate; and only 22.2% of teacher respondents and 12.5% of director respondents reported that there are adequate instructional materials in this schools.

The observed inadequacy of reference books and instructional materials seems to have a significant effect on the level of the success of the implementation of mathematics curriculum in the context of this study. In this regard, it was asserted in the New Education and Training Policy (NETP) (1994) of Ethiopia that the growth of science and technology and the corresponding effect of its development on educational activities call for the appropriate selection and usage of instructional materials for successful implementation of curriculum.

4.2.2 The Support Provided for Teachers

The amount and type of stationery and other teaching materials provided for teachers have great impact on the implementation of curriculum. The data presented in table 4.7 below shows the support provided for grade 9 mathematics teachers in the schools.

Table 4.7: Materials provided for teacher

Kinds of materials	Amount	Teachers' Responses	
		No	%
Exercise books for preparation?	A. Adequate	28	70
	B. Not adequate	8	20
	C. Not at all	4	10
	Total	40	100
Pens and Pencils	A. Adequate	8	20
	B. Not adequate	24	60%
	C. Not at all	8	20
	Total	40	100
Paper for making notes and working mathematical problems	A. Adequate	5	12.5
	B. Not adequate	12	30
	C. Not at all	23	57.5
	D. Total	40	100
Register forms for recording continuous test results	A. Adequate	26	65
	B. Not adequate	11	27.5
	C. Not at all	3	7.5
	D. Total	40	100

As the data in table 4.7 depicts the teachers are not sufficiently provided with many of the stationery materials which could help them for effective teaching-learning activities. For instance 60% of teacher respondents reported that pens and pencils provided for them are not adequate and 57.5% of the teachers responded that they are not provided with papers for preparing notes and working mathematical problems. This shows that there is insufficient good support for the teachers to implement grade 9 mathematics syllabus. In this regard Pratt (1983: 430) noted that if teachers are not provided with materials and are not supported by in-service training, they will be likely to do what they have done in the past. He further indicated that any curriculum implementation requires a full-hearted administrators support.

4.2.3 The Condition and Availability of Internal Facilities of Classrooms

The availability and condition of internal facilities of classrooms have a great impact on the teaching learning activities. If classroom facilities like desks, tables, chalkboard, notice board, etc are not adequately available and are in poor condition. Thus, they obviously hinder the effective implementation of curriculum.

Table 4.8: The availability of classroom facilities

Classroom facilities	Alternatives	Teacher Respondents	
		No	%
Students' desks and tables	A. Adequate	23	57.5
	B. Inadequate	17	42.5
	C. Non existent	0	0
	Total	40	100
Chairs for teachers	A. Adequate	0	0
	B. Inadequate	10	25
	C. Non existent	30	75
	Total	40	100
Chalk board	A. Adequate	31	77.5
	B. Inadequate	9	22.5
	C. Non existent	0	0
	Total	40	100
Notice board	A. Adequate	11	27.5
	B. Inadequate	10	25
	C. Non existent	19	47.5
	Total	40	100
Instructional materials for mathematics	A. Adequate	6	15
	B. Inadequate	16	40
	C. Non existent	18	45
	Total	40	100

As revealed in table above only 37.5% of teachers responded that desks and tables for students are adequate in the classrooms. All other classroom facilities are found to be inadequate or non-existent. For instance the non-existent of chairs for teachers and notice boards is reported by 75% and 47.5% of the teacher respondents respectively. Similarly 43% of teachers responded that there are no instructional materials for mathematics in the classrooms. Regarding this, Majasan (1995:48-49) noted that for an effective teaching-learning to occur classroom should be organized properly because whatever clever the teacher may be if the classroom is disorganized or overcrowded, effective teaching will be hampered. Data observed during classroom observation also conforms the responses obtained from the teachers. This means that most of the classrooms observed had either no or very limited internal facilities.

4.2.4 The Nature of Communication Among School Community Members

The type and nature of communication that exists among people involved in curriculum implementation in general and among those who have a day-to-day attachment to the curriculum (teachers, students, school directors, etc), in particular is very crucial for the effective curriculum implementation.

The data presented in the following table shows the nature of communication that exists among teachers themselves, teachers and department heads and teachers and school principals.

Table 4.9: The type and nature of communication in the schools (as obtained from teachers' responses)

Items	Alternatives	Teacher responses	
		No	%
How often do you meet to discuss with mathematics teachers of the same grade issues related to what you do during mathematics periods?	A. Once in a semester	4	11.4
	B. Once in a week	9	25.7
	c. Only during departmental meeting	21	60
	d. We do not meet at all	1	2.9
	Total	35	100
How often do you hold department meeting?	a. Once in a semester	14	37.83
	b. Once in a month	16	43.24
	c. More than once in a month	7	18.91
	d. Not at all	-	0
	Total	37	100
How often does your department head supervise your classroom?	a. Once in one academic year	-	0
	b. Once in a month	-	0
	c. Once in a semester	38	95
	d. Once in a week	1	2.5
	e. He/she does not visit me at all	1	2.5
	Total	40	100
How often do you meet your department head to discuss issues related to the implementation of grade 9 mathematics?	a. Once in a semester	13	34.21
	b. Once in a year	-	0
	c. Right after each supervision period	17	44.73
	d. We do not meet at all	8	21.05
	Total	37	100
How often does you school director supervise your classroom?	a. Once in one academic year	4	10
	b. Once in a semester	30	75
	c. More than once in a semester	-	0
	d. Not at all	6	15
	Total	40	100
How often does your school director or vice-director discuss matters related to the implementation of grade 9 mathematics with you?	a. Frequently	-	0
	b. Sometimes	10	25
	c. Rarely	10	25
	d. We never discuss the matter	20	50
	Total	40	50
What is your opinion about the effects of the current organizational structure of your school on the implementation of grade 9 mathematics?	a. Very convenient	8	23.52
	b. Convenient	20	58.85
	c. Not convenient enough	6	17.65
	Total	34	100

As the data in table 4.9 shows the communication that exists among teachers and other school personnel in the process of implementing of the curriculum is not adequate. For instance 60% of teachers replied that teachers of the same grade level

discuss issues related to the implementation process only during departmental meeting which is said to be held once in a semester (37.83%) or once in a month (43.24%) if effective implementation of a given curriculum is wished teachers teaching the same grade level should meet to discuss issues of implementation frequently. Similarly 95% of teachers respondents said their department heads supervise their classrooms only once in a semester and 75% of them responded that their directors also supervise their classroom only once in a semester. Moreover, 50% of teachers responded that their director or vice-directors never discuss matters related to the implementation of grade 9 mathematics with them. From the teachers responses to questions related to the type and nature of the communication existing in their schools, it can be understood that the communication system is not adequate enough to enhance the implementation of grade 9 mathematics syllables.

Regarding this, Snyder et al (1992: 417) noted that the greater the quality and quantity of sustained interaction among people involved in curricular activities the greater the degree of implementation. Similarly, Fullan (1991: 67-73) indicated that collegiality, trust, and interaction between teachers, raises the degree of implementation of curriculum.

Moreover, similar data obtained from directors also depicts that there exists a poor communication system in the schools included in this study. Table 4.10 shows this.

Table 4.10: The communication existing in the school (as obtained from directors responses)

Items	Alternatives	Director responses	
		No	%
Have you ever visited mathematics teachers of grade 9 in their classrooms?	A. Yes	8	100
	B. No	-	0
	Total	8	100
Have you ever discussed with mathematics teachers (individually or in group) issues related to the implementation of grade 9 mathematics syllabus	A. Yes	1	14.29
	B. No	6	85.71
	Total	7	100
Have you observed any problem in your school in implementing the grade 9 mathematics syllabus?	A. Yes	8	100
	B. No	-	0
	Total	8	100
What were the major problems observed in your school in implementing the grade 9 mathematics syllabus?	a. Lack of experience of mathematics teachers	-	0
	b. Shortage of mathematics teachers	1	16.6
	c. Lack of necessary teaching materials	2	33.3
	d. Lack of trained mathematics teachers in relation to the new syllabus	3	50
	Total	6	100
Were you introduced to how the new curriculum could be implemented? Say, through different workshops or seminars?	A. Yes	1	12.5
	B. No	7	87.5
	Total	8	100

The data in table 4.10 above shows that 85.71% of directors replied that they have never discussed issues related to the implementation of grade 9 mathematics syllabus with grade 9 mathematics teachers. A Similar percent of directors (87.5%) responded that they were not introduced to how the new curriculum could be implemented. This shows that directors lack orientation on how the new curriculum could be implemented. Moreover 50% of director respondents identified lack of trained mathematics teachers in relation to the new syllabus as a major problem they faced in the process of

implementing. The large class size and the vastness of teaching materials (textbook) were also identified by some directors as a major problem which hinder the proper implementation of the syllabus.

4.2.5 Teachers' Involvement in Curriculum Activities

Teacher's participation in curriculum activities throughout the different stages of curriculum is very much helpful for effective implementation of the curriculum. With regard to this, the following data 4.11 show the nature of teachers' involvement in curriculum activities.

Table 4. 11: Teachers' involvement in curriculum activities.

Aspects of involvement	Alternatives	Teachers' responses	
		No	%
Do you have any access to grade 9 mathematics syllabus?	A. Yes	15	40.5
	B. No	22	59.5
	Total	37	100
Do you manage to complete the text with in the time allotted?	A. Yes	16	40
	B. No	24	60
	Total	40	100
Do you think you need more training to implement grade 9 mathematics syllabus effectively?	A. Yes	16	40
	B. No	24	60
	Total	40	100

As the data in table 4.11, indicates 59.5% of teacher respondents reported that they do not have any access to grade 9 mathematics syllabus and 60% of teachers' responses show that they do not manage to complete the text within the time allotted. This implies that the teachers do not have sufficiently knowledge about the syllabus. This carries with it the implication that the teachers involved in this study may not be in a position to implement the curriculum as effectively as is wished to be done. To this end Dorthick

(1953: 219) in Shlunidu and Omulando (1992: 220-221) argue that the teachers' role is not only in effecting the planned curriculum but they should also play a significant role in developing the curriculum plan.

On the other hand, though 65% of teacher respondents responded that they do not need more training to implement grade 9 mathematics syllabus, a significant number of teachers' responses (35%) shows that they need more training. This difference in opinion towards the need for more training might arise from teachers traditional conception of teaching methods (teacher-centeredness ignoring students active role in teaching learning activities). It may also shown their resistance to change and innovations in the profession. Regarding this, research on teaching and learning mathematics conducted in the United States of America (Carpenter, T-P et al 1986: 831) revealed that mathematics teachers are essentially teaching the way they were taught in schools.

Therefore, the results obtained in tables 4.10 and 4.11 and the discussions followed answer the research question by identifying the school organization compatibility as one major factor influencing the implementation of grade 9 mathematics syllabus.

4.3 Factors Affecting the Implementation of Grade 9 Mathematics Syllabus

The data summarized below (see tables 4.12 and 4.13) show the extent to which factors selected affect the implementation of grade 9 mathematics syllabus.

Table 4.12: Possible factors that affect the implementation of the syllabus as ranked by respondent teachers

No	Possible factors	Mean rank	Rank	Teacher respondents
1	In adequacy of the periods to cover the portion	3.31	3	28
2	Teachers not being introduced to the syllabus	5.275	6	29
3	Teachers lack of interest	5.448	4	29
4	Poor supply of instructional materials at the school	4.379	7	29
5	Inappropriateness of the teaching methods and guide-lines suggested in the syllabus	4.551	5	29
6	Lack of prerequisite knowledge of the students	2.689	2	29
7	Overcrowdness of the classroom	2.206	1	29

As can be seen in the above tables mathematics teachers have put the factors that affect the implementation of grade 9 mathematics syllabus in order of their influence. The data obtained reveals that overcrowdness of the classrooms, lack of prerequisite knowledge by the students, inadequacy of the periods to cover the portion, poor supply of instructional materials by the school, and the inappropriateness of the teaching methods and guidelines suggested in the syllabus took the upper fives ranks among the factors that hinder the implementation of grade 9 mathematics syllabus.

On the other hand teachers' lack of interest and their not being introduced to the syllabus took the lower two ranks (7th and 6th respectively) denoting the minimal influence they have on the implementation of the syllabus.

The overcrowdness of the classrooms is also observed as a major factor negatively influencing the teaching and learning activities during the classroom observation sessions. Similarly those teachers who were interviewed emphasized the impacts overcrowdness of the classrooms have on the implementation activities of the syllabus.

Furthermore, the school principals were also asked to list some of the problems encountered during the implementation of grade 9 mathematics syllabus. The most widely mentioned problems by the school principals were over-crowdness of the classrooms and lack of training for teachers on how the new curriculum could be implemented.

Therefore, the major factors affecting the implementation of grade 9 mathematics syllabus are identified according to the rank order listed above.

Regarding this, Goodlad (1984: 175) noted that overcrowdness of classrooms is one of the factors affecting curriculum implementation. He further argues that the overcrowdness of classrooms results in frustration on the part of the teachers in their effort to perform their teaching roles.

Table 4.13: Assessment of classroom implementation barriers with respect to teaching load, students-class ratio and organizational factors

Items	Alternatives	Teacher respondents	
		No	%
Do you think the number of periods you teach in a day or in a week has any impact on your teaching effectiveness?	A. Yes	30	76.92
	B. No	9	23.08
	Total	39	100
On average, how many students do you teach in one class?	a. 40	0	
	b. 50	0	
	c. 60	0	
	d. 70	2	5
	e. 80	25	62.5
	f. 90 and above	13	32.5
	Total	40	100
Does the number of students affect what you do in the classroom?	a. Yes	40	100
	b. No	0	0
	Total	40	100
What is your opinion about the effects of the current organizational structure of your school on the implementation of the syllabus?	a. convenient	8	23.53
	b. Not very convenient	20	58.82
	c. Not convenient at all	6	17.65
	Total	34	100

Moreover, the information obtained in the rank order is also substantiated with information obtained in the questionnaire part. To this end, as the data in table 13 above depicts 76.92% of teacher respondents reported that the teaching load they have has a great impact on their teaching effectiveness. All of the teacher respondents (100%) reported that the existing large class size (overcrowdness of the a classrooms) is major implementation barrier.

Teachers were also asked to give their opinion about the effect of current organizational structure of their schools on the implementation of grade 9 mathematics syllabus. As to the responses of the teachers, 58.82% of the teacher respondents reported that the school conditions are not very convenient for effective implementation of the syllabus and only 28.53% reported that the school organizational structure is convenient for effective teaching.

Therefore, the data in tables 12 and 13 and the discussions that followed the tables together with the findings of the other parts of the study answer the third basic question raised in the study. That is "what are the major factors affecting the implementation of grade 9 mathematics syllabus?"

4.4 Assessment of Students' Feeling of mathematics Learning as a Result of Current Teaching and Learning of Grade 9 Mathematics

The data in the following table shows students' responses regarding their grade 9 mathematics learnings. The questions in the questionnaire were prepared in Amharic to avoid misunderstanding on the part of the students but translated to English in the appendix.

It is believed that mathematics has a very crucial role to play in one's school life and life out of the school. Despite this fact it can be observed that many students do not perform well in mathematics. With this understanding, this study intended to assess how far the current teaching and learning activities of grade 9 mathematics brought about better feeling of mathematics learning in the students. The data obtained from the students through questionnaire reveals the case as follows.

Table 4.14: Assessment of students' feeling of mathematics learning

No	Items	Alternatives	Student respondents	
			No	%
1	What is your experience of using the library? I _____ use library.	a. Always	12	8.45
		b. Frequently	60	42.26
		c. Rarely	60	42.26
		D. Very rarely	10	7.04
		Total	142	100
2	If your response to question number 1 above is 'rarely' or "very rarely", which one of the following do you think the reason is?	a. Teachers do not recommend additional reading materials and motivate the students	24	34.29
		b. Because the textbook is sufficient	28	40
		c. Lack of experience to use library	18	25.71
		Total	70	100
3	How often do you participate in preparing instructional materials related to grade 9 mathematics in SPC?	a. Very frequently	13	9.15
		b. Frequently	39	27.46
		c. Rarely	30	21.13
		d. Very rarely	40	28.16
		Total	142	100
4	What is your experience in group work during mathematics learning ?	a. Very good	25	17.60
		b. Good	52	36.62
		c. Poor	50	35.21
		d. Very poor	13	9.15
		Total	142	100
5	If your response to question number '4' is poor or very poor, which one do you think the reason is?	a. Because mathematics teacher does not initiate me to work in group.	35	55.6
		b. Learning mathematics is not convenient for group work.	7	11.1
		c. I do not like group work	21	33.3
		Total	63	100
6	How strong is the effect of your mathematics knowledge on other subjects?	a. Very strong	112	78.87
		b. Strong	18	12.68
		c. Its effect is not observable in other subjects	12	8.45
		Total	142	100
7	In which of the following methods do you think mathematics learning is highly possible?	a. When the teacher solves problems by himself	27	19.15
		b. When the teacher guides and students solve the problems	97	68.8
		c. More through reading reference materials	11	7.8
		d. Through individual study only	6	4.25
		Total	141	100
8	How often does your mathematics teacher relate the mathematics lesson to your real life situation in the classroom?	a. Frequently	15	10.64
		b. Rarely	53	37.59
		c. Very rarely	68	48.22
		d. Not at all	5	3.54
		Total	141	100
10	To what extent did the teaching and learning of current grade 9 mathematics lessons motivate your interest in learning mathematics?	a. To a very great extent	17	11.99
		b. To a great extent	50	35.21
		c. To no extent	75	52.81
		Total	142	100

The valid criterion of success in teaching is the degree to which the teacher has been able to bring a desirable change in behavior in his students. This shows that the teaching strategies teachers use to teach is an important aspect of educational activity to realize the implementation of the syllabus. The data in table 4.14 above shows the student behavior developed as the result of current grade 9 mathematics syllabus implementation. As the table depicts the majority of student respondents (42.26%) reported that they rarely go to the libraries to read additional reference materials, and the majority of those who reported this experience also reported that they rarely go to libraries because they found the text book to be sufficient, and the significant number of this group (34.29%) reported that it is because the teachers do not recommend additional reading materials to motivate the students. Similarly, the experience the students have in preparing relevant mathematics instructional materials in school pedagogical centers is found to be poor. This can be seen from the responses of the majority of student respondents (28.16%) who say that they very rarely participate in the preparation of instructional materials.

Furthermore, though 36.62% of the students reported the experience they have in group work is good during mathematics learning, a significant number of students (35.21%) reported that they have poor experience in group work. The majority of the students (55.6%) who reported that they have poor or very poor experiences in group work reported that it is because mathematics teachers do not initiate them to work in group.

On the other hand 78.87% of student respondents reported that the effect of mathematical knowledge in other subjects they learn is very strong. Moreover 68.8% of

the students reported that mathematics learning is highly possible in teaching and learning activities when the teacher guides and the students solve the problems by themselves. But as already discussed in section 4.1.4 under table 4.9 the teachers do not emphasise this method, rather they are devoted to in practicing teacher centered approach. On the other hand, the majority of the students (48.22%) reported that mathematics teachers very rarely relate mathematics lesson to their real life situations in the classrooms, and only 15% of student respondents responded that teachers frequently relate their mathematics lesson to real life situations.

Lastly 52.81% of the students reported that the teaching and learning of current grade 9 mathematics lessons did not motivate their interest in learning mathematics and 11.99% and 35.21% of the students reported they are motivated to a very great extent and to a great extent respectively.

Therefore, from the data presented in table 14 and discussion followed, it a good behavioral change towards the learning of mathematics does not seem to be properly developed as the result of current teaching and learning activities practiced by grade 9 mathematics teachers.

Regarding the role mathematics has, S.T. Bajah in "Connect" UNESCO Newsletter Vol. XXV. No 3-4 (2000: 5) noted that mathematics all over the world, has always been considered as a bridge not only between science and technology but also between all the subjects offered in our formal education system. He further urged that any one who is good in mathematics is presumed to be able to cope with other school subjects.

Similarly, Dossey (1992: 42) noted that the conception of mathematics held by the teachers may have a great deal to do with the way in which mathematics is characterized in classroom teaching. The subtle message communicated by children about mathematics and its nature may, in turn, affect the way they grow to view mathematics and its role in their world. This shows how big and decisive is the teachers attitude towards the subject and his ways of teaching in classroom to bring about change of behavior on the part of the pupils.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary

The purpose of this study was to evaluate the implementation of grade 9 mathematics syllabus in selected government schools in Addis Ababa. In particular, the study was designed to give some insight into:

1. the extent to which teachers are applying the methods and strategies suggested in the syllabus and teachers guide.
2. the extent to which school organization infrastructures are in line with the requirements of the syllabus.
3. the major factors which could hinder the implementation of the syllabus, and
4. the extent to which the teaching and learning activities of grade 9 mathematics have brought (developed) a better feelings of learning mathematics in the students. To this end three sets of questionnaires, classroom observations and interviews were used to obtain proper data. The data collected were analyzed interpreted and using descriptive statistics.

The interpretations and analysis of the obtained data are summarized as follows:

First, with regard to teachers classroom performance, 65% of the teachers whose classes were observed were found not starting lessons by first introducing the topic of the lesson. It was also observed that 70% of the teachers did not attempt to use different instructional methods. Similarly, during the 90% and 95% of the observed

sessions teachers were observed not to check their students' work and were also found not to recommend additional reading materials related to the lesson. It is only observed that 55% of the teacher giving class and homework. Furthermore, less than 50% of the teachers were observed to give summary of the important concept. Generally the average percentage of teachers' classroom performances (70.62%) show that they were not properly applying the methods and strategies of teaching suggested in the syllabus.

During classroom observations, some instructional considerations were identified and used to obtain information on teachers' classroom behaviors. To this end, in only 20% of the observed sessions teachers were observed encouraging the students to involve in discussion. In 35% of the sessions observed teachers were observed to treat laws and principles. Similarly, in 50% of the observed sessions teachers were observed not to relate the lesson to students real life situations and were observed rarely making efforts to recapitulate students' misunderstandings and reteach the unclear concepts. The teachers were also observed practicing the instructional considerations identified frequently in 27.14%, rarely in 37.85% and not at all practicing in 35% of the observed sessions. This shows that the teachers were applying the methods and strategies suggested to a very poor extent.

Second, with regard to the suitability of school organization infrastructure, the average student class ratio in the selected schools is found to be approximately 1:86 which implies that the classrooms are highly overcrowded. 81.25% of the teachers and 62.5% of the directors reported that reference materials related to grade 9 mathematics are not adequately available in their school libraries. Similarly, 77.5% of the directors and

87.5% of the teachers reported that the availability of instructional materials related to mathematics are not adequate enough in their school pedagogical centers. Furthermore, the support provided for the teachers by the school is observed to be inadequate. For instance, 60% of the teachers reported that pens and pencils provided for them are not adequate and 57.5% of them responded that they are not provided with papers for preparing notes and working mathematical problems. It was also observed that classroom internal facilities were not adequately available. For instance, the non-existence of teachers' chairs and notice boards in the classroom is reported by 75% and 47.5% of teacher respondents respectively. This problem was also observed during classroom observation. Regarding the type and nature of communications in the schools, it was found that there is a poor communication system in the schools. For instance, 60% of teachers reported that teachers of the same grade level discuss issues related to the implementation process only during departmental meeting which is said to be held once in a semester. 95% and 75% of the teachers also reported that their department heads and their directors supervise their classes only once in a semester. 50% of the teachers replied that their directors or vice-directors never discuss issues related to the implementation of grade 9 mathematics syllabus with them. Similarly, 85.7% of the directors responded that they had never discussed issues related to implementation activities with the teachers. This implies that the existing communication in the schools did not enhance the effective implementation of the syllabus.

Regarding teachers' involvement in curriculum activities, the data obtained revealed that 59.5% of the teachers do not have access to grade 9 mathematics syllabus. On the other hand, though 65% of the teachers reported they don't need more training to

implement grade 9 mathematics syllabus, a significant number of them (35%) responded that they need more training to implement the syllabus effectively. It was also observed during interview made with the teachers that they only use the textbook and many of them don't use the syllabus and teachers guide. They simply teach the way they feel is good.

Thirdly, regarding the possible factors identified to affect the implementation of the syllabus, the teachers have put overcrowdness of the classrooms, lack of prerequisite knowledge by the students, inadequacy of the periods to cover the portion, poor supply of instructional materials by the schools, and the inappropriateness of the teaching methods and guidelines suggested in the syllabus as the upper five ranking among factors influencing the implementation of grade 9 mathematics syllabus.

Similarly, 76.96% of the teachers agreed that their teaching load has a great impact on their teaching effectiveness and all of the teachers (100%) again confirmed that the existing large class size (overcrowdness of the classrooms) is major implementation barrier. On the other hand, it was found that 58.82% of teachers reported the existing school conditions are not very convenient for successful implementation of grade 9 mathematics syllabus.

Fourth, as the data in section 4.4 revealed students behavior towards mathematics learning does not seem to have been properly developed as a result of current teaching-learning of grade 9 mathematics. Accordingly, the majority of student respondents (42.26%) showed that they do not have experiences of using libraries and a significant number of students (34.29%) reported that their teachers do not initiate them to use libraries. Similarly, among the students who reported that they have poor

or very poor experiences in group work during mathematics learning (55.6%) agreed that their teachers do not encourage them to work in group. Moreover, the majority of the students (48.22%) reported that their mathematics teachers rarely relate mathematics lesson to their real life situations. As a result the students could not see the role mathematics has in their real life. This is supported by the responses of the students in which the majority (52.81%) of them agreed that the current grade 9 mathematics lesson did not sufficiently motivate their interest in learning mathematics.

5.2 Conclusion

It can be concluded from the finding of this study that most of the demands of grade 9 mathematics syllabus were not implemented as properly as they were intended to be implemented in Addis Ababa Administrative Region.

This is evident from teachers actual practices as to the requirements of the guidelines and students' behavioral development towards learning mathematics. Most of the instructional strategies and methods suggested to be used were not observed in the majority of the classrooms observed. Most of the teachers were observed not encouraging the students to participate in discussion and solve problems by themselves, rather the teachers were found doing the traditional method of teaching (teacher centeredness). The students' involvement in the process of teaching of mathematics was found to be minimal. As a result, students' feelings of learning mathematics does not seem to have properly been developed.

The overcrowdness of the classrooms, the inadequacy of the availability of related reference materials in the libraries and shortage of mathematics instructional materials in the schools pedagogical centers, together with the poor communication system existing among the school community members may have contributed to the limited success of the implementation process of the syllabus. Furthermore, lack of full commitment on the part of the teachers to implement the syllabus together with the absence of introducing them to new method of teaching or the syllabus and the absence of involving them in curriculum activities may have also contributed to the ineffectiveness of the attempts teachers make towards implementing the syllabus.

5.3 Recommendations

In light of the findings of the study it seems reasonable to forward the following recommendations.

1. The large class size (overcrowdness of the classrooms), inadequacy of related reference books in the libraries and shortage of instructional materials were found to be the major factors inhibiting the implementation of grade 9 mathematics syllabus. Therefore, the concerned administrative bodies and the community at large should devise mechanisms to build additional classrooms. In addition, as a short term plan teachers should pay full committeemen to devise new teaching methods such as grouping students according to some criteria (age, abilities etc) during teaching learning of mathematics to reduce the effect overcrowdness of classrooms have on the teaching-learning activities. Similarly, school principals and teachers should do a cooperative work and show their best effort towards the fulfilling of reference materials in the libraries and instructional

materials in the SPC. With this regard, specially the school administration should take the initiative or coordinating the community members to play important role regularly.

2. Lack of knowledge about grade 9 mathematics materials (syllabus and teachers' guide) on the part of grade 9 mathematics teachers was also found to be another major problem in the implementation process. Therefore, the concerned educational authorities (personnel) working at various level of the administrative structures should plan, organize and coordinate training programmes to upgrade teachers' abilities and capabilities in their profession. Even if re-training all teachers seems impractical, other mechanisms like workshops and seminars or in-service trainings should be intensively practiced to orient the teachers with educational changes. This might help to modify teachers' values of the innovation.
3. The inadequacy of communication among teachers and teachers and other school community members was also identified as another implementation barrier of grade 9 mathematics syllabus. Therefore, the school directors, department heads, teachers and school community members collectively should devise a new communication system which can facilitate the effective implementation of the syllabus. For instance, arranging regular monthly meetings to discussed issue related to syllabus implementation activities could be one of the mechanisms. And inviting senior academicians on workshops, seminars and departmental meetings to share their experiences regarding the implementation of syllabus could be another mechanism.

4. The inconvenience of school conditions like internal classroom facilities and support provided for teachers was also found to be barrier of syllabus implementation. Hence, the school administration and school committee memberd should find ways of improving internal classroom facilities and allocate a budget for stationery materials to provide for the teachers regularly.

5. Mathematics teachers and their respective department should design various mechanisms to develop a better behavior in the students towards the learning of mathematics. For instance, besides motivation made in the classroom they should be aware of the role mathematics club plays to bring a desirable behavior in the students and make use of this club intensively. Moreover, the Mathematics Association of Ethiopia (MAE) which was founded in 1981 has a great role to play to develop a desirable behavior in the students towards learning mathematics. One of the major objectives of this association is to popularize mathematics, particularly in schools through professional publications and regular meetings (HISSAB: Vol. 18. no. (1995)). Therefore, mathematics teachers should approach and cooperate to do with this association in order to attain the prescribed above.

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APPENDIX - A

Personal Profile of Teacher Respondents

Items	Alternatives	Teacher-respondents		
		M	F	Total
Qualification	A. M.SC	-	-	-
	B. B.SC/B.ED/B.A	32	3	35
	C. 12+3	1	-	1
	D. 12+2	4	-	4
	E. Others	-	-	-
	Total	37	3	40
Total years of service in the profession	A. 1-5	7	2	9
	B. 6-10	7	1	8
	C. 11-15	3	-	3
	D. 16-20	1	-	1
	E. 21-25	8	-	8
	F. 26-30	6	-	6
	G. Above 30	5	-	5
	Total	37	3	40
Teaching subjects other than mathematics	A. Yes	3	-	3
	B. No	34	3	37
	Total	37	3	40
Teaching load in periods per-week	A. Less than 10	-	-	-
	B. 10-15	5	-	5
	C. 16-20	2	-	2
	D. 21-25	6	2	5
	E. 26-30	24	1	25
	Total	37	3	40

APPENDIX - B

**Addis Ababa University
SCHOOL OF GRADUATE STUDIES
COLLEGE of EDUCATION
DEPARTMENT OF CURRICULUM AND INSTRUCTION**

(Questionnaire for teachers)

DEAR COLLEAGUE

This questionnaire is designed to collect information for research purpose. The questionnaire focuses on teachers' opinion of mathematics instructional performances and the actual implementation of grade 9 mathematics syllabus. The aim is to investigate the relationship of instructional methods and strategies suggested in the syllabus, and the actual teachers' performances in the classroom. Your genuine responses to the questionnaire is very much helpful for this research.

I am very much grateful to you for your kind cooperation without which the study cannot attain its goal.

Thank you in advance for your cooperation.

Background information

Kifle-Ketema _____ School _____
Grade(s) you teach _____
College or university you graduated from _____
Qualification _____ major _____ minor _____
Year of service in the Profession _____
Sex _____

PART ONE

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

1. Do you teach subject(s) other than mathematics?
a. Yes b. No
2. How many periods do you teach in a week?
a. Less than ten b. 10-15 c. 16-20
d. 21-25 d. 26-30
3. Do you think the number of periods you teach in a day or in a week has any impact on your teaching effectiveness?
a. Yes b. No
4. If your responses to (question 3 above) is "yes" given the constraints (e.g. shortage of teachers, large class size, etc), in which our school are operating, what, in your opinion, would be a reasonable weekly teaching load in order for grade 9 mathematics to have a better working condition?
a. less than ten b. 10 – 15
c. 16-20 d. If any specify _____
5. What do you think you would do to increase the effectiveness of your teaching if you had a fewer periods to teach?

6. Are you currently teaching different sections of different grades?
a. Yes b. No
7. If 'yes', does that influence your teaching in any way?
a. Yes b. No
8. If "Yes", (question 7 above) specify the influence your teaching of different sections of the different grade may have on your teaching.

9. Do you have any access to grade 9 mathematics syllabus?
a. Yes b. No

10. If "yes" (question 9 above), when were you introduced to the syllabus?
- A. Before the publication of the textbook
 - B. After the publication of the textbook but before using it in the classroom.
 - C. After I started teaching from the textbook
11. To What extent do you think the content of the textbook is reflected in the syllabus?
- a. To a very great extent
 - b. To a great extent
 - c. To no extent
12. How often do you use grade 9 mathematics teachers' guide?
- a. Once in a semester
 - b. Once in each new chapter
 - c. In every new topic lesson in a chapter
 - d. I have never used at all so far
13. If your answer to (question 12 above) above is 'D' the possible reason might be
- a. Lack of teacher's guide
 - b. Lack of need to use the guide on your part
 - c. Lack of potential advantages that the guide offers
 - d. If other reason, please specify _____
14. Are there reference books for grade 9 mathematics in your school library?
- a. Yes
 - b. No
15. If your answer to question number 14 is 'yes', what is your opinion on the number of reference books when seen against the number of students that would like to use the materials?
- a. More than adequate
 - b. Adequate
 - c. Not adequate
16. Do you often suggest to students to read reference materials other than the textbooks?
- a. Yes
 - b. No
17. If your response to question (number 16 above) is "yes", please specify the way you check whether or not the students use the materials you recommended?

18. If "No" (question 16 above), please explain why

19. Is there a school pedagogical center in your school?

- a. Yes b. No

20. If your answer to question (number 19 above) is "yes", does the center have sufficient amount of instructional material relevant to teaching grade 9 mathematics?

- a. Yes b. No

21. Do you manage to complete the text (course) within the time allotted?

- a. Yes b. No

22. If your response to question (number 21 above) is "No", what makes it difficult for you to complete the course within the time allotted?

- A. Shortage of the time allotted.
B. Extra work load you have in the school.
C. Because many of the lesson topics are complex to teach
D. Because students cannot cope up with the mathematical problems given in the text.
E. If any, please specify _____

23. On average, how many students do you teach in one class?

- A. 40 B. 50 C. 60 D. 70 E. 80 F. 90 and above

24. Does the number of students affect what you do in the class?

- a. Yes b. No

If 'yes', please explain briefly how _____

25. How often do you meet to discuss with mathematics teachers of the same grade issues related to what you do during mathematics period?

- A. Once in a semester.
B. Once in a week
C. Only during department meetings
D. We do not meet at all

26. If your answer to (question 24 above) is 'D', what do you think might the reason be?
- Because all teachers know what to do and not to do during maths period
 - Because it is the role of directors and department heads.
 - Because there is no time for discussion
 - If any, specify _____
27. How often do you hold department meeting?
- Once in a semester.
 - Once in a month
 - More than one in a month
 - Not at all
28. How often does your department head supervise your classroom?
- Once in one academic year
 - Once in a month
 - Once in a semester
 - Once in a week
 - He/she doesn't visit my class at all
29. Do you know in advance the day/date of the department head's supervision of your classroom?
- Yes
 - No
30. If your answer to (question 29 above) is "No", do you think it would be helpful for you if you knew the date or day of the supervision?
- Yes
 - No
31. If your answer to (question 30 above) is 'Yes', in what way do you think your knowing of the visit in advance might help you?
- _____
32. What do you think your department head would like to focus on during his/her visit to your classroom?
- On issues related to new methods of teaching mathematics.
 - On issues related to students behavior.
 - On issues related to the content of the subject matter.
 - On issue related to your lesson plan preparation.
 - All
 - I don't know what he/she might like to focus on.

33. How often do you meet your department head to discuss issues related to the implementation of grade 9 mathematics?
- A. Once in a semester
 - B. Once in a year
 - C. Right after each supervision period
 - D. We do not meet at all
34. How often does your school director supervise your classroom?
- A. Once in one academic year
 - B. Once in a semester
 - C. More than once in a semester
 - D. Not at all
35. How often does your school director or vice-director discuss matters related to the implementation of grade 9 mathematics with you?
- A. Frequently
 - B. Sometimes
 - C. Rarely
 - D. We never discuss the matter
36. What is your opinion about the support you get from your school directors?
- A. It is too much
 - B. It is enough
 - C. It is less than enough
 - D. there is no support at all
37. Do you think you need more training to implement grade 9 mathematics syllabus more effectively?
- a. Yes
 - b. No
38. If "Yes" (question 37 above) please specify below the kind of training needed to have
-
-
39. What is your opinion about the effects of the current organizational structure of your school on the implementation of the syllabus?
- a. Convenient
 - b. Not very Convenient
 - c. not Convenient at all
40. Do you have a clear understanding of your role relationship with the principal, teachers and other parties in the school in relation to the New Education and Training Policy?
- A. Yes
 - B. No
41. What are the major problems you encountered during the implementation of grade 9 mathematics? _____
-

PART TWO

Direction: Put a mark with tick (✓) to indicate your opinion with the respect to each statement in only one of five alternatives, i.e.

5. strongly agree 4. Agree 3. undecided
 2. disagree 1. Strongly disagree

No	Statement	5	4	3	2	1
1	Most of the aims and objectives of grade 9 mathematics which are written in the syllabus and teacher's guide are acceptable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	The teacher's guide for grade 9 mathematics helps teachers very much in planning their teaching strategies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	The organization of grade 9 mathematics syllabus is not convenient for teaching	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	After completing grade 9 the students' knowledge and abilities in mathematics will be developed and they could realize a complete and logical thinking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	The application of grade 9 mathematics to other subjects of the same grade level is significant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	The presence of adequate exercises at the end of each topic in the textbook inhibits the teachers from using other references materials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	Most of the contents of mathematics syllabus of grade 9 are not based on students prior mathematical knowledge, hence, are difficult to be mastered by the students	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	The design of grade 9 mathematics syllabus encourages teachers to use various instructional methods and techniques in order to increase students participation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	Since most of the ideas and views of mathematics teachers are incorporated in the current grade 9 mathematics syllabus, its implementation is expected to be effective	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	Students at grade 9 level are not expected to carry out proofs independently	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PART FIVE

Direction: please mark with a tick (✓) your responses in only one of the three alternatives by assessing the internal facilities of the classrooms in which you are teaching.

No	Classroom facilities	Adequate	In adequate	Non existence
1	Students' desk and tables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Chairs for teachers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Chairs and tables for students	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Chalk board	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Notice board	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Duster	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	Instructional materials for mathematics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

APPENDIX - C

**Addis Ababa University
SCHOOL OF GRADUATE STUDIES
COLLEGE OF EDUCATION
DEPARTMENT OF CURRICULUM AND INSTRUCTION**

(Questionnaire for directors)

Dear director

This questionnaire is designed to collect information for research purpose. The questionnaire focuses on school directors' opinion of mathematics instructional performances by mathematics teachers. It is to investigate the relationship of instructional methods and strategies suggested in grade 9 mathematics syllabus and the actual teachers' performances in the classroom. Your genuine response to the questionnaire is very much helpful for the success of this research.

I am very much grateful to you for your kind cooperation without which the study cannot attain its goal.

Thank you in advance for your cooperation.

Background Information

1. Name of the school _____
2. Kifle Ketema _____
3. Qualification _____
4. Years of experience as school director _____
5. Number of mathematic teachers in your school M ____ F ____ Total ____
6. Distribution of the number of mathematics teachers by qualification in the school
7. College Diploma: M ____ F ____ Total ____
M. Sc M ____ F ____ Total ____
B. Sc M ____ F ____ Total ____
Other if any M ____ F ____ Total ____

PART ONE

Direction: Please respond to the following questions with a tick (✓) in the space provided and by writing a complete answer wherever necessary

1. Does your school have a pedagogical center?
A. Yes B. No
2. If your answer is "yes" to (question 1 above), how do you rate the availability of mathematics instructional materials in the center?
A. Excess B. Adequate C. Not adequate
D. Non-exist
3. Is there a library or reading room in your school?
A. Yes B. No
4. If your answer to (question 3 above) is 'yes', how do you rate the availability of mathematics reference materials in he library?
A. Excess B. Adequate C. Not adequate
D. Non-exist
5. Is there shortage of mathematics textbook for grade 9 in your school?
A. Yes B. No
6. What is the student mathematics textbook ratio for grade 9 in your school?
A. 1:1 B. 2:1 C. 3:1 D. 4:1 E. 5:1
F. If any, specify _____
7. Does your school receive textbooks on time?
A. Yes B. No
8. If your answer to (question 7 above) is "No" what do you think might the reason for the delay be?
A. Poor delivery system of educational bureau.
B. Shortage of manpower in the school.
C. Shortage of published textbooks
D. If any, specify
9. Have you ever visited mathematic teachers of grade 9 in their classroom?
A. Yes B. No

10. If your answer to (question 9 above) is 'yes', how often do you visit (supervise) in their classroom?
- Once in a semester
 - Twice in a semester
 - Once in a month
 - Once in a week
11. Have you observed any instructional problems the teachers had during your visit?
- A. Yes B. No
12. What are some of the common instructional problems you observed during your visit in grade 9 mathematical period?
- Teachers' lack of interest in the subject mathematics.
 - Students' lack of interest in mathematics learning.
 - Lack of training on the part of the mathematics teachers with regard to the new syllabus.
 - If any other specify please _____

13. Have you ever discussed with mathematics teachers (individually or in group) issues related to the implementation of grade 9 mathematics syllabus?
- A. Yes B. No
14. If your answer to (question 14 above) above is "yes", what were some common implementation issues raised by the teachers?
- Specify _____

15. Were you introduced to the how of the new curriculum could be implemented through different workshops or seminars?
- A. Yes B. No
16. If your response to (question 16 above) is "Yes" how often did you orient the teachers with new ideas you are introduced to?
- Always
 - Sometimes
 - Rarely
 - I did not at all
17. Do you think that your school is in a new change process as a result of the new curriculum?
- A. Yes B. No

18. What ever your response to (question 17 above) is, please explain why you think so.

19. Have you observed any problems been faced in your school in implementing the grade 9 mathematics syllabus?

- A. Yes B. No

20. If your response to (question 19 above) is "yes" what are the major problems observed in your school implementing grade 9 mathematics syllabus?

- A. Lack of experience of mathematics teachers
 B. Shortage of mathematics teachers.
 C. Lack of necessary teaching materials
 D. Lack of trained mathematics teachers in relation to the new syllabus
 E. Any other, please specify _____

PART TWO

Direction: Please indicate by a tick (✓) the degree of school requirements provided by your school for grade mathematics teachers.

No.	School requirements for teachers	Adequate	Inadequate	Not at all
1	Exercise books for preparing lesson plan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Pens and pencils	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Paper for note writing and doing mathematical problems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Paper for test writing			
5	Register forms for recording continuous test results	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Different mathematical instruments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

III. Please be cooperative in providing information for the following questions

How many sections do each of the following grades have in your school?

Grades	number of sections
9	_____
10	_____
11	_____
12	_____

What is the average number of students per class?

Grades	Average number of students per class
9	_____
10	_____
11	_____
12	_____

What is the average number of desks in a classroom?

Grades	average number of desks.
9	_____
10	_____
11	_____
12	_____

Direction: For each of the following questions below, alternative responses are given respond to the questions by circling the letter of your choice.

1. How much is your interest to learn mathematics?
A. very high b. high c. moderate d. low
2. If your response for # 1 is 'D' which one of the following could be the reason for?
 - a. The subject mathematics is very difficult.
 - b. Poor teaching methods of teachers.
 - c. Because mathematics does not have the role of solving social and economic problems of society.
 - d. If any other specify _____
3. Is there library in your school?
 - a. Yes b. No
4. If your response for # 3 is 'yes' how do you rate the availability of relevant reference materials in the library?
 - a. very adequate b. adequate c. few d. not at all
5. What is your experience of using library? I _____ use library.
 - a. always b. frequently c. rarely d. very rarely
6. If your response for # 5 is 'C' or 'D', which one of the following could be the reason for?
 - a. Teachers do not recommend additional reading materials and motivate the students.
 - b. Because the textbook is sufficient.
 - c. Lack of experience to use library.
 - d. If any specify please

7. Is there school pedagogical center in your school?
 - a. Yes b. No
8. If your response for # 7 is 'Yes' how often do you participate in preparing instructional materials related to grade 9 mathematics?
 - a. Very frequently b. frequently c. rarely d. very rarely

9. How often does your mathematics teacher use instructional materials in the classroom?
- a. always b. sometimes c. not at all
10. What is your experience in group work during mathematics learning?
- a. very good b. good c. poor. D. very poor
11. If your response for # 10 is 'C' or 'D' which one of the following do you think is the reason for?
- a. Because mathematics teacher does not initiate me to work in-group.
b. Learning mathematics is not convenient for group work.
c. I do not like group work.
12. How does your mathematics teacher check your understanding in the classroom?
- a. By asking question and call on volunteers to hear their answer.
b. By asking "did you understand?" and watch for "yes" answer.
c. By asking "are there any question?" and watch for "there are not any."
d. By checking the work of each and every student.
13. How strong is the effect of your mathematics knowledge in other subjects?
- a. Very strong
b. Strong
c. Its effect is not observable in other subjects
14. In which of the following methods do you think mathematics learning is highly possible?
- a. When the teacher solves problems by himself.
b. When the teacher guides and students solve the problems
c. More through reading reference materials
d. Through individual study only?
15. To what extent your mathematics learning in grade 9 increased your mathematical knowledge?
- a. To a very great extent
b. To a great extent
c. To some extent
d. To no extent

16. How often does your mathematics teacher relate the mathematics lesson to your real life situation in the classroom?
- a. frequently b. rarely c. very rarely d. not at all
17. To what extent did the teaching and learning of current grade 9 mathematics lessons motivated your interest in learning mathematics?
- a. To a very great extent
- b. To a great extent
- c. To no extent

APPENDIX - E

Teachers classroom observation checklist with regard to lesson presentation variables
(As summarized from methods and strategies in the syllabus and teacher's guide)

Ser. No	Presentation variables	Check				Total class session observed
		Yes		No		
	Did the teacher	No	%	No	%	
1	start the lesson by introducing?					
2	attempt to use different instructional method?					
3	initiate the students to solve problems in the classroom?					
4	check the classroom situation so that it is conducive for teaching-learning purpose (ex. Chalk-board usage, students sitting arrangement etc.)?					
5	give class work and homework (assignments)?					
6	correct students works?					
7	make summary of important concepts of the lesson?					
8	recommend additional references materials related to conducted lesson topic(s)?					

APPENDIX – F

Teachers' classroom observation rating form with regard to some instructional considerations (As summarized from methods and strategies in the syllabus and teacher's guide)

Ser. No	Instructional considerations:	Rating scales						Total sections observed
		Frequently		Rarely		Not at all observed		
		No	%	No	%	No	%	
1	How often does the teacher encourage students to evolve in discussions?							
2	treat laws and principles sufficiently							
3	relate lesson to students real-life situations							
4	make efforts to recaptualate students' misunderstandings and discuss or explain the unclear concepts?							
5	provide answers to questions that students fail to answer?							
6	guide the students to find solutions for mathematical problems by themselves?							
7	forward cross questions to check students' understanding?							

DECLARATION

I, the underlined, declare that this thesis is my work and that all source of material used for the thesis have been duly acknowledge.

Name: Solomon Deressa

Signature: _____

Place Addis Ababa University

Date June 10, 2004

