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AVAILABILITY AND UTILIZATION OF INSTRUCTIONAL MATERIALS FOR MATHEMATICS INSTRUCTION IN PRIMARY SECOND CYCLE SCHOOLS:

THE CASE OF SIDAMA ZONE IN SNNP REGION

The Thesis Presented to the School of Graduate Studies,
Addis Ababa University

In Partial Fulfillment for the Requirements of the Degree of
Master of Arts in Curriculum

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ABSTRACT

The teaching and learning process attains its purpose when the IMs that facilitate the student learning are available in the schools and when teachers use them appropriately.

In view of this, the purpose of this study was to assess the availability of Mathematics IMs and their utilization for Mathematics instruction; as they contribute a lot in making difference in students Mathematics achievement. In the same vein, the study was also to investigate the support made to improve the availability of the IMs in the sample schools and the factors that affected utilization of IMs by Mathematics teachers.

To this effect, ten Primary and Junior Secondary Schools were selected as sources of information from the three Weredas of Sidama Zone in SNNP Region. Within these schools, a total of twenty teachers (two Mathematics teachers from each school, i.e., one from Grade 7 and one from Grade 8), the principals, the SPC-coordinators and a total of 100 students (ten from each school) were taken as actual sources of information. Moreover, the educational Support Section officials at the Zone and Wereda levels were also the sources of information. Questionnaire, observation and document analysis were the data collection instruments used to obtain data from the sources.

The results of the study, then, revealed that there was a critical shortage of Mathematics curricular materials and non-textbook IMs in the schools / SPCs. The government provided to schools only insufficient curricular materials and blackboards.

Moreover, there was very little support made by other organizations to SPCs/Libraries. In this regard at the school level, the effort made by teachers, SPC-coordinators, and students to prepare IMs were also less. Due to lack of budget and skilled manpower SPCs contributed less in supporting Mathematics instruction. The Utilization of IMs by Mathematics teachers were affected by all the material, financial and human factors as it were observed and witnessed by the respondents.

CHAPTER ONE

1. INTRODUCTION

1.1 Back ground of the study.

To varying degrees, all nations must update their education systems by charging them with developing the skills needed to solve the problems of the society. In line with this statement Demisu (1995:6) said that education in general, and Mathematics education in particular in developing countries must be seen as an input to rural development. He believed that rural development means rural transformation. It requires increased productivity, equitable distribution of income, better health, expanded educational opportunities promotion of social justice and the like. Indeed, meeting this challenge will be difficult for all countries but especially for developing ones (Lockheed et al, 1991:8).

Likewise, quality education becomes the talk of the day in both developed and developing countries. They are discussing learning outcomes and are profoundly concerned with the quality of teaching. Good teaching and good learning means using varied means and instructional materials. In professional literature, instructional materials are defined as media of communication used by the teacher and the student to advance teaching and learning processes.

In many countries, evidence suggested that student's achievement have declined (Amare and Tasew, 1996: 1). Many scholars described the students failure can be ascribed to many factors; shortage of educational inputs, learning environment, teachers' attitude, and the way students taught are some of the problems.

Lockheed and his associates (1991:40) pointed out that learning is determined by many factors including school inputs and their utilization. Improving educational inputs (IMs) appears to increase student achievement and reduce grade repeating. Scholars agreed that the availability of educational materials has received increasing evidence that it is an important correlate and a probable determination of classroom achievement (Amare & Tasew, 1996:1).

Most developing countries seem less to exploit this importance of using instructional materials in classrooms. For instance, in Sub–Saharan African countries,

the correlation between the annual expenditure per learner on educational materials and the time required for student to complete the primary cycle is significantly negative (Lockheed et al, 1991: 41).

Stones (1994: 21) pointed out that the greatest pedagogical problem would arise when insufficient time is allocated to provide the basic experience essential for the learners to learn the critical attributes of the concepts they are intended to learn.

In the review made by Hammond and Snyder (1992:63) teachers' values, classroom behaviors, and the resulting social learning climate in classrooms were strongly related to students' achievement and attitudes.

The body of mathematical knowledge needed for everyday life would include much of what is now called arithmetic, algebra, geometry, statistics, and logic. But the way any body of knowledge is transmitted is an integral part of the knowledge. To this end, Demisu (1995: 8) pointed out that the way the mathematical skills are acquired can influence a learner's way of thinking about the social, economic and political issues that swirl around him at all stages of day-to-day living. However, there is a general feeling that mathematics is taught in schools and materials used for teaching it have tended to remove mathematics from the context in which the subject occurs in real life.

Supporting this idea, Kogelman and Heller (1994:xi) believed that student's dislike of mathematics stemmed largely from the way it had been taught to them and from the fact that it dealt with seemingly irrelevant problems. Mostly, because of inadequate teacher training and preparation, mathematics is taught by means of rules and regulations that are neither correct nor helpful to the student.

As history of mankind tell us, before teaching has started in organized schools, people were teaching their children by means of actual experiences that involve the children senses. Devereaux (cited in Berhane, 1999:1) said that since early time, mathematicians or philosophers were tracing diagrams with sticks, which created the need for illustrating the development of ideas with diagrams and drawings.

Success in achieving the goals of mathematics (includes social, technical, cultural, and personal-Aesthetic) depends greatly upon the way teachers teach mathematics to their students and upon the availability of instructional materials to

support instruction. So teachers' training and improving support to school inputs are critical.

To this end, no field makes more use of instructional materials than does mathematics (Kinney, 1952: 290). Mostly, the junior high school mathematics is concerned with the knowledge useful in life; the question of how best to communicate quantitative data becomes significant to the learners. Wittich and Schuller(1979:11) said that the greater the abstractness or remoteness of the subject the less similarity there is likely to be between the teachers' meaning and the learners' understanding of it. To overcome this kind of communication problem is to deliver messages that are highly graphic, visual and participatory. The two authors pointed out that awareness of learning tenets together with a systematic integration of instructional materials into an overall instructional plan could bring about a higher level of learning. Learning takes place to the degree that the individual sees and feels the significance to his /her own felt needs of what he/she does. Proper motivation of learning is one of the basic essentials of any set of educational experiences, which can be achieved by using proper instructional materials in classrooms. In classroom instruction, it is important that mathematical principles and processes should first be studied in the situations in which they have been used or will be used. Geometry should be presented as a concrete study of the shape, size, and position of objects in the physical environment before it is presented as an abstract study of logic.

Presentday viewpoints in psychology agree in considering learning as an active process of acquiring meanings and abstract concepts through exploration, discovery and generalization. Abstract ideas of number develop out of a great amount of concrete, meaningful experiences. It is not sufficient to have the concept explained in words. The developmental natures of the learning sequence have been amply demonstrated by experience in all fields of common learning. The situations should be initially concrete and then increasingly abstract. A set of experiences may be provided to the learners, and they should be planned at levels in a concrete-abstract continuum:

Object → Picture → semi symbolic → symbolic

Besides their importance in simplifying learning abstract concepts, instructional materials also play a role in the development of desirable attitudes towards mathematics and its applications. The degree to which the development of learners' abilities has been accompanied by the development of desirable attitudes towards mathematics and its applications is confirmed by some researchers (Larcombe 1985, Kinney, 1952). They argue that the nature of learner's attitude toward the activity itself, toward the personalities connected with the situation, and toward the school as a whole is determined in large part by: the degree to which he/she recognizes the significance of the activity; evidence of his/her progress or lack of progress toward the goal; the extent to which the learner feels that he/she is capable of overcoming his/her difficulties; and the degree to which motivation is intrinsic rather than extrinsic. So these determinant factors could be highly improved if the teacher uses appropriate instructional materials in the teaching learning process.

The impact of the changing conditions in the world also calls for using instructional materials in mathematics teaching-learning process. Regarding this, Romberg (1996:773) pointed out that the extensive use of graphical, financial, and statistical data in daily news papers and in public policy discussions requires a higher standard of quantitative literacy for the necessary duties of citizenship.

Lockheed and his associates (1991:8) found that official curricular objectives, composition, and content are fairly uniform among countries. But the conditions under which education takes place in many developing countries effectively keep students from learning higher-order thinking skills. They suggest (1991: 9) that at all levels, students must relate to what is being learned and connect it with their own experience. The more that student connect with the learning materials, the more rapid their progress will be; and reducing grade repetition or failure.

To improve the instructional process, learning resources must be distributed wisely and managed well. Priority must be given to the educational inputs (IMs) that make a difference in learning. The availability of these educational inputs does not show its impact on learning unless they are used effectively in the teaching and learning process. In the same vein, Lockheed and others (1991: 41) pointed out that the impact of enhanced inputs ultimately depends on how well schools use the

available resources. In Philipins (cited in Lockheed et al, 1991: 52) 32 percent of Fifth –Grade science teachers used textbooks frequently, while 127 primary classes in Botswana teachers used textbooks only 12 percent of the time.

In spite of the barren conditions of many schools in the developing world a few are able to teach students the knowledge and skills called for in the curriculum. The result of such situation is the high number of student grade repetition or failure.

To improve the learner achievement, the contribution of using instructional materials in classrooms is very great. Shortage of instructional materials or underutilization of them has an impact on the quality of education in general and mathematics education in particular.

In Ethiopia, the Education and Training Policy document (TGE, 1994:2-3) has listed a number of educational problems of the "Dergue" regime. Among the problems listed were: poor methods of teaching, insufficient training of teachers, shortage of textbooks and other instructional materials. All these are indicators of the low quality of education provided at that time. Having identified these critical problems of the educational system in the past, the new Policy Document listed many actions to be taken by the new government. To reduce and overcome the stated problems and improve the quality of education, an overall strategy developed which is divided in to nine sections was developed. Educational support input (TGE, 1994: 27-29) is one of the nine stated strategies. It has seven articles, which are directly related to the supply, distribution, and utilization of instructional materials. Moreover, manpower training, production and distribution and calling support of various organizations and individuals in production of instructional materials included in the document.

There is no doubt that improving quality and relevance of education is directly related to the inputs supplied to schools and the process in using these inputs effectively at the classroom level. Indeed as it was explained earlier, this is the responsibility of education management at all levels.

Regarding to the status of availability of instructional materials and their utilization in the teaching-learning process in Ethiopia, some recent studies are made by educators in different places (Amare & Tasew, 1996; Abebe, 1997;Amare, 1998; Bernane, 1999;Amare, 1999; Sommers, 1996). These studies revealed that one of

the major problems in the teaching-learning process was shortage of instructional materials.

A survey made by Amare (1998: 289-298) revealed that unavailability of instructional materials was the most serious problem in the regions: Tigray, Amhara, Oromia, and SNNP regions. Non-textbook instructional materials were found to be more serious than shortage of textbooks.

At school level, SPCs could play valuable role in improving the availability and use of instructional materials. But, a survey study made by Berhane (1999) in Mekele Zone and Amare (1999:59) in Tigray found that SPCs are not giving the expected services to the teaching-learning process. According to Amare, the problems of SPCs revolved around shortages of materials, personnel and space; lack of clear school level policy and direction, and problems of training. In addition to this, Berhane found SPCs problems such as: no qualified personnel; SPCs are closed in some shift; SPC-coordinators have normal teaching load; shortage of budget; no incentives to teachers who use instructional materials; no written guide materials on how to prepare and use instructional materials; and SPC rooms were very small.

Many studies have also demonstrated that teachers do not often take advantage of instructional materials including books when they are available (Sommers, 1996: 100). Similarly, Amare & Tasew (1996: 37-38) found out that in the elementary schools of Addis Ababa, teachers were making little use of instructional materials in their classrooms. SPCs have been constrained by lack of trained manpower and shortage of resources. In Region 13 Abebe (1997: 48) reported that teachers use limited items of instructional materials.

In a summary, all reviewed studies revealed that inavailability of instructional materials and little use of the available ones by teachers. This suggests that the quality of education in Ethiopia, leaves much to be worked.

To the researcher's best knowledge, there is no study about the availability and utilization of instructional materials in the field of Mathematics instruction in SNNP Region in general, and in Sidama Zone in particular. Based on this background and the existing problem of high number of failures in examinations, the researcher is

initiated to carry out a research undertaking which focuses on inputs made to instruction and utilization of the inputs at school level for Mathematics.

1.2 Statement of the problem

As stated in the background of the study, the role of instructional materials in narrowing the gap between theory and practice is very great. In this regard, their role is very high in making learning more concrete, simplify learning of abstract concepts and develop a desirable attitudes towards mathematics and its applications. Availability and utilization of instructional materials is an important correlate and a probable determinant of classroom achievement. Utilization of instructional materials and the resulting social learning climate in classrooms were strongly related to students' achievement and attitudes.

As it is known, there is a growing feeling in students that mathematics is a difficult subject to learn. This feeling and the resulting low achievement in examinations made them to loose interest towards learning the subject. Unqualified teachers and shortage of instructional materials play great role in exacerbating the problem. In SNNP there is a large (greater than 50 percent) number of failures in 8^{th} Grade national examinations in general, and very low achievement in Mathematics in particular.

In this regard, the researcher believes that the problem could be minimized if the chalk-and-talk approach to teach mathematics is combined with student-centered approach. The latter approach gives better chance to student involvement in the teaching learning process. This makes learning more effective, increase interest, and as a consequence improves achievement, but, student-centered approach cannot be realized without making use of instructional materials.

The purpose of this study is, therefore, to assess the availability and utilization of instructional materials for mathematics instruction in selected primary schools found in Sidama Zone with special emphasis on grades 7 and 8. For this purpose, the study assesses the administrative support made to schools in the provision of instructional materials which help mathematics instruction; the status of availability of instructional materials in SPCs for Mathematics instruction and their quantity and

quantity and sources; the extent to which mathematics teachers prepare and use materials for classroom instruction; and the major factors that affect utilization of materials by mathematics teachers.

In order to achieve the above stated objectives the following research questions were raised:

1- Are the curricular materials (of Grade7& 8 Mathematics and instructional materials suggested in them) available in schools / SPCs?
2- Do Educational support sections at the Zone and Wereda levels provide the schools instructional materials, which help Mathematics instruction?
3- What are the sources of instructional materials (found in schools/SPCs that help mathematics instruction)?
4- Do SPCs have skilled manpower, adequate budget, and facilities to produce and display Mathematics instructional materials?
5- Do classrooms have adequate facilities, such as, blackboards, bulletin boards, adequate seats and a table for the teacher?
6- Do Mathematics teachers (in the level have the necessary training to) prepare and use instructional materials for their classroom instruction?
7- Do Mathematics teachers have favorable attitude toward preparing and using instructional materials for classroom instruction?
8- Do Mathematics teachers use the available instructional materials in classrooms?
9- What major factors hinder the utilization of instructional materials by mathematics teachers in grades 7& 8?

1.3 Significance of the Study.

As indicated in the background of the study no research undertakings were made pertaining to the availability and utilization of instructional materials for mathematics instruction. In the years 1990 E.C and 1991 E.C., 46% and 53% of the students failed in 8th grade national examination respectively (SNNP R.E.B, 1991 E.C.). The situation becomes serious when it comes to mathematics achievement. For instance, from the national examination rosters of 1991 E.C., and 1992 E.C. it was found that in the

selected three "Weredas" (government schools only) 2% and 1.6% of students scored 50% and above in the respective years.

Thus, it is timely and worthwhile to study this problem in the teaching-learning process and practices at school level. It helps to investigate the problems that hinder effective communication.

- The study may provide up-to date picture of the availability of instructional materials for improving the quality of mathematics instruction in the primary second cycle grades. Hence the findings of the study may help the zone to take action on the identified problems.
- The Region could benefit from the findings of the study to improve and facilitate the quality of mathematics education.
- Since the study is limited to one zone of the region, the findings could serve as a reference for further detailed study on the problem in the Region.
- The recommendations of this study may help all the concerned bodies, government and non-government, to take some measures to bring about change on quality of primary education in the Region.
- The items in the research instruments and discussions made with the researcher may help principals, teachers and SPC-coordinators to improve their knowledge about the role of instructional materials in instruction and the guides that help to select and prepare them. As a consequence they may make their respective contribution to improve the availability and utilization of instructional materials in their schools.

1.4 Delimitation of the study

This is a case study of ten primary schools (second cycle) found in selected three Weredas of Sidama Zone in SNNP Region.

To carry out a study that encompasses all primary schools in Sidama Zone is beyond the scope of this study. The researcher believes that it would have been better to conduct the study in a wider scale. But shortage of time, money, manpower, and other resources made the research to focus on ten government schools so as to make the study manageable. The study is limited into second cycle primary school

grades with special emphasis on grades, 7 & 8. It deals with a specific subject, Mathematics. This is due to the fact that the nature of the subject makes more use of instructional materials than do other fields. In addition to this, the existing serious problem in achievement in Mathematics and the researcher's background has also played some roles in choosing the subject. The scope of the study also limited in assessing the availability of curricular materials and instructional materials suggested in them for classroom use. It also assesses the support made by educational administrators at Zone, Wereda and school levels to improve availability of inputs.

The contribution of SPCs and teacher participation in production to improve the shortage of instructional materials was also assessed. Moreover, the way teachers plan to use instructional materials and implementation of that plan were assessed.

1.5 Limitation of the Study.

Shortage of time, money, manpower, transport and other resources highly affected the depth and scope of the study.

Due to the mentioned problems, sources of data are limited. But the researcher believes that the inclusion of a larger population size in the study could have promoted the elicitation of more reliable information.

Even though interview is believed to be the appropriate way of gathering information when the number of informants are few, the shortage of time & the difficulty of getting officials in their offices on schedule forced the researcher to use the questionnaire, which limits the study.

Besides, the complexity of classroom phenomena also limits the information obtained. As described by Shulman (cited in Anderson and Burns: 41), no single research program could include the entire classroom phenomena. Classrooms do have physical, social and instructional features that operate concurrently.

Studies of instruction search for reasonably stable patterns of teacher activity, teacher-student, student-student, and teacher-IMs & student-IMs interaction over some specified time period. It requires longitudinal investigation. But, observing utilization of IMs in classrooms for two or three periods does not give the true picture of the phenomena under study.

1.6 Operational Definitions

1- Instructional materials: refers to all forms of materials or devices with which students and teachers interact for the purpose of learning and teaching. These include graphs, pictures, charts, solid models, textbooks, Teacher's Guide, syllabuses, compasses, set squares, color chalk, blackboard, bulletin board, TVs, etc.

2- Utilization: refers to teacher's activity in planning, selecting, preparing and using instructional materials in classrooms.

3- Curricular materials: refers to student text, teacher guide and syllabuse

4- Attitude: refers to the opinion of teachers towards statements, which denote the role of instructional materials in teaching & learning, and teachers view in using them.

1.7 Acronyms

1- IMs: Instructional Materials.

2- SPCs: School pedagogical centers

3- SNNP: Southern Nations, Nationalities and Peoples

4- R.E.B: Regional Education Bereau

5- Z.E.D: Zone Education Department

6- W.E.O: Wereda Education Office.

CHAPTER TWO

2. RELATED LITERATURE

2.1. Definition of Instructional Materials

The term instructional materials have been defined in a variety of ways. It refers to all materials that are used by the teacher and the student for the purpose of teaching and learning as described by the following educators.

Media refers to any thing that carries information between a source and a receiver. These are considered instructional media when they carry messages with an instructional purpose (Heinich et al, 1999:8).

Instructional materials relate to all forms of materials with which students and teachers interact for the purpose of teaching and learning (Amare, 1999: 53). Instructional materials are all devices and materials used in the teaching and learning process (Nkuune, 1995: 224).

Instructional media are materials or devices which present a body of information and largely self-supporting rather than supplementary in teaching and learning process (Brown, 1969).

According to Romiszowski (Cited in Nkuuhe, 1995: 224) instructional materials include not only electronic communication media but also such devices as slides, photographs, teacher-made diagrams, charts, real objects and handouts that we use in the process of planned instruction.

Instructional materials have different names such as instructional technology (Brown and others, 1985), instructional media (Heinich and others, 1999) audiovisual materials (Dale, 1969). According to Aggarwal (1996: 152), the terms audiovisual aids, audiovisual materials, audiovisual media, and learning resources mean the same thing.

2.2. Relationships Between Media, Learning and Instruction

Too frequently, teachers use instructional materials without any reference to the guiding principles of how the experiences contained in those media will be used by the learners. Without a good conceptual rationale, use of a specific materials may

become simply mechanical, with the hope that what is presented to the learners will eventually become meaningful to them.

Teachers can develop conceptual and theoretical bases on which to choose specific materials and methods by knowing the relationships between media, learning and instruction. Topics covered in this section include classification of instructional materials, instruction and learning, and instructional communication.

Classification of Instructional Materials

A diversity of media are used for instruction. There are large varieties of instructional materials range from simple and concrete to complex and abstract ones.

Classification has been made by different authors, such as, Dale (1969), Culkin (1978), McLuhan (1964). Dale has attempted to classify media on the basis of the degree of experiential concreteness through the Cone of Experience. In the same vien Amare (1999) said that materials can be concrete or abstract. Concrete instructional materials allow physical involvement of learners and abstract ones allow imaginative involvement of learners with a minimum effect of physical involvement or sensory involvement. For instance, concrete instructional materials include real objects, models, specimens, simulators, etc; and abstract instructional materials include written or spoken words (Amare, 1999: 54).

Mcluhan classify media into hot and cold. As to him cool media are participatory or have high student involvement; hot media, on the contrary, are so full of data that they give no chance to students to add any data and consequently rendering the student a passive role. According to Amare's interpretation, photograph is hot medium and cartoon is cool medium.

Culkin classify instructional materials as audio, visual and audiovisual. Audio media are those materials mainly designed to communicate message via hearing. Visual media are known to communicate message via sight. Audiovisual media are those materials, which involve both sight and hearing senses.

Learning is attained through direct and maximum physical involvement of the learner. In terms of relative effectiveness for instruction, direct experience is most effective than the indirect experience. Instruction, however, should proceed from

direct experience to iconic representation of experience (such as use of pictures and films) to symbolic representation (such as use of words) according to Bruner (cited in Heinich et al, 1999: 14).

Instruction and Learning

According to Heinch and his associates (1999: 6), instruction is the arrangement of information and environment to facilitate learning. Environment includes, where the instruction takes place, the method and media needed to convey information and guide the learner's study. They said that learning is the development of new knowledge, skills or attitudes as an individual interacts with information and environment.

So, learning takes place all the time but as educators we are concerned with the learning that takes place in response to our instructional efforts.

Instructional Communication.

Effective instruction cannot take place unless communication takes place. If the teacher knows something about the communication process instructional materials can be used effectively. A simplified description was given by Heinich and others (1999: 12-13) about how instructional communication works. A message, such as, definition of "polygon", is selected by the information source, the teacher or student. That message is sent through a channel or medium (e.g. spoken works, a drawing on a blackboard, printed material, or a model). The learners or teacher, evoking in each of their minds their own interpretations of the message, then receives the message. Feedback helps the teacher ascertain whether instruction has been successful.

Bruner (cited in Heinich et al, 1999: 14) stated that the sequence in which a learner encounters materials has a direct effect on achieving mastery of the task. When a learning task is presented to adults who have no relevant experiences on which to draw, it is facilitated when instruction follows a sequence from actual experience to iconic representation to symbolic or abstract representations. Different methods such as demonstration, drill-and practice, tutorial, discovery and problem

solving are applicable to learners of all ages. Virtually all of media (concrete or abstract) can be used to implement any of the methods.

2.3 The Contribution of Instructional Materials Within the Teaching and Learning Process

Throughout history of mankind instructional materials have influenced education. They provided the teacher with tools to engage students powerfully in the learning process and thereby bring about quality education.

As Heinich and others (1989:24) stated, one of the most important roles of instructional materials is to serve as a catalyst for change in the whole instructional environment. As to them, instructional materials can be used to facilitate, and in some cases provide for, intellectual development. Instructional materials can help provide a learning atmosphere in which students actively participate in the learning process.

Supporting the same idea, Callanhn and Clark (1988: 412) stated that instructional materials facilitate student learning by eliminating the reliance upon spoken word. They increase the number of senses through which the message is communicated to the student. Similarly, Dalc (1956) said that instructional materials reduce verbalism, increase student involvement and interest. They enable the teacher to use the time effectively and efficiently to attain the intended objectives. Moreover, various authors give rationale on the contribution of instructional materials that they provide students with rich and real experience that facilitate their understanding and there by bring about quality education (Heinich et al, 1999; Amare, 1999; Aggarwal, 1996; Clark & Starr, 1986; Unwin & Aleese, 1978; Dale, 1956). According to them, instructional materials increase interest, comprehension, retention and correctness of the learning process.

Thus, instructional materials help the student to relate the classroom instruction with the outside world. In addition to these, Amare (1999: 54) pointed out that instructional materials provide the learner with many experiences such as doing, drawing, reading, observing, sketching, computing, discussing and speaking. This indicates that instructional materials make the students to be actively involved in learning rather than being passive learners.

Hany and Ullmer(1980:8) stated that using different instructional materials can help the students analyze different phenomena. They provide multisensory stimuli and multiimage stimuli, thus making possible the comparing and constructing of visual phenomena. In addition to these they said that instructional materials could serve as storage bank of educational content that can be used and reused when they are needed. ICDR (1995) describes instructional materials as an integral components of curriculum development that help students to be mentally alert, supplement and broaden experience. It also enhance clarity of message, simplify concepts, and principles. It not only helps to make learning concrete, but also help students to learn how to learn.

Teachers should use instructional materials to minimize the communication gap between the students and them. Nkuuhe (1995: 225) said that whenever teachers talk, the words they use are arbitrary symbols that represent whatever they are saying. With instructional materials, words acquire a more concrete meaning.

According to Lockheed and his associates (1991:47), instructional materials are critical ingredients in learning, and the intended curriculum cannot be easily implemented without them. They provide information, organize the scope and sequence of information presented, and provide opportunities for students to use what they have learned.

Aggarwal (1996: 154) states that instructional materials provide significant gains in informational learning, retention and recall, thinking and reasoning, activity, interest, imagination, better assimilation and personal growth and development.

Different authors provide instructional functions of various instructional materials. In this section review was made in the contribution of visuals, print, display boards, and instructional television.

The contribution of Non-Print Visuals

The major roles of visual instructional materials are provided by Heinich and his collogues (1999:64). According to them visual instructional materials provide a concrete referent for ideas: can motivate learners by attracting and holding their attention and generating emotional response; can simplify information that is difficult

to understand; and provide a redundant channel giving some learners a chance to comprehend visually what they might miss verbally.

Koumbi (1994: 47) has stated that the inclusion of visuals widens the teaching scope of audio. As to him, there are many learning tasks for which the ephemerical nature of audio is a handicap (e.g., comparing numerical data).

Williams (1963: 5-16) has provided a list of instructional purposes served by pictures. Among them pictures recall experiences, compare and contrast, build new experiences, give meaning to word symbols, demonstrate a process, raise questions and present problems, provide reference, invite participation, review and summarize a topic.

Graphics are instructional materials that summarize information and ideas through drawings, graphs, charts, diagrams, symbols, cartoons, etc. They are a valuable means of communicating certain kinds of information (Wittich & Schuller, 1979; Brown et al, 1977).

Brown and his associates (1977: 126) stated that through the production of various types of graphics, students learn to think in visual terms and gain skill in organizing and editing their ideas into capsulated, clear, forceful statements.

They added that students may apply graphic skills to almost every aspect of communication and to the use of many visual instructional materials. Students are involved in learning by doing. Still pictures allow instruction to move down from the level of verbal symbols in Dale's cone of Experience to the more concrete level of pictures (Heinich et al 1989: 103). They said that drawings can be used in all phases of instruction, from introduction of the topic through evaluation. Particularly effective visuals may provide for learner interaction with the visual. For instance, answer cards to mathematics facts may be moved into the correct position by the student. To all forms of instructional materials students can be asked to respond to materials by actually getting involved with them. The interaction should be for the purpose of increasing learning or enhancing awareness.

Heinich and others (1989: 100) suggested that use of year things as part of concept learning give meaning to abstract words. They added that besides their obvious virtues as means of presenting information, raising questions, and giving

hands on learning experiences, realia also could play a valuable role in the evaluation phase of instruction. For example, real objects can be displayed in a central location with learners directed to identify them, classify them, define them, compare and contrast them.

Models are effective teaching devices for several reasons. Much of the effectiveness of direct and concrete learning experiences comes from the fact that such experiences involve the use of the intellect and physical senses (Wittich & Schuller, 1979: 68-72).

According to Aggarwal (1996: 182), models are important because they provide reality, concretize abstract concepts, and enable us to reduce or enlarge objects to an observable size. Classroom construction of models appeals to learners of all ages and can stimulate inquiry and discovery (Heinich et al 1989: 101).

The Contribution of Print

Print is the most widely used instructional material in education. According to Heinich and others (1999: 102), print materials include textbooks, reference books, booklets, study guides, manuals, worksheets and word-processed documents prepared by students and teachers. Knirk & Gustafson (1986: 142) stated that in the form of text it remains the primary information storage and delivery tool. As to them print instructional materials are used for presenting information related to most types of objectives including factual information, principles, concepts and rules, some procedures, and to some extent, the development of attitudes and opinions. The most common contribution of printed materials stated by Heinich et al (1999: 102) is the presentation of content information. Teacher made handouts can complement a teacher's presentation, or students may also use them as they study independently. Students may also use printed materials to augment the information teachers present. Students frequently refer to supplementary printed materials to locate information on a specific topic not covered in their textbook.

As to Gagn'e (cited in Romiszwski, 1974: 68) print material is often very good at achieving cognitive objectives. Brown and his associates (1985: 384) pointed out that textbooks provide convenient and random access to the message it contains;

users control the process by which they gain information they seek, often contain excellent visualizations of concepts and information with accompanying verbal elaborations and explanations.

Lockheed and others (1991: 49) stated that textbooks are the single most important instructional material because they deliver the curriculum. They added, when textbooks are available, instructional time is not wasted while teachers and students copy text on and off the blackboard. As to their review, over the past decade, researchers have found that the availability of textbook and other instructional materials have a consistently positive effect on student achievement in developing countries. Heinich and his associates (1999: 102) pointed out that textbooks have long been the foundation of classroom instruction. Teacher guides that are well integrated with the textbook or other instructional materials can have a positive impact on student achievement. Lockheed et al (1999: 49) pointed out that effective guides include information on what to teach and on now to teach it, diagnostic tests that help teachers monitor student learning and modify the daily lessons accordingly, suggestions on how to manage the classroom, and activities for classroom use.

The contribution of Display Materials

Classroom materials commonly used for display of instructional materials include blackboard and bulletin board. The most commonly display material in classroom is the blackboard. Although the blackboard is most commonly used as a medium of verbal communication, it can be used as a surface upon which to draw visuals to help illustrate instructional units and serve as adjuncts to verbal communication. Graphics, such as sketches and diagrams, or charts and graphs, may be drawn on the blackboard for display to the class.

Bulletin board displays tend to serve three broad purposes (Heinich et al, 1989: 118). These are decorative, motivational, or instructional. Displaying student work exemplifies the motivational use of bulletin board. It fosters pride in achievement, reinforcing students' efforts to do a good job.

Knirk & Gustafson (1986:151) state that bulletin boards have the following contributions and functions:

- To stimulate student interest. Student may display their work or other assignment works on bulletin board for other students, other teachers, administrators, and parents to see.
- To present a single copy of visual.
- To make a classroom attractive and lively, but they must be changed constantly.

The contribution of Instructional Television

Instructional television has a lot of contributions to the classroom teaching-learning process. Schramm (1977:81) pointed out that television made it possible to assist elementary school teachers in the fields where they were least well prepared, for inexperienced teachers to watch expert teaching in their own fields, and for step to be taken toward equalizing opportunities between large and small, Urban and Rural schools.

He reviewed students' response to the question, what they thought of television verses non-television classes. Students identified the chief advantages of television teaching, they thought, were that without it they would not have the visuals and other materials presented by the television teacher; further more, the television classes were better prepared and the television teachers, in general, more expert in their subjects. According to Knirk & Gustafson (1986: 155) review teachers use instructional television for four reasons: *First,* it brings new resources to the classroom; *second,* it provides different approaches to presenting materials; *third*, it presents new material; and *fourth,* it reinforces material taught in other lessons.

Lockheed and his associates (1991: 51) reviewed the contributions of other instructional materials. They said, other instructional materials could also facilitate the teaching learning process. Some materials, such as filmstrips, posters, and audiotapes, help the teacher to communicate knowledge. Some such as pencils and paper enable the student to practice what has been taught. Some such as chalk and chalkboards, for example do both.

2.4 Instructional Materials and Mathematics Instruction

Mathematics should be taught so that learners experience its usefulness in interpreting statements in books, pictures, and graphs. For years mathematics educators have advocated using a variety of forms to represent mathematical ideas for students.

Hiebert & Carpenter (1992: 70) stated that physical three-dimensional objects are often suggested to be especially useful. The simple rationale usually provided is that children understand better when ideas are presented with concrete materials.

In most instruction programs they argue, written symbols are the representation of choice, but are contextually more distant from quantities or relationships than many concrete materials. It may be helpful for students to fill this gap between quantities and written symbols with physical materials, beginning with contextually close materials that make contact in salient ways with the quantitative relationships of interest and, then, moving to contextually more distant materials that, in turn, make contact with written symbols.

In mathematics, Skemp (cited in Larcombe, 1985: 41) contends, most lower order concepts, from which the learner may seek to build do not have single, clear, properties but rather many properties. Some of the many properties may be relevant to the concept being built up whilst some may not (he called noise).

For the pupil who is finding mathematical concepts hard to develop, skemp pointed out, the noise factor may well be absolutely critical. He argues that in the earlier stages of the formation of concept low noise with little distracting detail is desirable, but as the concept becomes more strongly established, increasing noise teaches the recipient to abstract the conceptual properties from more difficult examples.

The contribution of Instructional Materials in Mathematics Teaching Learning Process

Instructional materials support mathematics learning not only at an early age but right through learning at an early stage in concept formation, Larcombe (1985: 42) said that when confronted with a situation requiring recall it may well be the case that

reverting to concrete materials will provide the necessary trigger for a learner who seems to be well past the stage of needing concrete materials

Instructional materials provide a public representation to which attention can be drawn and a focus for discussion. Because the materials are public, said Hiebert & Carpenter (1992: 72), they can be shard by all the students in the class. They argue that the students perceive the same mathematical features; the language in the classroom can be about the same things. Communication among the students and teachers is enhanced because all the participants can focus their attention on the same entities and relationships between entities. Concrete materials, by providing a comparatively un ambiguous target, thus make such shared discussions possible. By interacting with the materials and with others about those materials, students are likely to construct the relationships that the teacher intends.

The use of instructional materials seemed to allow students to try out their ideas, examine and reflect on them, and modify them (Clements & Battista, 1992: 494). They added, this physical approach seemed to maintain students interest, to assist students in creating definitions and new conjectures, and to aid them in gaining insight into new relationships. Over all, the benefits of instructional materials hold across grade level, ability level, and topic given that the use of instructional materials make sense for that topic.

Instructional materials promote the quality of teaching and help the learner to acquire behavioral changes (cognition, convocation, and practice), MOE, 1991. Furthermore, many contributions of instructional materials to the teaching learning process were given by educators (Williams, 1963; Clements & Bottista, 1992, Kieran, 1992) and some of the contributions are:

- promote the quality of teaching;
- make computation tasks on practical value;
- broaden the base of students understanding;
- give students an immediate, intuitive grasp of certain geometric ideas;
- gives feedback;
- help to initial introduction of mathematical concept;
- help to increase special visualization ability;

- facilitate the construction of sound representations of geometric concepts;
- in courage the use of more senses;
- allow students to try out their ideas, examine and reflect on them;
- maintain students interest;
- assist students in creating definitions and new conjectures;

As Hiebert and Carpenter (1992: 71-72) explained, the effectiveness of using concrete materials in classroom is a potential interaction between the materials and the social situation in which the materials used. Cobb and Lampert (cited in Hiebert & Carpenter, 1992: 72) pointed out that social interaction in classroom provides a powerful way of collecting students' attention and focusing it on shared experiences. Through, class discussions, teachers and students can talk about possible relationships, drawing attention to the relationships of interest.

Students should manipulate concrete geometric shapes and materials so that they can "workout" geometric shapes on their own.

Pictures are an aid in the study of geometric shapes. When students are learning to identify common shapes (circles, square, rectangle, triangle, prism, cylinder, pyramid, cone, etc.) they can collect pictures of objects to be mounted on charts or display on bulletin boards. A student can use information in pictures to build a pyramid. Pictures can give students an immediate, intuitive grasp of certain geometric ideas.

According to Clements & Battista (1992: 448), students use a diagram to interpret a theorem; they must alter the corresponding mental image by distinguishing its essential aspects during the abstraction process. The image becomes a guide for thinking about and applying the theorem. The Soviet researcher Kabanova - Meller (Cited in Clements & Battista, 1992: 48) states that mastery of geometric theorems is characteristically accomplished through the perception of diagrams and is intimately connected with the development of spatial images. To be successful with proof problems in which a diagram is used, students must establish semantic connections in the diagram.

Much of the effectiveness of direct, concrete learning experiences comes from the fact that such experiences involve the use of the intellect and the physical senses.

Wittich states that in order for three- dimensional teaching materials to be effective, students must be able to see them clearly and examine them from various angles.

Research Implications on the Contribution of Using Instructional Materials in the Teaching and Learning Process

The majority of studies verify that the use of instructional materials facilitate the construction of sound representations of geometric concepts. The studies made by different researchers reviewed by Clements & Battista (1992: 443-449). Some of the reports revealed that:

- Positive Correlations have been found between spatial ability and mathematics achievement at all grade levels.
- A three-week instructional training program significantly increased the spatial visualization ability for all students in grades 5-8, with no sex differences in the gains. Students taught in primary schools where the use of manipulative materials was prevalent preformed better on tests of spatial ability than students who were in schools lacking use of such materials.
- Exposure to a greater variety of stimuli positively affects achievement in geometry.
- Learners for better with solid cutouts than printed forms, the former encouraging the use of more senses.
- Students respond favorably to initial introduction of concepts in real world settings and that manipulative are important and helpful, especially at lower levels.
- Manipulating geometric solids help students learn geometric concepts.

Similarly recent evidence, reviewed by Fuson (1992: 268), indicates that the superiority of mathematical Performance of elementary school children in Japan and Taiwan over U.S. children is not limited to computation but extends to applications in real world and word problems and to mathematics as an abstract system and ranges over all topics in the mathematics curriculum. Classroom observations in the three countries indicated that most U.S. class time was spent on individual seatwork,

teacher talk was focused on rote procedures, and explanations or discussions were infrequent. In contrast, Japanese and Taiwanese teachers used real world problems and concrete, manipulabel objects much more than did U.S. teachers. Every child in Japan and every classroom in Taiwan had a mathematics set of colorful, interesting materials used extensively to illustrate and model mathematical concepts. Elementary school mathematics education in Japan has also been described as helping children master a multiplicity of conceptual structures for mathematical ideas by using concrete objects and situations from which such conceptual structures can be constructed.

Everston and his associates (cited in Rosenshine & Steven, 1986:383) stated the importance of a high frequency of questions in mathematics of grade six to eight. Moreover, this study have revealed that, in Junior high school mathematics instruction, the most effective teachers asked an average of 24 questions during the 50 minutes mathematics period, where as the least effective teachers asked an average of only 8.6 questions.

In the study reviewed by Schramm (1977: 180), in Junior high school mathematics, the average achievement level of Urban and Rural pupils on a standardized test of concepts rose after four years of television teaching.

Studies, on the contribution of instructional materials to improve student learning made in different countries (both developed and developing) by different scholars. Lockheed et al (1991: 49-51) reviewed some of the studies made in developing countries.

Necaraguan students in classes randomly assigned to receive textbooks scored significantly higher on a test of mathematics achievement than students in classes with no textbook. In Philippines it was found that students who received textbooks scored higher than the comparison group on tests of science and mathematics.

In Brazil the effect on student learning of adding basic instructional elements to poor rural schools was studied from 1981 to 1985. One of these elements was a textbook. Students in schools receiving textbooks scored significantly higher on tests of mathematics than did students in schools without textbooks.

Another study made in Brazil and a package of writing materials (including chalk, notebooks, pencils, erasers, and crayons) boosted fourth-grade mathematics achievement. Undoubtedly, the children then had an opportunity to practice in mathematics.

2.5. Mathematical Learning Difficulties in Schools

How teachers design and arrange instruction have a great deal to do not only in what is learned but also with how the learner uses what is learned. The mathematics teachers need to be self-reliant is the same mathematics they were taught, and supposedly learned, in primary school. But, most of the teachers were not taught how to apply mathematics concepts to practical, adult life situations.

Kogelman and Heller (1994: xvi) pointed out that because of inadequate teacher training and preparation mathematics is taught by means of rules and regulations that are neither correct nor helpful to the student. And it continues to be taught by insecure professionals who, unfortunately, introduce guilt, dislike, and anxiety into the subject. The report released in 1991 by the National Academy of Sciences, reviewed by Kogelman and Heller, conclude, "Ignorance in mathematics teachers begets ignorance in students". It is hardly surprising, then that majorities of young people grow up with poor skills and uneasy feelings about mathematics.

So, in this section review was made on the conditions that make mathematics learning difficult in schools and their solutions accordingly. These include learners' feelings and attitudes, and teaching practices in schools.

Pupils Feelings and Attitudes

Larcombe (1985:5) believe that any discussion about mathematics learning with pupils who display difficulty in the subject must commence with a very deliberate look at what might be going on in the mind of the learner. Laurie Buxbon (cited in Larcombe, 1985: 5) and others have high lighted connections between feelings and mathematics in such a way that teachers can not escape the fact that there must be great implications for those who seek to teach the subject.

According to Larcombe (1985: 6) evidence of negative feelings and attitudes to mathematics learning is so common factor amongst the least able students in schools. Teachers are in great danger of assuming that it will inevitably be present and planning our work against the assumption.

A look at the case of mathematics teaching, Dossey (1992: 42) described his view by saying 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.

Rutter (Cited in Larcombe, 1985: 6) pointed out that disaffected behavior is more commonly the outcome of educational failure than cause of it. That is the development of the learners dislike for Mathematics is greatly bound up with knowledge of, and fear of failure. Larcombe said that part of a syndrome of reinforced failure whose most marked effect is upon the learners' motivation towards Mathematics learning. As it was described earlier, using IMs in the teaching and learning process contribute a lot in improving feelings and attitudes towards learning Mathematics.

Practices in Schools

Among the conditions that affect student mathematics learning are practices in schools. Teachers should know that concepts formed through experience with the material world. Dunne and Wragg (1994: 8) stated the formation of a concept needs a range of experiences that include associated facts, skills and strategies as well as examples of the concepts in use. Even in the17th century, educators have understood the dangers of plunging into abstract concepts and principles without building a foundation in concrete experience (Heinich, et al, 1999:96). For instance, the greatest amount of information can be presented in the least amount of time through printed or spoken words, which are the top of concrete-abstract continuum. But if the student does not have a prerequisite background experience and knowledge to handle these verbal symbols the time saved in presentation will be time lost in learning.

Research on teaching and learning Mathematics conducted in U.S.A reviewed by Carpenter and Romberg (1986: 851) revealed that mathematics teachers are essentially teaching the same way they were taught in school. Almost none of the concepts, methods, or big ideas of modern Mathematics programs has appeared in the studied classrooms. Similarly a synthesis of another three studies which was prepared by the National Councle of Teachers of Mathematics in 1979, revealed that the predominant pattern in teaching Mathematics is extensive teacher directed explanation and questioning followed by student seat work on paper and pencil assignment.

Likewise, Adedoton (1990: 1-2) reported the weakness in Nigerian primary school Mathematics education. He suggested that students at this level should not be treated as a piece of registering apparatus, which store up information isolated from action and purpose. The focus of Mathematics teaching should not be in teaching children mathematics, but in teaching children to learn mathematics.

According to Larcombe (1985: 14-22), each school does need to identify aspects of its organizations and practices, which might be considered its own "weak points". Regarding this he has listed six weak points to be considered.

First, choice of work does not match Mathematical level of the learner. As to him, the Mathematical development of each learner is highly individual. There is a great need to recognize it in practice as teachers plan work for learners who will be critically affected if what is given to them is of quite the wrong order of difficulty.

Second, the teaching style does not match individual needs of the learner. Cockcroft (Cited in Larcombe, 1985: 16) suggested that the teaching of Mathematics to all learners should include opportunities for; exposition by the teacher, discussion between teacher and learner and between learners themselves, appropriate practical work, consolidation and practice of fundamental skills and routines, Problem solving including the application of mathematics to everyday situations, and investigational work. But, a program of mathematics work that depends upon the use of only one style of working is bound to be reaching fewer learners than a program, which can call on a range of styles and approaches.

Third, incorrect assumptions, about the strength and weakness, of individual learner. For instance, Yerushalmy (cited in Kieran, 1992: 408) stated that students' lack of prior experience with Cartesian graphs prevented them from interpreting the information that was contained in the graphs.

Fourth, choice of current and subsequent pieces of work does not relate to past success or failure.

Fifth, teaching materials are not suited to the needs of the learner. Larcombe suggested that if the teaching material limits mathematics to just number related work, the need to recognize and make provision for the use of concrete materials cannot be overstated. This latter point is seldom a difficulty in infant and junior schools.

Sixth, School assessments are in conflict with a teaching model based upon meeting needs of students.

Furthermore, practices on the development of concepts need to be considered. In his discussion Skemp (cited in Larcombe, 1985: 35) argued that primary concepts are derived from sensory and motor experiences, and secondary concepts derived from previously abstracted concepts. In relation to students learning mathematics, Larcombe (1985: 36) believes, the following seem worth highlighting.

There is no Mathematical concept except within the mind of the person who has it; and the concept he/she has will have been built up and is being built up continuously as new perceptions and new discriminations are made.

Not only must teachers give ample opportunity to pupils to have fundamental mathematical experiences as they see and handle concrete materials (which will increase the likelihood of making perceptions), but teachers must also try to establish whether or not these have been made and develop strategies for facilitating perception. The most obvious strategy here is that of promoting discussion and developing dialogue in order to focus attention of the pupil upon what is there to be seen and experienced. In practice, however, in so many classrooms, discussion is not seen as a planned legitimate activity. It arises only if someone happens to ask or to say something.

It is important that we recognize not only perception but also the abstraction and formulating of rules as a function that must happen within the mind of the learner, if any concept is to develop. In practice (in schools) the rule is given to be memorized, recalled, and brought into use later rather than being abstracted by the learner.

The worked example followed by practice is the least effective strategy for the learner deficient in the concept (Larcombe, 1985: 37).

The presence of concrete experiences is fundamental to the development of concepts.

Clearly the building blocks for the conceptual hierarchy are the lower order concepts. The richer the sensory exploration and observation of concrete materials the greater is the likelihood of appropriate discriminations being made. Therefore, the greater the provision for subsequent higher order concept formation.

But, in our school systems we rush towards sums and symbolic representation so that writing and recording take up the learners' energy and thought rather concrete experiences.

Besides these, Stones (1994: 21) stated that the greatest pedagogical problems will arise when insufficient time is allocated to provide the basic experience essential for the learners to learn the critical attributes of the concepts they are intended to learn.

Driscoll (cited in Clemens and Battista, 1992: 448) related difficulties that students have with drawings to the notion of concept images. For instance, middle school students had a great deal of difficulty identifying right triangles when they were drawn with non-standard orientation (legs not vertical and horizontal). If students concept images do not include relevant and irrelevant attributes of the concept they become too restricted for proper identification and use of future examples.

In general, in most of mathematics teaching activities so much time is spent concentrating on number related work which has little visual outcome. There is great scope for developing diagrams and models to express number patterns and facts. Teachers have a great opportunity to adorn their mathematics work area with pictures and objects from the natural world. To supplement this, Blankin and Kelly (1994:117-118) described that mathematics should focus on practical and problem-solving

issues. It must be used on the day-to-day life of the learners and must be used for societies need and activities at large. It should be visible and meaning full. This of course, requires the changing of traditional role of mathematics teachers.

2.6 Availability of Instructional Materials in Schools

The provision and effective use of school inputs are the responsibility of education management at all levels. Lockheed and his associates (1991: 41) pointed out that the concept of effective schools encompasses the system of school and administrative relationships. They stated that the impact of enhanced inputs ultimately depends on how well schools use the available resources. Schools vary considerably in this respect. In spite of the barren conditions of many schools in the developing world, a few are able to teach students the knowledge and skills called for in the curriculum.

In developing countries the basic elements of an orderly school environment are frequently missing. The stock of instructional materials is limited, and the physical surroundings are detrimental to learning. In this section the sources and availability of instructional materials will be reviewed.

Sources of Instructional Materials

In the first place, Clark & Starr (1986: 420) pointed out that materials for learning could be found almost everywhere. There are local, state, national, and international sources of free and inexpensive materials. According to Heinich and his associates (1999: 107), many local government agencies, community groups, and private businesses provide informational materials on free loan. Public libraries often make videotapes, prints, and filmstrips available. Other state and federal government agencies make materials available for use in schools. Nationally, one of the most prolific sources of free and inexpensive materials is the federal government.

They added, in the United States, the U.S. Government Printing Office and the National Audiovisual Center offer special access to materials.

International organizations such as the Organization of American States (OAS), the United Nations (UN), and the North Atlantic Treaty Organization (NATO) also operate information offices.

To obtain the materials, the teacher determined to use in classroom, he/she can write a letter to the supplier identified.

At school level School Pedagogical Center (SPC) and school library are the main sources of instructional materials. Teachers, students and SPC coordinators are also sources of Instructional materials.

Supports to Improve School Inputs

According to Lockheed and his associates (1991: 56), providing instructional materials has been a feature of international donor activity of the past decade. They revealed that of the 232 World Bank Education Projects approved between 1970 and 1983, 48 (21%) supported the preparation, provision, or distribution of educational materials and textbooks. In addition to international support countries can develop national, regional, local and school level supports to improve school inputs.

1. *Developing National Institutions and support Agencies.*

   Such institutions and agencies help to improve school inputs. Even small countries (Lockheed et al, 1991: 128) may have to set up a clearly defined unit for developing instructional materials, carrying out the design, development, and testing necessary to achieve high quality, and managing the shortage and distribution of materials. Experience in Bangladesh, China, Ethiopia, and the Philippines suggest that textbook agencies, whether autonomous or divisions of the national or federal education ministry, are essential to establishing and sustaining a program of materials development.

2. *Encouraging Regional Initiatives.*

   Encouraging local initiatives also help to improve schools. The central ministry should establish mechanisms to encourage school initiatives. One such mechanism, Lockheed and his associates (1991: 130) suggested, is the school improvement fund. This is a financing program that supplements regular

budgetary support for schools by authorizing intermediate level administrators to make grants for projects proposed by individual school. Support should be provided for programs that complement national/regional inputs. Grants might thus be made for supplementary reference materials, non-textbook instructional materials, in service training, etc.

3. *Intermediate Level Support*

Providing intermediate level support is necessary to schools. School inspection is critical to identify school problems. Once intermediate level staff identifies problems, they must have the authority and resources to help schools resolve those problems (Lockheed et al, 1991: 130). According to ovens strengthening community involvement may also have importance to school.

4. *School level support*

At school level principals, teachers, SPC coordinators, and students can play their respective role to support the school in improving instructional materials shortage. Lockheed and his associates (1991: 44) argue that effective schools have strong principals who devote considerable time to coordinating and managing instruction, are highly visible in the school, and stay close to the instructional process. At the same time instructional leadership is in many ways a shared responsibility. They said that in developing countries principals over burdened with administrative tasks. As to them (1991: 133), to manage their schools effectively, principals require a high degree of control over matters such as using material inputs, developing staff, mobilizing and using community resources with in general guidelines, and evaluating the progress and problems of their teachers, students and school. In all cases, granting authority to principals must be coupled with giving them adequate and appropriate training and resources. Teachers, students, or SPC coordinators can prepare multimedia instructional materials. According to Heinich and his Colleagues (1989: 86), one often-overlooked source is the teacher. He/She can produce drawings, charts, graphs, tables, and models and can communicate effectively using these graphic media. As Clark & Starr put it:

> *Occasionally, teachers defend dull, humdrum teaching on the grounds that the school administration will not give them adequate materials. Usually such complaints are merly passing the buck, although they may be signs of incompetence: for at the expense of a little ingenuity and initiative, boundless supplies of materials are available to even the poorest schools (Clark & Starr, 1986: 420).*

They argued that materials for learning material is free or inexpensive. Teachers can start by collecting pictures from periodicals; can duplicate diagrams, graphs, reading materials, worksheets, etc.

Likewise, Heinich and others (1999: 97) suggested that teachers and students can prepare board games, posters, activity cards, wall charts, geometric shapes, flash cards, charts, graphs, etc.

SPCs are the main sources of available instructional materials. Moreover, they are places to find and produce instructional materials at different levels. These centers support teachers and students in the preparation of instructional materials and prepare materials based on lessons content. Therefore, the SPC coordinator can be an important resource for the teacher. As SPC-coordinator (Heinich et al, 1999: 43) gains a better idea of the teacher's need, arrangements can be made to contact area media collections (public, academic, or regional) to borrow potentially useful materials.

School library is also the source of print materials. Most school libraries participate in regional cooperatives, which share materials (Heinich et al, 1999: 43).

Indeed, the SPCs were charged with responsibilities of providing a list of comprehensive services and professional advice to teachers and students in their area. SPC coordinators are required to accomplish the following services: provide cooperative supervision of activities of students using the SPC; systematically acquainting students with the proper and effective use of instructional materials; organize all instructional materials for convenience, availability, and effective use; keep school administrators informed of the needs and services relating to the instructional materials program; provide professional service throughout the day; conduct periodic inventories of instructional materials wherever located; maintain a clearing house of information including up-to-date file; encourage public support of

instructional materials services; with cooperation of teachers, keep collection functional by systematic weeding; encourage teachers to order instructional materials and services for in advance of date of use; assist teacher in selecting instructional materials for classroom use; inform teachers of new instructional materials that have been acquired; assist teachers in planning for effective use of instructional materials, provide facilities and assistance in the production of instructional materials. To accomplish all these the coordinator should trained in Personnel management; Material production; Educational psychology, Library Science; Media service and evaluation techniques.

Similarly, the school librarian is required to give the following services: guide teachers and students in their selection of books; assist students to develop discrimination in reading, viewing, and listening; assist students to use resources of the library in the promotion of their assignments, cooperate with teachers in providing materials and preparing exhibits for bulletin boards and other displays; and provide professional materials.

2.7. Utilization of Instructional Materials in Mathematics Teaching and Learning Process

Teaching-Learning process is a means through which the teacher, the learner, the curriculum and other variables are organized in a systematic manner to attain predetermined goals and objectives (Aggarwal, 1996: 55). So, the process involves the selection, organization and delivery of information in appropriate environment and the way the learner interact with that information. Heinch and his associates (1999: 26) pointed out that there needs to be some considerations about utilization of instructional materials in the teaching and learning process. As to them, selection of instructional materials to suit a particular learning outcome is of particular importance. Integration of quality instructional materials is also of importance. The effectiveness of instructional materials depends on how they are integrated into the larger scheme. According to Schramm,

> *Motivated students learn from any medium if it is completely used and adapted to their needs. Within its physical limits, any medium can perform any educational*

task. Whether a student learns more from one medium than another is at least as likely to depend on how the medium is used as on what medium is used. (Schramm, 1977: iv)

To this end, principles in the utilization of instructional materials have been provided by different authors (Brown et al, 1977; Aggarwal, 1996; Heinich et al, 1999). Utilizing instructional materials has requiring the teacher to prepare, present and follow-up (invite and answer questions about instructional materials).

If the teacher is going to use instructional materials effectively, he/she must plan systematically for their use. The teacher begin instructional planning by assessing his/her students characteristics and the learning objectives to be attained. With this in mind, the teacher is in good position to select the types of instructional materials or delivery systems to be used and to consider specific materials that he/she might need.

Furthermore, sound principles provided by Heinich and others (1999: 26) help the teacher to increase the impact of using the material. The principles are the following: select material with appropriate attributes; introduce it to the learners by relating it to prior learning and indicating it how it is related to today's objectives; present it under the best possible environmental conditions; elicit a response from learners; review the content; and evaluate its impact.

So, in this section we consider the principles and criteria in the selection, planning and preparation, and using instructional materials in classroom.

Selecting Instructional Materials for classroom Instruction.

Ideally, material presented to a student should be sufficiently with in his/her field of experience so that he/she can learn what needs to be learned, but enough outside the field of experience to challenge and extend that field (Heinich, et al, 1989: 4).

Supporting this idea, Larcombe (1985:41) stated that in the earlier stages of the formation of a concept low noise (irrelevant properties of lower order concept) with little distracting detail is desirable; but as the concept becomes more strongly

established, increasing noise teaches the student to abstract the conceptual properties from more difficult examples.

Similarly, Romiszkowski (1974) stated that there is evidence that too much realism or detail may hinder the communication of teacher's message. He argues that there is increasing level of abstraction and increasing use of symbolic conventions as the teacher proceed along the scale given below.

Pictures ⟶ Diagrams ⟶ Graphic Representations

Consequently, the further a visual lies along the scale, the more must a student learn how to read the conventions before the visual will communicate the intended message.

Likewise, Amare (2000: 12) said the mode of information reception affects the mode of thinking. He added the argument that student learning is positively correlated with Amount of Invested Mental Effort (AIME), which is a perquisite for learning (Amare, 1999: 54). McLuhan (1964) said those media that encourage maximum involvement of the senses are most effective in the teaching-learning process. According to him with cool media, the learner gets more chance in involvement but with hot media, the involvement is limited resulting in limited learning.

So, in the teaching-learning process teachers are expected to select instructional materials that give more chance to the learner. Besides what has been said so far educators provide principles and criteria that may serve teachers well in making their day-to-day decisions about their selection of instructional materials (Aggarwal, 1996; Brown et al, 1977; Koumi, 1994; Romiszkowski, 1974; Heinch et al, 1999; Haney & Ullmer, 1980).

As to them materials must be examined in light of the specific objectives of the lesson, the needs and interest of learners, what attributes are need for proper communication of the idea involved, comparative merits and distinctive teaching functions, practical and technical factors, and the consistency of the materials with the method of teaching.

Furthermore, the criteria to be considered in selection of instructional materials include: the content, the purposes, appropriateness, cost, technical quality,

circumstances of use, learner verification and validation of usefulness and quality (Brown et al, 1977: 75).

In general, inappropriate selection of instructional materials can hamper the teaching-learning process. They are not an end by themselves but means to an end. Therefore, they must be used at the right time, in the right place and in the right way. To do this selection of appropriate materials is the main prerequisite. Scholars, however, have debated about what criteria should be applied in selecting materials. The net result of studies is an understanding that different criteria are suitable for different situations. Recent research, reviewed by Heinich and others (1999: 44), confirms that certain criterias are critical in the appraisal of materials. Among the questions to be asked about each specific piece of instructional materials are the following:

- Does it much the curriculum?
- Is it accurate and current?
- Does it contain clear and concise language?
- Will it motivate and maintain interest?
- Does it provide learner interest?
- Does it provide for learner participation?
- Is it of good technical quality?
- Is there evidence of its effectiveness? (e.g., field-test result)
- Is it free from objectionable bias and advertising
- Is a user guide or other documentation included?

Planning & Preparing to use Instructional Materials in Classrooms

Having either selected, modified, or designed own materials, the teacher must plan how the materials will be used and how much time will be spent using them. According to Heinich and others (1999: 31) all effective instruction requires careful planning.

Then, previewing the instructional materials help the teacher to exploit it's full potential and avoid unnecessary mistake (1999: 47). Next, the teacher needs to prepare instructional materials to support instructional activities he/she plans to use.

Here, the first step is to gather all the materials that you and the students need. In doing so, Aggarwal (1996: 158) provided principles of preparation. They are: as far as possible, locally available materials should be used in the preparation of instructional materials; teachers should receive some training in the preparation of instructional materials; teachers themselves should prepare some of the materials; and students may be associated in the preparation of instructional materials. Moreover, the teacher should determine in what sequence the materials would be used. What will the teacher do with the materials as a presenter? What will the student do as learners? Some teachers keep a list of the materials needed for each lesson and an outline of the sequence in which the activities will be presented.

The contribution of instructional materials to the teaching learning process largely depends upon how the teacher structures the learning situation. According to Brown and others (1977: 63-67) instructional materials could be used in introduction, development, organization, summarizing or evaluation of the lesson.

Next, prepare the environment; wherever the learning is to take place, the facilities will have to be arranged for proper student use of the materials. Certain factors are often taken for granted for any instructional situation. For instance, comfortable seating, adequate ventilation, climate control, suitable lighting are some of them. Next, prepare the learners because studies on learning tell us very clearly that what is learned from an activity depends highly on how the learners are prepared for the lesson.

Heinich et al (1999: 48) and Brown et al (1977: 61-63) provided activities teachers do to prepare learners. To prepare the learners teachers should: introduce the materials; make it clear why the material is being used at the particular time it is; briefly describe what the materials covers; stress what is important to be learned from the materials; tell students what they will be expected to do after using the materials (e.g., define, draw, measure, etc).

Using Instructional Materials in Classrooms

As it was mentioned earlier, research and practical experience show that much of the effectiveness of instructional materials depends on how they are integrated into

the larger scheme. As to the reviewed utilization techniques earlier, having selected the instructional materials with appropriate attributes, the teacher should introduce it to the learners by relating it to the prior learning and indicate how it relates to today's objectives, elicit a response from learners, review the content, and evaluate its impact.

The increased availability of instructional materials and the shift from teacher-centered to student centered learning increases the likelihood that students will be using the materials themselves rather than watching as the teacher presents them to the whole class. Learners must practice what they are expected to learn and should be reinforced for the correct response. There should be activities with in the lesson that allow learners to respond to and receive feedback on the appropriateness of their performance or response.

Dunne and Wragg (1994: 18) stated that skills are relatively straightforward actions, physical or mental, that can be practiced in isolation. For instance, drawing an angle with a protractor and adding numbers by using wooden blocks are examples of skill. A mental skill, such as solving problem, is shown to the child by taking it through and practicing it often includes the child using the same language. Teachers should guide the learners in their observable work.

To improve attitudes of students towards learning mathematics, teachers can deal with a range of practices in day-to-day activities of students. Such practices provided by educators (Bolster et al, 1978: Kogelman & Heller, 1994: Larcombe, 1985). For example, building a fence requires an understanding of "perimeter"; the concept of "area" comes in when we carpet our reading room; and sewing a round tablecloth makes use of the geometry of a circle. Examples of everyday mathematics can be found in a daily newspaper; in advertisers' claims as well as in business news analysis, sports statistics, science reports. Therefore, teachers can use these to change the way how mathematics is taught in school classrooms.

Larcombe (1985: 75) has pointed out that those who are advocating forms of individualized learning trust in the interaction between the learner and the learning materials. That is, active involvement is being the key. To do this, the nature of the assignments given to facilitate active involvement must be very carefully selected.

The teacher or other learners may be alongside to discuss, raise questions, and make comments, but it is as the assignment progresses that learning takes place (McNeil, 1996; Larcombe, 1985). For example, the teacher can give assignments for students about relationships among the metric system; using graphs to solve problems, reading and making curved graphs; squares, square roots, and the right-triangle relations; using percent in computing interest, discount on clothes & shoes, instolment buying; conversion of currency, temperature measures, electricity measures; reading their electric meter, telephone bill; dealing with price fluctuations, the consumer price index; word pictures, reading tables & graphs, etc.

This is, of course, in considerable contrast to the conventional situation where first the teacher presents the teaching points and looks for the learning to take place in the learner. However, in student centered approach the key role of the teacher has shifted from being an expositor of mathematics to a director and tutor of individual learners (Larcombe, 1985: 76). In line with this, Heinich and others (1999: 48) described the role of the teacher as a facilitator, helping students to explore the topic, discuss the content, prepare the materials for the topic, or present information to their classmates.

Williams (1963: 51-52) suggest practices related to using pictures in classrooms. As to him, for teaching meter reading such as thermometers, speedometers, gas or electric meters, pictures of their dials or scales large enough to read are introduced, so that computation tasks on practical value. For the study of buying and selling, the teacher introduces the term first cost, margin, overhead, profit, and selling price, which are more meaningful if accompanied by a diagram and pictures. Students should be taught about insurance and taxes so that they are informed of social implications as well as arithmetical concepts. Students who collect pictures of the items on which there is a luxury tax will note what are considered luxuries by our lawmakers. When learners are learning to identify common shapes such as circle, square, rectangle, and triangle they can collect pictures of objects to be mounted on charts or displayed on bulletin boards with the title. Pictures of containers collected from advertisements are used - cans (cylinders) or boxes (cubes) - to round out a collection on industrial uses of solid geometric figures. Learners can

use information in pictures to build prisms, cylinders, cones, and pyramids of different shapes and volumes.

Students can learn from visuals in two ways. These are by interpreting visuals (decoding) and by creating visuals (encoding). The former is the skill to read and translate the visuals into verbal messages and the later is the skill to create visuals as a tool to communicate effectively with others. The development of both decoding and encoding skills require practice (Heinich et al, 1999: 65-68). Larcombe (1985: 81-92) provided mathematical practices that encourage different activities.

Practices to Encourage the use of Language

Larcombe (1985: 81) pointed out that the act of describing objects or pictures can reveal a great deal about the way the learner observes things. Use of manipulative assist students in creating definitions (Clements & Battista, 1992: 449).

Practices to Encourage concrete work

The first means of encouraging concrete work must be to create a workshop atmosphere in the room where apparatus, models, and other mathematical artifacts are seen to be part and parcel of the room. In such atmosphere, it will be appropriate to encourage such works as: making models to represent structure and number operations; investigating spatial arrays; measurement; and representation (Larcombe, 1985: 82).

Practices to Encourage Discrimination and Perception

Students have failed to develop confidence in making perceptions and relating one area of their experience to another. The best chance teachers have is to expose them to many situations where there is a need to classify and compare like and unlike attributes. This will mean an emphasis on simple logic work related to various aspects of shape, number, symmetry, etc. Comparing apparently identical pictures with some things the same and some different, collecting similar and different collections of pictures, objects, etc., can all provide rich practice for sorting in response to such

questions as "What is the same about all these?" or "Which is the odd one out here?" etc (Larcombe, 1985: 84-86).

Practices to Encourage problem Solving

The student must not be judged on the basis of skill in communicating but upon observation, discrimination and willingness to compare the possibilities (Larcombe, 1985: 86-89). For example the following activities help the student to develop such skills.

- Given spoken, written or illustrated problem or problem situation. Students are required to select from given alternative solutions which they feel an appropriate
- Given a set of statements about a model, object, or picture. The student must judge which is false and which is true.
- Given a series of pictures, etc, with one missing. The student must choose from a given set of possible alternatives, which one will "fit" to make up the set.
- A variety of visual and manipulative puzzles where the "missing piece" must be selected from a set of possible pieces.

Practices to Give Opportunity to Enjoy Aesthetic Experiences

Larcombe (1985: 90-94) has provided activities related to certain problems which he has noticed with many students. The activities include, problems with location, problems with copying accurately, problems with circles, and problems of repeating the same thing twice.

2.8 Factors Affecting Utilization of Instructional Materials

Educators classified factors affecting utilization of instructional materials into three like, logistic/ material factors, financial/ economic factors, and human/political factors (Koumi, 1994; Nkuune, 1995; Aggarwal, 1996). These factors are considered as constraints for selection and use of instructional materials.

Human /political factors include individual feelings of insecurity with unfamiliar media or, conversely, individual preferences for the more glamorous media (Koumi,

1994: 57). In line with this, Laver (Cited in Nkuuhe, 1995: 228) provided teachers and students factors that influence instructional material selection and use. Student factors include; their preferences, perceptual difficulties, experiences and background (urban, rural), interests, level of motivation, individual differences, physical disabilities, and others. Likewise, teachers' factors include their own skills, knowledge, attitude and preferences. Aggarwal (1996: 159) added that lack of interest and ability of teachers, indifference of students, and language difficulties are among the human factors.

Logistic/material factors include, ineffectiveness of the materials like unplanned utilization make them to not prove their full usefulness. When the materials used without a definite purpose they lose their significance and importance (Aggarwal: 159).

There is no doubt on the economic and political constraints facing our schools. These often affect the budget. Consequently, shortage of instructional materials will greatly affect their selection and use.

Nkuuhe (1995: 227) summarized the factors that influence utilization of instructional materials. These factors are:

- the task to be learnt and the teaching method selected (lesson objective and content);
- characteristics of the learners such as their experiences, interests, motivations;
- characteristics of the teacher such as that persons; skills, attitudes and preferences;
- material factors including economic and political constraints as well as cost, time availability ease of use and maintenance of the material.

Finally, based on this brief review of the definition of IMs, their contribution within the teaching and learning process, the guiding principles on their utilization, and the factors affecting utilization of them, this study attempts to assess the availability and utilization of IMs for mathematics instruction in selected Sidama Zone primary schools.

CHAPTER THREE

3. RESEARCH DESIGN AND METHODOLOGY

3.1 Method of the study

The principal objective of this study was to assess the availability and utilization of IMs for Mathematics instruction in the selected ten primary schools (second cycle) of Sidama Zone.

A Descriptive Survey method was used, since this method is more appropriate to gather data related to the problem under study.

This study investigated the congruence between the intended material inputs (by curricular materials) and the observed materials in schools. To achieve this the main input variables considered in the study were:

- The support made by Z.E.D and W.E.O to schools towards improving IMs for Mathematics instruction;
- The availability of Mathematics curricular materials and non-textbook IMs intended by the curricular materials;
- The attitude of Mathematics teachers towards the preparation and use of IMs in the teaching-learning process;
- SPC contributions to Mathematics instruction;
- School principal's contributions to Mathematics instruction;

The process variables given due emphasis in the study were:

- Teacher's activity in planning preparing and using IMs in classroom instruction;
- Student's involvement in learning mathematics by using IMs available in the school.

3.2 Sources of Data

The universe of the study encompasses Z.E.D and W.E.Os Educational Support section officials, school principals, SPCs & their coordinators, Libraries, Grade 7and 8 Mathematics teachers and students in the government schools of Sidama Zone in SNNP. Relevant documents from the Z.E.D, W.E.O and schools also served as additional source of data.

3.3 Sampling Procedure

The study was the cases of ten government schools in the three Weredas of Sidama Zone. To select the Weredas a purposive sampling technique was used. The names of the Weredas were Awassa Zuria, Shebedino and Dale. Neighboring Weredas, accessible to transport were purposely selected for convenience. This permitted the researcher to reach two or more schools in a day to make classroom observations. More over, the selected Weredas have 23 government schools listed in the record of 8th grade national examination file up to 1992 E.C., which is half of the total government schools in the zone at the same level.

An available sampling technique was used to select target populations from the zone and Wereda Educational support section officials. The same technique was used to select all school principals and SPC- coordinators. From the 23 schools in the selected Woredas, 5 rural and 5 urban schools were selected using purposive sampling technique by considering their accessibility to transportation. Then from the selected ten schools one section from each grade was selected and taken as a sample for the study. In doing so, simple random sampling was used in schools which have more than one section in the sample grades. Mathematics teachers and students in the sample sections considered as respondents to the study. Hence 20 teachers and 100 students (5 from each section) were taken as respondents to the study.

Using the above procedure, the selected government schools are shown in 'Table 1.

Table1: List of Target schools & Number of Math teachers in grades 7 & 8.

No	Wereda	Name of the school	Total No of grade 7and 8 math Teachers	No of Teachers having Diploma in Majoring / Minoring Maths
1	Awassa Zuria	Tabor Primary & Junior S. School.	12	6
2	Awassa Zuria	Awassa Haik Primary & Junior S. School.	3	1
3	Awassa Zuria	Tula Primary & Junior S. School.	2	1
4	Shebedino	Leku Primary & Junior S. School.	4	1
5	Shebedino	Abela Lida Primary & Junior S. School.	2	1
6	Shebedino	Morecho Primary & Junior S. School.	2	1
7	Shebedino	Dilla Anferara Primary & Junior S. School.	2	1
8	Dale	RasDesta Primary & Junior S. School.	5	1
9	Dale	Yekatit 25 Primary & Junior S. School.	4	1
10	Dale	Bokaso Primary & Junior S.School.	2	1

To obtain adequate information for the study three types of data collection tools were used. They are questionnaire, observation and document analysis.

1. Questionnaire

Five sets of questionnaires with closed and open-ended items were used to collect data from officials, principals, SPC-coordinators, teachers and students.

The questionnaires, which were initially prepared in English, were given to two experts having a qualification of M.A. in Curriculum and Instruction. The experts were involved in assessing and commenting the extent to which the items were appropriate in securing relevant information to serve the purpose of the study. Based on the feedback from the experts some modifications were made on the items. Then the questionnaires were translated into Amharic in order to alleviate any unnecessary complication in responding to the items. A language expert whose qualification was M.A in Ethiopian Languages and Literature made the translation.

Subsequently four of the drafts of the questionnaire were tested on two government schools, having grades 7 and 8,selected from Awassa Zuria Wereda for pilot study. Later on, the items in the pre-tested questionnaires were revised to find out statements that might be open to questions. Lastly, the questionnaires were retyped after making slight modifications.

The finalized Amharic version questionnaires were administered to 20 teachers, 4 Wereda and Zone Educational Support Section Officials, 10 principals, 10 SPC-coordinators and 100 students.

The questionnaire for Mathematics teachers consisted of items regarding: their background; the sources they use to obtain IMs; the availability of curricular materials and non-textbook IMs in the SPC; their evaluation of the contribution of SPC to Mathematics instruction; activities to involve students in production and use of IMs; their agreement or disagreement towards the given statements about using IMs; their evaluation of the frequency of using IMs whenever necessary; the use of suggested IMs (used or not used) and the reasons for not using them; and their attitude towards teaching the subject and the importance of utilization of IMs for Mathematics instruction.

The questionnaire for Z.E.D and W.E.O Educational support section officials consisted of items regarding the kind of material inputs support they give to schools; their evaluation of the support given; the budget allocation, the expected lifetime of textbooks and the mechanisms to replace the used out books; and the distribution mechanisms.

The questionnaire for principals consisted of items regarding the kind of material input support made to schools from the Z.E.D., W.E.O.s, NGOs and community members; the working hours of SPC & Library; their evaluation of the participation of mathematics teachers in SPC; the effort the school has made to improve shortage and utilization of IMs; the response to the effort made; the student to textbook ratio; the strategy they follow to solve the shortage of IMs; their evaluation towards the contribution of SPC; and the reasons they sine about the shortage of IMs and the rank of these reasons.

The questionnaire for SPC-coordinators consisted of items regarding their training the availability of guide materials to perform their responsibilities, the source of budget for SPC's activities; their evaluation of the degree of support from principals, Z.E.D, W.E.Os, NGOs and community members; the availability of curricular materials; the participation of teachers and students in SPC; the sources of IMs available in the SPC; the frequency of using available materials in SPC by Mathematics teachers; the problems of SPC by rank, and their evaluation of the contribution of SPC to the teaching learning process.

The questionnaire for students consisted of items regarding their most favorite subject, ranking subjects based on their feeling towards them; whether they have a text book or not and where they use it; the availability and utilization of SPC and Library; availability of Mathematics reference books in the library; their participation in SPC & Library; their first semester Mathematics achievement; their attitudes towards the subject, and the evaluation of their different Mathematical abilities & skills.

2. Observation

To Supplement the information obtained through questionnaires, a structured observation sheet using two sets of formats was used. So, SPC & Library, and classroom instruction were observed using the forms prepared to collect factual data for the study.

In observing of SPCs a checklist was used to assess the quantity of available IMs in the SPC; the arrangement & the source of available IMs; the space to produce, display, and store IMs; the row materials & the tools to produce IMs were examined. In the library, a variety of Mathematics reference books; number of seats; kind of services given to teachers and students were observed.

In the classroom observation, a checklist was used to observe the classroom environment and teacher's use of IMs. Besides the checklist, a rating scale was also used to rate teacher activity and use of IMs (See Appendix-)

3. Document Analysis

Documents at different levels were analyzed to generate data relevant to the study, at the regional level, 8th grade national examination roster; at the zone level the document showing the distribution of curricular materials in 1991 & 1992 E.C. were analyzed. At the school level teacher lesson plans; SPC borrowing list file, SPC participation file, students first semester Mathematics achievement list were analyzed

CHAPTER FOUR

4. PRESENTATIONS, ANALYSIS, AND DISCUSSION OF DATA

In this chapter the data collected through the questionnaires, observation and document analysis are presented with the help of tables. They are then followed by analysis and discussion of data to give answers to the nine basic questions, which were raised in Chapter One.

4.1 Presentation and Analysis of Data

This section presents and analyzes the collected data. Here the data are presented in tables and analyzed using percentages, frequencies and descriptive statements. The numerical values that are presented in percentages were calculated to the nearest whole numbers. Besides, the figures in the parenthesis of each table are percentages.

Table 2: Demographic Characteristics of the Respondents.

No.	Item	*Respondents*		
		Teachers	**Principals**	**SPC coordinater**
		N=20 (100%)	**N= 10(100%)**	**N= 10(100%)**
1	**Sex** a) Male b) Female	 16(80%) 4 (20%)	 9 (90%) 1 (10%)	 10(100%) - -
2	**Age** a) 20-30 b) 31-40 c) 41-50 d) 51-60	 4 (20%) 12 (60%) 3 (15%) 1(5%)	 2(20% 6(60%) 2(20%) -	 1 (10%) 7 (70%) 2 (20%) -
3	**Educational level** a) 12+2 b) 12+1 c) 12+TTI d) Other	 13 (65%) 5(25%) 2(10%) -	 6(60%) 3 (30%) 1(10%) -	 3(30%) - 7(70%) -
4	**Years of Experience in the current job** a) 6-15 b) 16-25 c) 26-35	 11(55%) 7(35%) 2(10%)	 8(80%) 2(20%) -	 4(40%) 6(60%) -

According to Table 2, about 80% of teachers, 90% of principals, and 100% of SPC-coordinators were male respondents at the school level. Regarding their age the

majority of respondents were found to be between 31and 40 years of age. That is, 60% of teachers, 80% of principals and 70% of SPC-coordinators age is between 31and 40 years. Pertaining to their qualification, 65% of teachers, 60% of principals and 30% of SPC-coordinators have diploma obtained from different colleges. Twenty five percent of teachers and 30% of principals and 70% of SPC-coordinators have 12+TTI certificate. Regarding to their experience in the current job, 55% of teachers, 80% of principals and 40% of SPC-coordinators have experiences between 6 and 15 years. Only 20% of the teachers have experiences between 26 and 35 years. All the rest have experiences between 16 and 25 years.

Box-1: ***Classification of sample schools as Rural and Urban***

Wereda	**Name of urban schools**	**Name of Rural Schools**
Awassa Zuria	Tabor Primary & J.S. Awassa Haik Primary & J.S.	Tula Primary& J.S.
Dale	Ras Desta Pri.&J.S. Yekatit 25 Pri.&J.S.	Bokaso pri. & J.s.
Shebedino	Leku Pri.&J.S.	Abelalida Pri-& J.S. Morecho Pri. & J.S. Dilla Anferara Pri.&J.S.

Source: Z.E.D.

According to Box-1, the sample schools in each Wereda were classified into groups. Two schools from Awassa Zuria, two schools from Dale and one school from Shebedino Weredas were taken as urban sample schools. Others were classified as rural schools depending on the classification of Z.E.D. Therefore, 50%of the sample schools are in urban and the rest, 50%, in rural.

As it can be seen from Box 2,IMs suggested in the syllabuses of grade 7and 8 Mathematics could be broadly classified as two-dimensional and three-dimensional IMs. In grade 7 Mathematics different types of graphs, charts, pictures, and tables are among the suggested two-dimensional IMs.

BOX-2: IMs Suggested by Grade 7 and 8 syllabuses & Teacher's guides

Grade	Unit	Suggested IMs.
7	1	Graphs on coordinate system, square with 100 equal unit subdivision; Pictures of parts of whole; table of proportions; charts showing algorisms for solving problems of percent; Survey of line, bar and circle graphs.
	2	Picture of number ray; Slide rule; survey of rules for addition, multiplication and division with rational number;
	3	Balance; Survey of rules of transformation; picture of number line
	4	Ruler; compasses; model of circles, survey of theorems on circles; protractor; summary table of the unit.
	5	Numerical table; models of right prisms; right cylinders; cubes; rectangular right prisms; triangular right prisms; summary table of the unit.
8	1	Charts showing: properties of operations with rational numbers; the rule for multiplying two binomials; the rule for multiplying two binomials; the rules for converting products into sums.
	2	Tables and venn diagrams showing representations of relations; graphs of simple relations; ruler; charts showing sequences, the four quadrants of coordinate plane; Squared paper, flashcards containing rule of transformation; charts containing rules for removing brackets charts showing the steps for solving word problems
	3	Numerical table charts showing the relationship between squaring and extracting square roots; charts, which show the steps how, the point, which corresponds to $\sqrt{2}$, is obtained by construction.
	4	Figures representing a path, closed path, simple closed path; models showing different plane figures;
	5	Set square; charts with similar triangles,
	6	Charts containing steps for constructing similar triangles using similarity theorems.
	7	Protractor; set square; ruler; flash cards containing the similarity theorems; models of cylinders and prisms; models of different pyramids; models of circular cones; models of spheres.

Source: Grade 7 and 8 Syllabuses.

Different types of models and objects such as slide rule, balance, ruler, models, compasses & Protractor are three-dimensional IMs suggested in the curricular materials. In Grade 8 Mathematics graphs, charts, pictures, tables, Venn diagrams, squared papers and flash cards are among the suggested two-dimensional IMs. Different kind of geometric models and objects like ruler, set square, protractor are three-dimensional suggested IMs.

Table 3: The Availability and Working Hours of SPCs and Libraries in Sample Schools.

Alternatives	No. Of SPC	No. Of Library	Remark
a) Available	10(100%)	7(70%)	1 SPC do not work at all.
b) Not available	_	3(30%)	1SPC opened in 2nd semester.
a) Full time working	6 (60%)	2(20%)	In 3 rural schools Library is not
b) Half time working	3(30%)	5(50%)	available.

Source: School principals and SPC- coordinators.

According to Table 3, 100% of the sample schools have SPC and 70% of them have libraries. Moreover, 60% of SPCs and 20% of libraries opened full day while 30% of SPCs and 50% of the libraries work half day (by shift system). One of the SPCs (10%) is not active, only an empty room and its coordinator is available. Thirty percent of the schools located in rural areas do not have a library.

According to the observation data (see Annex-A), no Mathematics syllabuses and teacher's guides were available in the sample 10 SPCs. But, in 3(30%) SPCs, both grade 7 and 8 mathematics student textbooks were available. One textbook for each grade level was found in the SPCs provided by government sources. Pictures of parts of whole found in 2(20%) SPCs and the available quantities were 2 in one and 7 in the other. They were made by teachers and SPC-coordinators. Slide rule and survey of rules for addition of rational numbers were made by teachers and found in 1(10 %) SPC. Their quantities were 1 and 2 respectively.

Rulers and compasses were found in 4(40%) SPCs and made by teachers and SPC-coordinators. In 7(70%) SPCs, models of circles were found in few quantities. Protractors were found in 4(40%) SPCs and made by teachers and SPC-coordinators. Models of right prisms (not cubes) and models of right cylinders were found in 4(40%) SPCs. The sources of the models are teachers, SPC-coordinators, NGO and the Awassa College of Teachers' Education.

From the same sources, models of cubes were found in 5(50%) SPCs. Models of triangular right prisms were found in 3(30%) SPCs. Setsquares were found in 6(60%) SPCs and provided by government. Models of different prisms (not right ones) donated by NGO and was found in 1(10%) SPC. Models of different pyramids were available in 4 ((40%) SPCs. Models of circular cones were found in 3(30%) SPCs. Models of sphere were found in 2(20%) SPCs.

The detailed data of quantities of the available IMs per SPC were given in "Annex-A" and the sources of the IMs were mostly teachers and SPC-coordinators.

Annex-A reveals that from a total of 157 available IMS in 9 SPCs only 15 were two-dimensional IMs found in 20% to 30% of the SPCs. More over, most of the available IMs produced by teachers and SPC coordinators. Only few are donated by

NGOs and government sources. Besides this the distribution of the quantities per school show that few number of each type of IMs were found in most SPCs.

Table 4. Availability of Grade 7&8 mathematics curricular materials and IMs suggested in them as perceived by Teachers.

No	Item	No. Of Teacher respondents	
		Yes	No
1	Do you have the following Curricular materials?		
	a) Grade 7/8 math syllabus	1(5%)	19(95%)
	b) Grade 7/8 math Teacher's guide	11(55%)	9 (45%)
	c) Grade 7/8 math student Textbook	20 (100%)	-
2	How do you evaluate the availability of mathematics IMs in the SPC for the grade level you teach?		
	a) Adequate	-	
	b) Average	8 (40%)	
	c) Very few	10 (50%)	
	d) Not at all	2 (10%)	

According to Table 4, out of 20 mathematics teachers 5% of them have the syllabuses while 95% of them were not have it. Fifty five percent and 100% of the teachers have teacher's guide and student's textbook respectively. Moreover, about 40% of teachers were perceived that the availability of non-book IMs for mathematics instructions in the SPCs were average while 50% of them indicated they were very few. Only 10% of teachers indicated there were no IMs in the SPC.

From Table 5, it could be possible to imagine that how the problem is serious. According to the principals, the text to student ratio range from 1:8 to 1:30 for Grade 7 and 1:8 to 1:25 for Grade 8. Mathematics teachers have indicated that the ratio ranges from 1:7 to 1:15 and from 1:6 to 1:20 for Grades 7 and 8 respectively. There are inconsistencies of information from principals & Teachers. This might be due to the fact that some students have purchased their own textbook and reduced the ratio to some extent.

Table 5: The Ratio of Mathematics student textbook to Students

Name of the School	Respondents			
	Principals		Teachers	
	Grade7	Grade 8	Grade7	Grade 8
Tabor	1:9	1:10	1:8	1:10
Awassa Haik	1:10	1:10	1:9	1:8
Tula	1:8	1:8	1:7	1:8
Ras Desta	1:10	1:10	1:10	1:10
Yekatit 25	1:30	1:25	1:15	1:20
Bocakso	1:10	1:10	1:8	1:7
Leku	1:15	1:13	1:12	1:10
Morecho	1:20	1:20	1:15	1:15
Abelalida	1:20	1:10	1:8	1:6
Dilla Anferara	1:10	1:8	1:12	1:8

It seems that principals referred only to the numbers of textbooks distributed by the school with out considering these purchased by the students themselves.

According to Table 6, all respondents agree that there are mathematics IMs support from the Z.E.D /W.E.O, but all the officials and 70% of the principals evaluate the support made was low. Indeed, about 30% of principals said that the support made by the education offices were moderate. Regarding the kind of support made to schools, Z.E.D and W.E.O Educational Support Section officials confirm that Grade 7 & 8 Mathematics syllabuses were provided to schools. But, 100% of the principals did not agree to it. However, all respondents agree that teacher's guides, student textbooks and blackboards were provided to schools by the offices.

Pertaining non-textbook IMs such as other mathematics reference books, three -dimensional models, compasses & protractors, rulers, graph boards, bulletin boards, graphics, and different color chalks, all respondents agreed that no support were made in the past five years as to their knowledge.

Table 6: Types of Mathematics IMs Supported by Z.E.D/ W.E.Os to Schools.

No	Items	Z.E.D Official N=1		W.E.O Officials N=3		Principals N= 10	
		Yes	No	Yes	No	Yes	No
1	Are there any Math IMs support from ZED /W.E.O to schools?	1		3		10	
2	Types of Support made?						
	a) "Grade 7/ 8 math syllabuses	1		3		-	10
	b) Grade 7/8 math Teacher's Guides	1		3		10	
	c) Grade 7/8 math Student Textbooks	1		3		10	
	d) Black board	1		3		10	
	e) Non-textbook IMs	-	1	-	3	-	10
3	How do you evaluate the support given to schools by Z.E.D /W.E.O?						
	a) Satisfactory	-	1	-	3	-	10
	b) Moderate	-	1	-	3	3	
	c) Low	1		3		7	
4	Balance between subjects in supporting IMs						
	a) Balanced	-		-		-	
	b) Not balanced	1		3		10	

Regarding the balance between subjects in supporting IMs all respondents agree that there is imbalance between subjects. They argued that right from student to text ratio up to non-text IMs support there are differences between the subjects. Especially natural science and social science subjects benefit more than mathematics.

Table 7: Number of Mathematics Student Textbooks Distributed in the Zone for the past two-years and the year 1993 E.C.

Year (E.C)	Grade	No. Of Textbooks Distributed	Total number of students in the zone
1991	7	2747	14905
1991	8	3410	12553
1992	7	6224	19460
1992	8	2068	11700
1993	7	0	-
1993	8	0	-

Source: Z.E.D. Educational Support section& 1991 E.C Educational Statistics Annual Abstract, R.E.B, SNNPR.

From Table 7, it is possible to see the total number of textbooks distributed to schools and the total number of students by grade in Sidama zone. If the books were distributed evenly, student to text ratio would have been 5: 1 to the nearest whole number for Grade 7 and 4:1 for Grade 8 in 1991 E.C. Assuming that 50% of the books distributed in 1991 E.C returned to schools there were 7598 grade 7 Mathematics books and 3773 Grade 8 Mathematics books available in the zone in 1992. . So, the student to text ratio to the nearest whole number was 3:1 for grade 7 and 3:1 for grade 8 in 1992 E.C.

According to the source from Z.E.D there were no textbooks distributed in the year 1993 E.C. Regarding the total number of students in1993 E.C there was no data obtained till the date of data collection period to this study.

Any way the number of text books returned to schools in 1992 E.C were not equal to the distributed books and the actual conditions in the sample schools did not show that much number of books due to different reasons (see Table 5).

Table 8: Availability of skilled Manpower, in SPCs.

No	Item	SPC- Coord N=10	Remark
1	Educational level a) 12+2 b) 12+TTI	 3(30%) 7 (70%)	
2	Additional training in Material production &evaluation techniques a) Yes b) No	 3(30%) 7(70%)	
3	Frequency of the training a) Once b) Twice c) Four times	 1(10%) 1(10%) 1(10%)	
4	Duration of each training a) One month b) Two month c) Two for one week & Two for one month.	 1(10%) 1(10%) 1(10%)	All are given before 1984 E.C
5	Evaluation of the training a) Very good b) Good	 2(20%) 1(10%)	
6	The SPC-coordinator assigned by: a) W.E.O b) Principal c) Staff	 3(30%) 5(50%) 2(20%)	
7	Any additional responsibility to the SPC-Coordinator? A) Teaching B) Unit leader C) No	 8(80%) - 2(20%)	The teaching load ranges from9 to 16 periods per week. One of them had mental problem.

According to Table 8, out of 10 SPC coordinators, 30% of them have college diploma and 70% of them have TTI certificate. But, this is not sufficient to be SPC-coordinator and it needs additional repeated training to the manpower available in the schools. Regarding this 30% of SPC-coordinators took training while 70% of them did not. Among these 30%, 10%of them took training only once, 10% twice and 10% four times before 1984 E.C. The Duration of the trainings ranges from one week to two-months. Twenty percent of them evaluated the training(s) were very good and 10% as good. Regarding their assignment to the position out of 10 SPC-coordinators, 30% of them were assigned by W.E.O, 50% of them by principals and 20% of them by the staff. From the data in the table 80% of the SPC-Coordinators have additional teaching load ranging from 9 to 16 periods per week. Twenty percent of them have no additional task due to health problem.

The data in Table 8, reveals that there is no uniform criteria or guide to assign SPC-Coordinator and there is no responsible body to assign manpower to the SPCs.

Table 9: Budget Allocation to SPC / Library

Item	Respondents		
	Z.E.D. N=1	W.E.O. N=3	Remark
Is there any budget allocated to strengthen SPC/Library			In 1993 E.C. NGO I allocated some budget to purchase reference books.
a) Yes	-	-	
b) No	1(100%)	3(100%)	

Source: Z.E.D & W.E.Os educational support Sections.

According to Table 9, all respondents at the Zone and Wereda level confirm that there was no budget allocated to SPCs /Libraries still now. But, this year some amount of budget allocated to purchase reference books to strengthen libraries, covered by NGOs. But, up to data collection time the budget was not released.

Sample school principals and SPC-coordinators in Table 10 evaluated the level of organizations support given to SPCs.

Regarding the NGOs, out of 10 principals, 20% of them rated as moderate and 10% of them rated to be low. Seventy percent of both respondents were rated no support at all. The principals of the two schools have informed the researcher that

they wrote project proposals to NGOs to strengthen the SPCs and have got positive responses. With respect to the support made by school administrators out of the 10 principals, 30%, 40%, 20%, and 10% of them were rated high, moderate, low and no support respectively .Out of 10 SPC-coordinators, 20% of them were rated high, 50% of them were rated moderate, 20% of them were rated low, and 10% of them were rated no support at all.

Table10: Evaluation of Level of Organizations Support to SPCs by Principals & SPC-coordinators.

Level	NGOs		School Administration		Community		Education College	
	P	C	P	C	P	C	P	C
High	-	-	3(30%)	2(20%)	-	-	-	-
Moderate	2(20%)	-	4(40%)	5(50%)	2(20%)	2(20%)	2(20%)	2(20%)
Low	1(10%)	3(30%)	2(20%)	2(20%)	4(40%)	3(30%)	-	-
No	7(70%)	7(70%)	1(10%)	1(10%)	4(40%)	5(50%)	8(80%)	8(80%)

N.B: P- Principal & C-SPC- Coordinator.

The community support was moderate to20% of both respondents. Forty percent of principals and 30%of coordinators rated it was low. But, 40% of the principals, and 50% of the coordinators rated there was no support at all. Regarding the educational college, 20% of both respondents rated moderate support while the rest 80%of them rated no support at all. From this we can see that 20% of the sample schools had access to exploit the resource from Awassa college of Teacher Education.

The data in Table 11, shows the effort made by the principals to improve the shortage of IMs in the school. Hundred percent of the sample principals have indicated that they report to the government educational offices, while 60 percent of them indicated that they also call support from the NGO. But, most of the respondents did not exploit the support from the community and institutions around them.

Table 11: Efforts Made by the Principals to Minimize Shortage of IMs.

No	Item	Respondent Principals N=10	
		Yes	No
1	The kind of strategy (ies) You Followed to minimize shortage of IMs?		
	a) Report to Z.E.D & W.E.O	10	-
	b) Call Support from NGO	6	4
	c) Call Support from the community	3	7
	d) Call support from Institutions	2	8
2	Do mathematics teachers report the problem they face towards shortage of IMs?	7	3
3	If the response to Item "2" is "Yes", how the replay from you was solved the problem?		
	a) Partially	4	
	b) Very little	2	
	c) No solution	1	
4	How do you evaluate your accomplishment / performance of the responsibility in strengthening the Library/ SPC?		
	a) High	3	
	b) Average	5	
	c) Low	1	
	d) Very low	1	
5	Give incentive to mathematics teachers who prepare and use IMs	6	

Most of the respondents (70%) indicated that teachers were reported IMs shortage problems, but the replay by most of the respondents were indicated either solved the problem partially or very little. Sixty percent of the respondents indicated that they give incentive to teachers who prepare and use IMs. Generally, most of the respondents rated their performance in strengthening the library / SPC as either high or average.

From the descriptions given above it is not difficult to see that better support to SPCs come from school administrators.

As it is evident in Table 12, out of 10 SPCs in 80%of them raw materials such as drawing paper, markers, different color inks, hard boards, and woods were available to varying degrees. However, out of these 80%, in 30%of the SPCs the available materials were inadequate while in 50% of them it was very few. Out of the 10SPCs, 20% of them do not have raw materials to produce IMs at all.

Table12: Facilities to Produce and Display Mathematics IMs in the SPCs (Observation)

№	Items	No. Of Schools		Remark
		Yes	No	
1	Availability of row materials to produce IMs.	8	2	In five schools it was very few.
2	Availability of curricular materials			
	a) Syllabuses	-	10	
	b) Teacher's Guides	-	10	
3	c) Student textbooks	3	7	
4	Availability of guides to produce IMs	2	8	
	SPC-facilities			
	a) Production room	3	7	
	b) Display room	10	-	
	c) Display shelves	3	7	
	d) Workbench	10	-	
	e) Hand tools	10	-	In three schools the tools were very limited.
5	Display room size 5 x 6			
	a) 7 x 6	3		
	b) 8 x 5	3		
	c) 14 x 6	2		
	d) 15 x 6	1		
6	Arrangement of IMs in SPC is by:	1		
	a) Subject			
	b) Department	5		
	c) Mixed	3		
	d) No material	1		
		1		

Regarding the guide materials, which help the SPC coordinator to produce IMs or a specific subject at each grade, 20%of the SPCs have a guide that describes the role of SPCs and published by MOE in 1980 E.C. The rest, 80% of them did not have any guide, material. Indeed, the curricular materials also a good guide to find the type of IMs needed for a certain topic. The SPC coordinators can refer from them and produce the necessary IMs beforehand than waiting the teacher request. But 100% of the 10 SPCs did not have the syllabuses and teacher's guides, which are very important. Students textbook found onlyin30% of the SPCs while the rest 70% did not have the textbook.

Pertaining the space, production materials, and display place facilities, only 30%of the SPCs have separate rooms for production and display while the rest 70% did not have this facility. These majority groups use the same room to produce and display IMs. Display shelves found in30%of the SPCs while the rest 70% use the floor and broken tables to display the available IMs. The entire sample SPCs have hand

tools and workbench to draw figures, to cut woods, etc in varying degrees. But in 30 percent of the SPCs the availability of hand tools was very limited. Regarding the 10-display rooms size, 30%of them have average size while 50%of them were wide .The rest 20% of the 10display rooms were very wide.

The arrangement of available IMs in the SPCs were found as follows: out of the observed 10 SPCs, in 50% of them the arrangement was subject wise, in 30% of them it was by department, while in10% of them it was mixed and difficult to find the IMs needed .As it can be seen from the data, in most of the SPCs the arrangement of IMs permits easy selection of the available materials.

The lack of skilled manpower affects the preparation of necessary IMs in the SPCs. All SPC-Coordinators in the sample schools evaluated their knowledge of grade 7and 8 mathematics curricular materials, which could guide them to prepare IMs necessary to the specific content and objective.

Table 13: The Guide SPC-Coordinators use to Produce Mathematics IMs.

№	Items	SPC-coor. N=10	
1	How do you evaluate your knowledge about grade 7and 8 mathematics curricular materials?		
	a) Good	-	
	b) Average	1	
	c) Low	3	
	d) No idea.	6	
2	What guide do you use to prepare IMs that help mathematics instruction?		
	a) Textbook		
	b) My experience		
	c) Teachers request	7	
	d) B&C	1	
	e) a, b,c	2	

Source: SPC-Coordinators.

According to Table 13, out of 10 SPC-coordinators 10% of them rated their knowledge of curricular materials as average while 30% of them rated it as low. The rest 60%of them rated they have no idea about it.

Pertaining to the guide they use to prepare Mathematics IMs, 70% of them responded that they use the teachers request. Ten percent of the respondents said

that they use both their experience and the teacher request, while 20% of them said they use the textbook, their experience and the teacher request.

From the data described above we can see that the skill of SPC-Coordinators was not sufficient to support the mathematics classroom instruction. Skilled SPC-Coordinator should investigate the syllabuses of every subject in order to prepare IMs beforehand to support the teaching-learning process. But, this did not happened in most of the sample schools. Moreover, most of the coordinators wait the teacher request, which should not be the case, to prepare the IMs. They should refer to the curricular materials and prepare the IMs by themselves or together with the teacher and then encourage the teacher to use them in classroom.

Table14: The Source Mathematics Teachers use to Obtain IMs.

№	Items	Teacher Respondents № N=20
1	Which source you use to obtain IMs?	
	a) SPC	14(70%)
	b) Library	-
	c) Neighboring schools	-
	d) a & b	3(15%)
	e) a, b,& c	3(15%)
2	Which strategies you use to prepare and use IMs for a lesson?	
	a) Select the available IMs from SPC	8(40%)
	b) Modify the available IMs	2(10%)
	c) Produce the IMs from local resources	6(30%)
	d) a & c	4(20%)
3	During selection of IMs which method you follow?	
	a) Participate the SPC-coordinator	2(10%)
	b) Use the syllabuses	-
	c) Use the teacher's guide	3(15%)
	d) Use the student test book	4(20%)
	e) a & c	2(10%)
	f) a & d	1(5%)
	g) c & d	6(30%)
	h) a,c,& d	2(10%)

According to Table 14,out of 20 teacher respondents 70% of them said they use only SPC as a source to obtain IMs. Thirty percent of the respondents said they use the SPC and library while 30% of the respondents said they use the SPC, library and neighboring schools. However, using more than one source is better than using single source. In this regard, 3o% of the respondents use two or three sources to obtain IMs.

Regarding the strategies to prepare and use IMs, 40% of the respondents said they select only the available ones, 10% of them said they modify the available ones and 30%of them said they prepare the new once from local resources. Only 20% of them said they use more than one strategies namely select the available materials or prepare new ones from local resources.

Pertaining to the selection methods, 10% of the respondents said they participate the SPC-coordinator, 15% of them said they use the teacher's guide and 20% of them said they use the student text book. The rest 55% of the respondents said they use more than one methods mentioned above.

Table15: Observation of Classroom Facilities and IMs. In Rural & Urban Schools.

Variables	Number of observed class rooms N=20								
	Adequate			Inadequate			Not Available		
	U	R	T	U	R	T	U	R	T
Blackboard	4	2	6	6	8	14	-	-	-
Students' desks, Chairs or benches	2	6	8	8	4	12	-	-	-
Table & chair for the teacher	-	-	-	-	-	-	10	10	20
Bulletin board	2	-	2	-	-	-	8	10	18

N.B: U= urban, R=rural, T= Total

The data in Table 15, shows the internal conditions of the classrooms in terms of the degree of availability of the basic facilities and instructional materials in urban and rural schools. The rating was done on the basis of the following descriptions. If double non-damaged workable blackboards exist in the classroom, it is rated as adequate. But, if single blackboard or double and some of its parts damaged blackboards exist in the classroom, it is rated as inadequate.

Based on this observation made in 20 classrooms, 10 of them located in urban and 10 in rural schools. As it can be seen in Table 15, 70% of both the urban and rural classrooms have no adequate blackboard. However, out of these classrooms 40% located in rural while 30% in urban schools. Here note that all the observed classrooms have blackboards vary in degree of adequacy.

Regarding the student's seat, adequate, rated when no more than three students sit on one desk. If four students sit on one desk or student sit on the floor due to shortage of desk it was rated as inadequate. Based on this observation it is found that 40% of both urban and rural classrooms have adequate seats while 60% of them have inadequate seats.

In 100% of the observed classrooms there were no table or chair for the teacher to use. Bulletin board was found in 10% of the sample classrooms located in urban schools.

Table 16: The Major Criteria(s) Teachers Use to Select IMs for the Lesson.

Alternatives	Number of Teacher respondents N=20
a) The objective	12
b) The teaching method	6
c) The color of the material	-
d) a & b	2

The data in Table 16, shows the major criteria(s) that mathematics teachers use to select IMs for the content they are going to teach in classrooms. Pertaining this, out of 20 respondents 60% of them said they use the objective as a major criteria while 30% of them said they use the teaching method. The rest 10% of the respondents said they use both the objective and the teaching method as the major criteria's.

The data in Table 17, shows the type of training that the sample mathematics teachers took and the program they passed to obtain their diploma. Pertaining this out of the 20 respondents, 65% of them said they have diploma at the college level. Among these 50%major /minor mathematics while 15% were other subjects. The rest 35% of the respondents said they did not have college diploma. Among those who have college diploma, 20% were passed through regular, 10% were through summer and 35% were though extension programs. Regarding the training related to the utilization of IMs at the college / TTI level, 50% of the respondents said they took while the rest 50% said no they did not. Those who took the training evaluated it as, 20% very good and 30% good.

Table 17: Mathematics Teachers Training on IMs Selection, Preparation & Use.

№	Item	Number of Teacher respondents. N=20
1	College diploma	
	a) Major /Minor mathematics	10(50%)
	b) In other subject	3(15%)
	c) No	7(35%)
2	Type of the program in obtaining diploma?	
	a) Regular	4(20%)
	b) Summer	2(10%)
	c) Extension	7(35%)
3	Qualification other than diploma	
	a) 12+1	5(25%)
	b) 12+TTI	2(10%)
4	Training about IMs selection, preparation& use at the college or TTI level.	
	a) Yes	10(50%)
	b) No	10(50%)
5	If " Yes" how do you evaluate the training in helping you to utilize the IMs in classroom?	
	a) Very good	4(20%)
	b) Good	6(30%)
	c) no change	-
6	Have you taken workshop /seminar regarding utilization of IMs?	
	a) Yes	
	b) No	10(50%)
7	If "Yes" how many times?	10(50%)
	a) Once	9(45%)
	b) Twice	1(5%)

With respect to the workshop or seminar participation 50% of the sample teachers said they tool workshop or seminar in relation to utilization of IMs. Concerning the frequency of participation of seminars, 45% were said only once while 5% said twice. The rest 50% of the respondents said they did not took workshop or seminars.

The data in Table 18, shows the agreement or disagreement of mathematics teachers towards statements given as advantages of using IMs. Most of the given statements describe the advantages IMs give in the teaching learning process. Regarding this, out of 20 respondents 40% of them rated they did not agree in the statement "Using IMs attract students attention." Only 10% of the respondents rated their agreement to the statement, "Using IMs is simply for use not for their advantage. Thirty percent of the respondents disagree to the statement, "Using IMs save the time

waste by trying to transmit a concept verbally. " Using IMs develop and improve student language ability, but a total of 45% of the respondents rated either disagree or have no idea. Fifty five percent of the respondents agree in using IMs help for evaluation by students. To the statement, "Using IMs give chance to the student to visualize the concept widely and in-depth."55% of the respondents rated they disagree. To the statement, 'Using IMs create a relationship between the existing material and the symbol representing it."A total of 25%of the respondents rated either disagree or no idea. Fifteen percent of the respondents rated their disagreement to the statement, "Using IMs initiate interest to learn."

Table 18: The Knowledge of Mathematics Teachers About the Role IMs Play in Teaching-Learning Process.

№	Given Roles of Using IMs	Teachers' Rating .N=20		
		Agree	Disagree	No idea
1	Attract student attention	12(60%)	8(40%)	
2	Simply for using not for their importance.	2(10%)	18(90%)	
3	Save the time waste by trying to transmit a concept verbally.	14(70%)	6(30%)	
4	Develop and improve student language ability	11(55%)	7(35%)	2(10%)
5	Help to evaluation by students			
6	Give chance to the student to visualize the concept widely and in depth	11(55%) 19(95%)	9(45%) 1(5%)	
7	Create the relationship between the existing material and the symbol representing it.	15(75%)	2(10%)	3(15%)
8	Initiate interest to learn	17(85%)	3(15%)	

According to the data in Table 19, out of 20 teacher respondents a total of 75% of respondents mostly use the textbook or both the textbook and Teacher's guide to plan the lesson. But, 60% of the respondents mostly use the textbook while 40% of them use both the textbook and Teacher's guide in classrooms. Most of the respondents, 65%, do not apply any mechanism to make students who have the textbook to use it in classrooms.

During observation, as the data in Table 20 shows, it was found that only few students bring the textbooks into classroom. Even those who bring the text did not use it because the teachers write note, class work and homework on the blackboard.

The researcher asked the teachers why they not let the students to read, write and work by themselves from the textbook.

Table 19: Curricular Materials Utilization by Mathematics Teachers.

No	Item	Number of Teacher Respondents N = 20
1.	In planning your lesson which material you use mostly? a) The syllabus only b) The Teacher's guide only ---------- c) The Student Text book only---------- d) B & c ---------- e) a, b, & c ----------	 - 4(20%) 7(35%) 8 (40%) 1 (5%)
2.	The Curricular materials you use mostly in classrooms a) Teacher's guide only b) Student textbook only c) a & b	 - 12 8
3.	Apply different strategies to make students have the textbook to use it in the classrooms? a) Yes b) No	 7 13

The reasons given by the teachers were; shortage of textbook and large class size made them not to do so. They added, it was impossible to group students with these few number of textbooks.

Table 20: Students Having the Textbook and Students Bring the Textbooks into Classrooms.

Number of the School	Class Size		Number Students			
			Having the Text		Bring the Text in Classroom	
	Grade		Grade		Grade	
	7	8	7	8	7	8
Tabor	73	64	14	16	4	4
Awassa Haik	80	77	13	15	5	6
Tula	95	86	10	7	-	-
RasDesta	103	97	15	10	4	3
Yekatit	99	81	11	13	2	5
Bokassa	87	73	6	9	1	-
Leku	110	87	13	14	7	5
Abelalida	82	93	11	10	3	5
Dilla Anferara	98	83	12	9	-	-
Morecho	89	90	4	5	-	-

The data in Table 21, shows the degree of utilization of IMs by teachers. According to the respondents, 15% of them rated they were always prepare and use

IMs inclassrooms,50 percent of them rated sometimes, and 35% of them rated very few times and not at all. Regarding the number of IMs produced by teachers in the past 1½ year only 10% of them indicated they were prepared 6 to 7 IMs. The majority 90% of the respondents said they prepared few or none. Out of 20 respondents only 35% of them said they were prepared worksheets from other resources.

Table 21: Teachers Evaluation of Preparation and Use of IMS.

No	Items	Number of Teacher Respondents N= 20
1.	How frequent you prepare IMs and use them in classrooms? a) Always b) Sometimes c) Few times d) Not at all	 3 (15%) 10 (50%) 5 (25%) 2 (10%)
2.	Number of IMs produced by you in the past 1½ year. a) 7 b) 6 c) 3 & 2 d) 1 e) 0	 1 (5%) 1 (5%) 6 (30%) 5 (25%) 4 (20%)
3.	Did you prepared worksheets from other sources for students that help to exercise what they have learned? a) Yes b) No	 7 (35%) 13 (65%)
4.	Did you give assignments to the students from Library resources? a) Yes b) No	 10 (From the Test) 10 (50%)
5.	Did you give assignment to the students to prepare graphs, charts, and models? a) Yes b) No	 14 (70%) 6 (30%)
6.	How frequent you participate students in preparation and use of IMs? a) Many times b) Some times c) Few times	 - 6 (300%) 8 (40%)
7.	How do you evaluate the contribution of SPC to mathematics Instruction? a) High b) Average c) Low d) Very low e) No contribution	 2(10%) 10 (50%) 2(10%) 4(20%) 2(10%)

Fifty percent of the respondents indicated they give assignment to the students from the library resources. But, during the discussion with the researcher the teachers said that they have very limited resources and in most cases the textbook and

national examination booklets were found in the library. So, mostly they give assignment from the textbook and examination booklets.

Regarding participation of students in preparation of IMs, 70% of the respondents said they give assignments to the students to prepare graphs, charts and three-dimensional models. However, among these 70% respondents, 30% said they sometimes participate students in preparation and use of IMs in classrooms while 40% said only few times.

Regarding the contribution of SPC to mathematics instruction 10% and 50% of the respondents rated as high and average respectively. Ten percent and 20% of them rated as low and very low respectively. Only 10% of the respondents rated the SPCs have no contribution to mathematics instruction.

Table 22: Evaluation of Teachers/Students Participation in SPC/ Library.

No	Items	Respondents	
		SPC-Coor. N=10	Librarian N=7
1	How frequent mathematics teacher use the available IMs in the SPC/ Library?		
	a) always		
	b) sometimes	4	2
	c) few times	5	5
	d) no	1	-
2	Did students came to use the SPC/ Library for doing their assignments?		
	a) yes	1	5
	b) no	9	2
3	How frequent students use the SPC/ Library to prepare and use IMs?		
	a) always	-	3
	b) sometimes	1	2
	c) few times	4	2
	d) no	5	-
4	How do you evaluate the participation of mathematics teachers in SPC to prepare IMs?	**SPC-Coord N=10**	**Principals N=10**
	a) high		
	b) average	1	1
	c) low	3	2
	d) no	5	6
		1	1

The data in Table 22, presents the 10 SPC-Coordinators, 7 librarians and 10 principals evaluation of teachers/students participation in SPC/ Library to prepare and

use IMs. Sixty percent of the SPC-Coordinators and 71% of the librarians rated teachers' frequency of utilization as either few times or not at all.

Regarding students, 5% of the SPC-Coordinators and 71% of librarians said, students came to SPC/ Library for doing their assignments. Pertaining the frequency of utilization of SPC/ Library by students, 71% of the librarians rated always or sometimes. But, 90% of the SPC-Coordinators and 71% of the librarians rated students' frequency of use of the SPC/ Library were few times or not at all.

The participation of teachers in SPC regarding preparation of IMs is rated as high or average by 40% of SPC-Coordinators and 30% of the principals while 50% of SPC-Coordinators and 60% of principals rated it as low.

Table 23: SPC and Library Services at Schools.

No	Items	Respondents		Remark
		SPC-Coor. N=10	Librarian N=10	
1	The SPC/ Library give service to:			
	a) teachers only	6	-	
	b) teachers and students	3	7	
	c) the community	-	-	
	d) no service	1	3	
2	The SPC/ Library service hour			
	a) full day	6	2	SPCs mostly
	b) half day (shift)	3	5	closed during
	c) no service	1	3	observation
3	Kind of services given in SPC/ Library?			
	a) Production	9	-	Borrowing only
	b) Guidance for use	2	7	for teachers
	c) Borrowing	9	7	
	d) Reference/ reading room	3	7	
	e) Catalogue	1	1	

Table 23, presents data about SPC/ Library services given at school level. As it can be seen from the table, the respondents reveal that 60% of the SPCs give service only to teachers. Thirty percent of the SPCs and 70% of the libraries give service to both teachers and students. Pertaining their working hour, 60% of the SPC coordinators and 20% of the librarians responded that the SPC/ Library opened full day. According to the respondents 30% of the SPCs and 50% the libraries opened for half day. The librarians told to the researcher that they mostly give service for junior

class students. So, the library opened in opposite shift to these students. Most of the users of the library do their homework from the text found in the library.

Ninety percent of the SPC-Coordinators indicated that they give IMs production and borrowing services. According to 70% of the librarians, guidance for using texts, borrowing and reading room services given in all libraries to varying degrees. But, borrowing the text and other available books is allowed for teachers in weekends due to shortage of books.

Table 24: Mathematics Teachers Utilization of SPC.

No	Items	Respondents	
		SPC-Coor. N=10	Teachers N=20
1	The period where mathematics teachers frequently visit the SPC?		
	a) throughout the semester	1	4
	b) at the beginning of the semester	2	6
	c) few times in the semester	5	4
	d) at the evaluation time	1	4
	e) not at all	1	2
2	Asking the SPC-Coordinator technical or professional help in preparation of IMs?		
	a) yes	8	14
	b) no	2	6
3	How do you evaluate the provision of raw materials when teachers come to SPC to prepare IMs?		
	a) adequate	1	-
	b) moderate	2	6
	c) low	5	10
	d) no	2	4

The data in Table 24, shows the utilization of SPCs by mathematics teachers. According to the respondents most of the mathematics teachers visit the SPC at the beginning of the semester or few times in the semester. A total of 70% of SPC-Coordinators and 50% of teachers replayed in support of the above idea.

Regarding to asking technical help to prepare IMs by mathematics teachers, 80% of SPC-Coordinators agree that teachers ask help, but very few times specially when they asked by the principal to present their material need plan. To this end, 70% of teacher respondents said that they ask support from the SPC-Coordinators, but they told to the researcher that they get positive replay in few cases.

Concerning the raw materials support when teachers need to produce IMs, 20% of the SPC-Coordinators and 30% of teachers rated low provision of raw materials.

Table 25: Students Response on SPC/ Library Services.

No	Items	Number of Respondents N=100
1	What are services SPC give to students? a) support during preparation of IMs b) borrowing IMs c) students do not allowed to inter into SPC d) no idea	 6 (6%) 8 (8%) 60 (60%) 26 (26%)
2	Do you have the mathematics textbook? a) yes b) no	 20 (20%) 80 (80%)
3	If your answer is "no" where do you get the text to do exercise or home work? a) from the library b) borrow from a friend c) provided to groups by the school d) no way to get the text, but the teacher write it on the blackboard	 20 (20%) 10 (10%) 10 (10%) 40 (40%)
4	Do you use the library to study mathematics? a) yes b) no	 35 (35%) 65 (65%)
5	Did you get support/ guidance from the librarian? a) yes b) no	 20 (20%) 80 (80%)

According to the data in Table 25, out of 100 students, 6% of them indicated that they have got support from SPC during preparation of IMs. Eight percent of them indicated they borrowed IMs from the SPC. But, 60% of the respondents indicated that the SPC is not allowed to students while 26% of the respondents did not have any idea about it.

From 80% respondents who do not have the text, 20% indicated that they use the library and 10% indicated that they borrow from their friends to use the text. As it was indicated in the data, 10% use the text provided by the school while 40% have no way to get the text except copying what is given by the teacher.

Regarding the library utilization the data shows that 35% of the respondents use the library to study mathematics. However, 65% of the respondents do not use the library. The reason was, as respondents told to the researcher, there are no other reference books except few copies of textbooks in the library. This and the shortage of working hours made most of the respondents not to use the library. As it was indicated by 20% of the respondents, few librarians give guidance to students in finding the resource from the library.

Table 26: Attitude Score of Teachers Towards the IMs Utilization for Instruction

Qualification	List of 20 respondents score out of 100%	Number of respondents score greater than the mean score.
Diploma in major/ minor Math. N=10	57, 60, 63, 67, 68, 70, 77, 78, 82, 85	4
Diploma in other subject/ below diploma N=10	51, 52, 67, 70, 70, 73, 73, 77, 83, 83	5
	Mean = 70.3, S.d ≅ 9.3, Neutral Score = 60	

The list of the attitude score for each respondent out of 100 percent is presented in Table 26. The mean of the respondents score is calculated and equal to 70.3. The neutral score is also 60 percent. The neutral score is also 60 percent. As it is evident in the table out of 20 respondents, 80 percent of them have got the score greater than 60 percent. Twenty percent of the respondents have the score bellow or equal to the neutral value. Hence they have negative attitude.

However, out of 10 respondents who have diploma in major/ minor mathematics 60 percent of them have got the score below the mean. Out of 10 respondents who have diploma in other fields or below diploma level 50 percent of them have got the score below the mean. Moreover, the measure of the spread/

dispersion of the scores (the standard deviation) calculated and is equal to 9.3. This shows there is a greater variation between the scores of the respondents. That is, variation between attitudes of respondents. Therefore, though 80 percent of the respondents exhibited positive attitude, 45 percent of them (who scored above the mean) exhibited high level of agreement to the IMs utilization for classroom instruction.

Table 27: Rating of Teachers on Their Frequency of Using the Stated IMs Whenever they are Necessary.

Key: A- Always, B- Sometimes, C- Few times, D- Not used,

No	IMs	Rating				Remark
		A + B		C + D		
		No	%	No	%	
1	Grade 7/8 math syllabuses	-	-	20	100	
2	Grade 7/8 math Teacher's Guide	10	50	10	50	
3	Grade 7/8 math student text	19	95	1	5	
4	Other math reference books	9	45	11	55	
5	Figures in the student text	17	85	3	15	
6	Worksheets	4	20	16	80	
7	Diagrams and graphs from news paper and math books	9	45	11	55	
8	Different color chalk	7	35	13	65	
9	Blackboard	20	100	-	-	
10	Bulletin board	1	5%	19	95	

The data in Table 27, shows the teacher's rating on their frequency of using the curricular materials and other IMs in the teaching-learning process. According to the data in the table, student text, figures in the student text, and black board are used always or sometimes. The syllabuses, worksheet, different color chalk and bulletin board are among the least used or not used IMs.

The data in Annex-B, shows the teachers' rating whether they "used or not" the suggested IMs in the syllabuses of Grade 7 & 8 and the reason(s) for not using them. As it can be seen from the table, in Grade 7 most of the suggested IMs in unit 1, unit 4, and unit 5 were used as indicated by most of the respondents.

Among the reasons for not. using the IMs, unavailability of IM(s) was the most frequent one that indicated by most the respondents. The possibility to teach without the suggested IMs and the need for assistant to prepare the IMs were the next frequent reasons for not using the materials. The lack of idea about the importance of IM(s) become the third frequent reason.

Accordingly, most of grade 8 mathematics teachers indicated that they used most of the suggested IMs in unit 2 and unit 7. The reasons indicated for not using the suggested IMs were almost similar to Grade 7 teachers in their degree of frequency, except the need for help to choose the appropriate IMs was more frequent reason than the lack of ability to use the IMs in the proper way.

Table 28: Availability of List IMs (Catalogue) and the 1992 E.C & 1993 E.C Borrowing list Files in SPC

No	Type of File	Number of SPC N=10	
		Available	Not Available
1	Borrowing list (1992 E.C)	5 (50%)	5 (50%)
2	Borrowing list (1993 E.C.)	8 (80%)	2 (20%)
3	Catalogue of available IMs	2 (20%)	8 (80%)

As it can be seen from the data in Table 28, out of 10 SPCs, the 1992 E.C. borrowing list was found in 50% of the SPCs while 1993 E.C. list was found in 80% of the SPCs. The list of available IMs (catalogue) in SPC was found only in 20% of the observed SPCs.

Table 29: Distribution of Teachers in the Available SPC-Borrowing Files.

Category	Urban	Rural	Total
Number of teachers found in the borrowing files	7	4	11
Number of Teachers not found in the borrowing files	3	2	5
Total	**10**	**6**	**16**

According to the data in Table 29, out of 16 sample mathematics teachers in the schools where the borrowing file was available, the list of 7 urban and 4 rural school teachers were found in the SPC-borrowing files. The list of 3 urban and 2 rural school teachers were not found in the files. Generally, out of 20 sample teachers in 10 schools, only the list of 55% of them found in the SPC-borrowing files.

The data in Table 30, presents the frequency of borrowing IMs from the SPCs in the past three and half consecutive semesters. These include two semesters from 1992 E.C. and one and half semester from 1993 E.C. academic years. It also presents the type of IMs borrowed from the SPCs in the indicated period. As it can be seen from the table, the highest frequency of borrowing was 10, but in two SPCs only the 1993 E.C. borrowing files were available. Regarding the type of materials borrowed from the SPCs, most of them are mathematical instruments such as compasses, protractor, ruler, T-square, set square, slide rule.

Table 30: Frequency of Borrowing IMs from the SPC by Mathematics Teachers (1992 E.C. to March 1993 E.C)

Teacher Code	List of IMs borrowed from SPC In Three Semesters	Frequency/ Three Semester & up to march 1993 E.C
T_1	Compasses, protractor, ruler, models of circles	3
T_2	Compasses, ruler, rectangular prism & triangular prism, cylinder, pyramid, triangular pyramid, right circular cone, protractor	7
T_3	Slide rule	* 1
T_5	Pointer clock, models of circles, charts of mathematics rules, protractor, compasses, ruler, model of rectangular prism, cylinder	8
T_7	Protractor	* 1
T_{11}	Compasses, T-square, protractor	4
T_{12}	Math graph, parallelogram models, models of angles, figures of rectangle, rhombus, charts showing arcs, angle in circles, chords; cylinder, chart of similar triangles	10
T_{13}	Protractor, compasses	2
T_{14}	Set square, protractor, models of cylinder and pyramid, triangular prism	4
T_{15}	Protractor & compasses, slide rule	3
T_{16}	Charts to show commutative property of addition and multiplication	2

Source: The SPC borrowing list. *Only from 1993 E.C. file.

Moreover, solid geometric models are among the most used IMs and it appears few charts also borrowed from the SPCs.

The data in Box-3, shows the list of IMs in the sample teachers 1993 E.C. weekly lesson plan. As it is evident in the table, out of 20sample teachers the lesson plan of 16 (80%) teachers analyzed. The rest 4 (20%) teachers have created different reasons for they couldn't find their lesson plan.

Box-3: List of IMs in the Teachers Lesson Plan

Teacher Code	IMs Listed in the 1993 E.C. weekly Lesson Plan up to the observation time
T_1	Textbook, duster, chalk
T_2	Textbook
T_3	Number rays, student text, number line, simple slide rue for addition of rational numbers, survey of rules for multiplication of rational numbers, diagram of rules of transformation and balance, ruler.
T_4	Textbook, graphs, blackboard.
T_5	Model of circles, charts of mathematics symbols, protractor, compasses, ruler.
T_7	Student text, teachers guide.
T_8	Chart, squared paper, ruler, colored chalk, straight edge.
T_9	A square with 100 square units, students text, survey of different graphs, number lines, balance, diagram.
T_{10}	Charts showing properties of operation with rational numbers, charts showing the ruler of removing brackets, Venn diagrams, tables & Venn diagrams showing relations, ruler, colored chalk, graphs, set square, charts showing rules of transformation table of values, figure representing a path, ruler, compasses, colored chalk, straight edge.
T_{11}	Textbook, teacher's guide, different graphs, charts, Venn diagrams, colored chalk, ruler, charts showing figures path, simple closed path, models of different plane figures, protractor, set square.
T_{12}	Protractor, textbook, color chalk, blackboard.
T_{13}	Textbook, protractor, compasses, graphs, pictures of plane figures.
T_{14}	Textbook, graphs, charts
T_{15}	Student text, pictures of graphs, pictorial representation of data, compasses, protector, colored chalk, slide rule.
T_{17}	Student text, different said materials, the corner of the door & window to show angle, protractor, and pictures of ray, adjacent angles, and colored chalk.
T_{20}	Meters, ruler, stick, square paper, colored chalk, numerical tables & tables of values.

However, among the lesson plans analyzed by the researcher 7(35%) sample teachers have written few common IMs, such as textbook, teacher's guide,

blackboard, chalk, etc, repeatedly throughout the semester. To the contrary, 6(30%) teachers write a list of many IMs in their lesson plans.

A simple observation of Table 30 and Box-3 reveals that IMs listed in the lesson plans did not match with IMs borrowed from SPCs.

According to the data in Table 31, out of 100 sample students (50 from Grade 7 and 50 from Grade 8) the majority of students were rated that they cannot able to perform the basic performances they should able to do.

Table 31: Students' Rating on their Ability to Perform the Given Performances.

No	Performances	Ratings N=100					
		I Can		At an Average		I can't	
		No	%	No	%	No	%
1	Understand and interpret the data given by graphs	20	20	38	38	42	42
2	Drawing different groups for the given data	13	13	10	10	77	77
3	Construction of geometric figures using instruments in the mathematical instrument box	18	18	10	10	72	72
4	Defining different geometric figures and models.	12	12	19	19	69	69
5	Calling the name of different plane figures & solid models.	18	18	24	24	58	58
6	Drawing circles & arcs using protractor & compasses.	15	15	11	11	74	74
7	Measuring line segments using rulers.	25	25	37	37	38	38
8	Using a slide rule to perform operations.	7		19	19	74	74
9	Measure angles using protractor	20	20	31	31	49	49
10	Find the area or volume of geometric figures or solids using formula.	12	12	23	23	65	65

The observation data presented in Table 32, shows the actual classroom environment and teachers' use of IMs.

In classroom it was observed that due to inadequate seats and large class size, in most classrooms students were not have adequate seat. The seating arrangement did not permitted easy teacher movement to check students' work. It was also observed that in some classrooms students at the backside could not see the blackboard and due to this they were forced to stand while writing.

Pertaining teachers' use of IMs, observations of 60 sessions (periods) were made in the 20 sample classrooms (10 from grade 7 and 10 from grade 8). In all

observed sessions, 100 percent of sample teachers have write exercises on the blackboard to be worked in classrooms or at home.

Table 32: Classroom Observation Results (Check List)

No	Classroom Environment Variables	Check				Total Sessions N=60
		Yes		No		
		No	%	No	%	
1	All students have adequate seat in the classroom (no more than 3 students sit on a desk).	24	40	36	60	60
2	There are instructional displays in the classroom.	-	-	60	100	60
3	The sitting arrangement permits easy teacher movement.	24	40	36	60	60
4	The blackboard is readily viewed from all positions in the classroom.	39	65	11	35	60
	Teacher's use of IMs					
1	Give class/ homework from the textbook.	60	100	-		60
2	Let students to do class/homework on the blackboard.	4	7	56	93	60
3	Non-textbook IMs listed in the lesson plan are presented.	14	23	46	77	60
4	IMs suggested in the curricular materials for the topic are presented.	10	17	50	83	60
5	Let students to use and do exercises from the text by themselves.	-	-	60	100	60
6	Draw the needed diagrams/ sketches on the blackboard.	30	50	30	50	60
7	Repeatedly use the diagrams to clarify the content.	15	25	45	75	60
8	Writing on the blackboard is legible.	47	75	15	25	60
9	Resources of the environment are used to provide practical applications of the IMs.	3	5	57	95	60
10	When the teacher use the IM(s) focuses on meaning and promoting student understanding	20	33	40	67	60
11	Involve learners by using controlled practice (e.g.: - invite and answer questions, discussions, dialogue).	25	42	35	58	60
12	Check students' performance or demonstration of skills expected to be learned from experience (e.g.: - drawing graphs, construct models, solve problems, defining, proving, etc).	15	25	45	75	60

In 100 percent of the observed sessions the teachers did not let the students to read and solve problems or do exercises from the textbook by their own. Only in 7 percent of the session students observed while working the exercise on the blackboard. Non-textbook IMs, such as, figures representing pictures of plane figures, picture of rays & number lines, protractor, compasses, pictures of adjacent angles, pictures of similar triangles, and pictures of similar plane figures obtained by central stretching were listed in few lessen plans and observed in 23 percent of the sessions. But, all observed the teacher in the classroom drew IMs on the blackboard and students copy it on their exercise book.

IMs suggested in the curricular materials for the topic were presented in 17 percent of the observed sessions. However, in 50 percent of the sessions, teachers draw the needed diagrams/ sketches on the blackboard without using mathematical instruments and in most cases the diagrams were not listed in the lesson plans. In 25 percent of the sessions teachers were observed when they use the diagrams repeatedly to clarify the content. But, in most cases teachers clean the picture and write note or something else and then refer to the cleaned picture when they discuss the topic. This might be due to the inadequacy of the blackboard which are single or damaged in some cases. In 75 percent of the sessions it were observed that the writing on the black board is legible. In most of the observed sessions (95%) only blackboard and chalk used extensively by the teachers. Resources of the environment to provide practical applications were used in 5 percent of the sessions. It was observed when teachers use the corners and their arm to demonstrate the concept angle. It was observed in 33 percent of the sessions, when teachers use the diagrams and focus on meaning; such as adjacent angles, reflection, rotation, stretching constant, name of line segments in the circle, etc, in order to promote understanding of the terms.

Moreover, in 42 percent of the sessions it was observed when teachers involve learners by inviting and answering questions. In 25 percent of the observed sessions teachers have checked students' performance or demonstration of skills (such as choosing from pictures of angles drawn on the blackboard, which are adjacent and not, using the given stretching constant to draw a figure similar to the given picture on the board, solving equations & inequalities, drawing circles and arcs, labeling the name of line segments in the circle, etc,) expected to be learned from the experiences. But, in 75 percent of the sessions teachers have not checked students' performance or demonstration of skills. In most sessions teachers write on the blackboard, ask students questions and let them to copy what is written on the board. In some sessions it was observed that the teacher write exercises/ draw diagrams on the blackboard and students copy it for the whole period. Teachers have told to the researcher that it was their strategy, to write the exercise in one period and to discuses it in the next period, to overcome the shortage of textbook.

4.2. Discussion of Results

In this section an attempt is made to discuss the results presented in the preceding section.

Explanation of the data with reference to the basic research questions has been made in the following sub-topics.

4.2.1. Availability of Mathematics IMs in the Sample Schools

As it has been stated in chapter two, availability of IMs depends on national, regional, local and school level supports made by the concerned bodies .The Provision of the material inputs and allocation of budget for activities that complement notional /regional input are necessary to schools. At school level the principal, the SPC-coordinator, the teacher and the student can play their respective role to improve the availability of IMs in the school. Here the SPC and library are the main sources of IMs in general, and mathematics IMs in particular.

Type of Mathematics IMs Suggested in Grade 7/8 Syllabuses

The data in Box-2, presents the suggested mathematics IMs in grade 7/8 mathematics syllabuses .The IMs could be classified as: objects (mathematical instruments), three-dimensional models, and graphics. Graphics include IMs that summarize information and ideas through graphs, drawings, charts, diagrams, symbols, etc.

In this study the data were served as input variable intended by the syllabuses and used for the purpose of reference and crosscheck.

Availability of SPC and Library in the Sample Schools

In all the sample schools SPCs were available and most of the schools have library. Almost one-third of the rural sample schools do not have library. Pertaining the SPCs, most of them were nominal and do not give the expected service to the teaching-learning process. Though the response given by most of the principals and SPC-coordinators indicate that they work full day the researcher observed that SPCs opened during the visit and mostly they are closed. One of the SPCs in Urban sample

schools opened in the second semester of the 1993 E.C. academic year and it was closed for the past 10 years. Another SPC in rural Sample schools was found empty during observation. According to the information told by the SPC-coordinator to the researcher it has been used as a store to crops produced by the school.

All the libraries lack reference books other than the student textbooks. Most of them work half day and closed for the other shift. In these schools students have no chance to use the library when they have free periods.

As it was described earlier in this paper, SPCs and libraries are sources of IMs and they should provide professional service throughout the day. But, the survey data in Tables (3 & 23), show this did not happened in most of the observed schools.

Availability of Curricular materials and IMs Suggested in them in the Sample Schools

At school level SPCs are the centers for preparation of IMs locally and places to find the available IMs. They are centers to collect and display IMs for use by teachers and students. Having this in mind, observation was made by the researcher in each SPCs using a checklist to see the status of availability of intended IMs by the syllabuses. On the way the quantity of each available IM and its source has been recorded.

Regarding the availability of IMs and quantities available, the data in Annex-A, disclose that there are few IMs available in the SPCs. Among the curricular materials only the student textbook has been found in few SPCs.

A crosscheck between Box-2 and Annex-A reveals that there were very few (9.6%) two-dimensional IMs available in at most three SPCs. Though they were one or two in number, relatively three-dimensional IMs are available than two-dimensional IMs. To verity this, most teachers indicated that very few IMs are available in SPCs and in some cases they indicated not at all (Table 4). Therefore, it is reasonable to say, that those none-textbook IMs which are available in the schools appear simply as samples for visitors and not for use in the teaching-learning process in most SPCs. During the inventory by the researcher the IMs were found not touched, i.e., they are

covered by dust and spider webs. The available quantities also not sufficient even for teachers let it not be for students to use in classrooms.

Teaching-learning process requires at least the provision of textbooks and teacher guides. However, the result presented in Annex-A and Tables (4 to 7, 19 and 25) shows the lack or absence of curricular materials in the sample schools.

Though all the sample teachers have textbooks almost all of them have no syllabuses, and forty five percent of them also have no teacher's guide. At any level, teachers need a guide to identify the type of IMs they need for a certain content in order to plan their lesson. A list of IMs were given in the syllabuses and teacher guides. However, the presence of these curricular materials in the hand of teachers may have at least a guiding role in their planning, selection, preparation and use of IMs. But also seems that the majority of teachers haven't at least some understanding of the guidelines and specifications of the syllabuses.

The data in Tables (5 to 7, 19, and 25) presented the textbook availability in the hand of students. Though there are inconsistencies in the figures between teachers and principals due to the information they have, textbook to student ratios indicate the shortage of textbook was the most serious educational problem in the sample schools. The results indicate that students either had no textbooks or had no regular access to them.

Furthermore, the lack of textbooks for students can be seen from the number of mathematics books distributed in the past two years by Z.E.D. Therefore it is reasonable to conclude that there is a serious shortage in the schools to provide a sufficient mathematics textbook to the students. As it can be seen in Table 19, few students purchase the textbook by themselves.

The result of this study seems to be in agreement with the finding of Amare (1998: 289-298), which indicate the inavailability of IMs as the most critical educational problem in Ethiopian schools.

The result also seems consistent with the findings of Berhane (1999: 78) which indicate most of the SPCs in Mekele Zone did not seem to have adequate IMs. But, it is to the contrary, which indicate the student to book ratio, including Mathematics, is one to one (Berhane, 1999: 77).

Moreover, Lockheed et al (1991: 52) reported that in Dominican Republic fewer than 20 percent of eight grade students in public schools had a Mathematics textbooks. In Malawi it was found that fewer than 30 percent of primary students had their own textbook. Similarly, an international World Bank Study (Cited in Lockheed et al, 1991: 53) found that schools in Guinea-Bissau had no teacher guides for any grades other than grade one. A survey in Malawi reported that fewer than 15% of teachers had received a teacher guide for a subject other than English. As stated earlier the findings of this research undertaking appeared to be similar with that of the study in Dominican Republic and Malawi regarding the availability of textbooks. But, the findings of this study with respect to the teacher guides were somewhat better than that of Guinea-Bissau and Malawi.

Support Made to Schools to Improve Availability of Mathematics IMs

As it was described earlier, there are international, national, regional, local and school level supports to improve the availability of IMs. The state and federal government agencies make materials available for use in schools. Nationally, one of the most prolific sources of IMs is the federal government. Regional government, according to the data in Table 6, provide curricular materials through the Z.E.D. and W.E.O. to schools with out payment. But, the finding reveals that 100 percent of the Educational Support Section officials at the Zone and Weredas, and principals indicated that the support made by the government was low. Non-textbook IMs like other mathematics reference books, mathematical instruments, three-dimensional models, graphics, different color chalks, and bulletin boards are not provided by the Educational Support Sections.

Regarding the balance in support among subjects all respondents agree that there is no balance among subjects. Specially, natural science and social science subjects benefit more than mathematics.

In general, the support regarding non-textbook IMs has not gain consideration. These materials provide rich experience that requires high student involvement in the process. The findings of this study show that no support made by Z.E.D. regarding

non-textbook IMs. This result is in agreement with Amare (1999: 62) finding which indicates to appear that planners are not convinced about the clear role of IMs.

Regarding regional support, Lockheed et al (1991: 130) suggests, encouraging school initiatives help to improve IMs. They indicate the central and regional education offices should establish mechanisms to encourage school initiatives. One of such mechanisms is the school improvement fund. This is the financing program that supplement regular budgetary support for schools by authorizing intermediate level administrators to make grants for projects proposed by individual school. However, the data presented in Tables 9 and 10, show that there were no budget allocated from the government to schools to strengthen the services given by libraries and SPCs.

Nevertheless, the data show that there is a sign of willingness from NGOs to give a grant for projects proposed by few school principals to strengthen their SPCs and a grant to purchase reference books for school libraries in Sidama Zone.

Pertaining the support from the local community which have importance to schools, the data shows that almost half of the principals and SPC-coordinators indicated that some support obtained from the community.

The findings of this study, however, contrast to the finding of Berhane (1999: 68) which indicates the sample schools' SPCs had annual budget allocation in their respective schools. But, the result of this study appears to be consistent with Amare and Tassew (1996: 37), which indicates schools did not have their own budget allocation for the SPCs. Pertaining the support available to SPCs the data in this research, shows that schools were the major sources of financial & material support from their internal revenue. This result seems in agreement with the finding of Berhane (1999: 70) in sample schools found in Mekele Zone.

In relation to support from the local Institutions the result of this study shows that few schools started strengthening their relationship with the Awassa College of Teachers' Education. They have got some non-textbook IMs from the college, which were prepared by teacher trainees.

With regard to school level support the principals; the teachers, the SPC-coordinators and students can play their respective role to support the school in

improving IMs shortage. Regarding this, the result presented in Tables 10 and 11, show that most of the principals support the SPCs by assigning some materials and financial support as described above.

In this regard, Lockheed and his associates (1991: 133) indicate, granting authority to principals must be coupled with giving them adequate and appropriate training and resources. But, the findings show that principals repeatedly reported to W.E.O. about the lack of curricular materials and other resources, though the support was low from the offices.

The findings also show that the majority of the principals call support from the NGOs and some from the community and others from the college. Whatever the reply was low. The majority of the principals gave incentives such as moral, special material support, better evaluation grades, giving prize at the school day ceremony, or letter of appreciation to teachers who prepare and use IMs.

Therefore, it is reasonable to say that the majority of the principals were made a considerable effort to improve their school material inputs. The result of the study seems not in agreement with the finding of Berhane (1999: 76), which indicates school principals not offer incentives to those teachers who were superior in using IMs.

Educators indicate that teachers can produce drawings, charts, graphs, tables, and models. They can start by collecting pictures from periodicals; can duplicate diagrams, graphs, reading materials, worksheets, etc. According to Clark and Starr (1986: 420), at the expense of a little ingenuity and initiative, boundless supplies of materials are available to even the poorest schools.

However, regarding this the results of the study shows that very little support made by mathematics teachers to improve the availability of IMs. In one way or another, the data presented in Annex-A and B, Tables (14, 21, 22, 24 and 27) show that teachers made little support to improve the shortage of IMs by preparing them from the local resources.

For instance, the variety and quantity of IMs in SPCs were very few and appeared to be produced long ago; almost no graphic IMs is available; most of the teachers indicated that they prepared very few IMs in the past 1½ years; most of

them indicate that they did not used the suggested IMs due to inavailability which shows their less effort to prepare the IMs; most of them indicate that they select the available IMs or ask the SPC-coordinator to prepare the IMs; most of the principals and SPC-coordinator rated that the participation of Mathematics teachers in preparation of IMs were low. All the above results presented in the study directly or indirectly show that the effort made by Mathematics teachers to improve the shortage of IMs were low. But, a short glance on Box-2 reveals that most of the suggested IMs could prepared from inexpensive materials locally. The crosscheck between Box-2 and Annex-A shows the inavailability of suggested graphic materials.

Therefore, it is reasonable to say that Mathematics teachers made little support to improve shortage of IMs in the school.

As it has been described in chapter two, educators indicated that the SPC-coordinators required to accomplish a comprehensive services and professional help to teachers and students. However, the results in this study directly or indirectly show that there were little effort made by the SPC-coordinators. For instance, Annex-A shows few (in terms of availability) IMs in most of the SPCs which indicates little effort made to prepare mathematics IMs, the observation make it clear that SPCs closed most of the time which show they did not provide service throughout a day due to different reasons, most of the SPCs did not conduct periodic inventories and did not have catalogue, most of the SPC-coordinators did not prepare IMs based on the lesson content, they wait teachers request and they have no knowledge of the mathematics syllabuses (Table 13); they did not encourage students and teachers to use the SPC (Tables 20, 23 & 25); most teachers indicate that they did not used suggested IMs due to lack of assistance (Annex-B). All the above results show that little effort made by SPC-coordinator to support IMs availability.

Therefore, the results presented in the study show that SPC-coordinators made little support to improve the shortage of mathematics IMs in the sample schools. Moreover, they did not accomplish most of their performances. The finding in this study was consistent with the finding of Berhane (1999: 76) which indicate SPC-heads failed to accomplish most of the activities which were expected from them.

Sources of IMs Found in the SPCs/ Schools

As it has been presented in Annex-A, most of the available IMs in the SPCs produced by teachers or SPC-coordinators. According to the discussion made with the SPC-coordinators to know the year of production of IMs, most of the models, compasses, protractors, and straight edges prepared 10 years ago. In one sample school models of very high quality have been found in the SPC and the coordinators indicated that the models were donated by NGO during the former regime. The mathematical instrument box (set square), the curricular materials, and the blackboards was provided by the government freely. The former one were provided in the past regime.

However, it is surprising that most of mathematics teachers indicated that they give assignment to the students and participate them in preparation of IMs. The observation result does not show student-made IMs. Therefore, it seems students do not involve in preparation of IMs. It is also observed that the chalk provided by the school, purchased from its internal income. But there was a serious shortage of chalk in most schools and it was observed when teachers were obliged to stop their lesson due to lack of chalk. Most of the IMs are found in the observed SPCs were produced from local resources.

Availability of Skilled Manpower and Facilities to Produce and Display IMs in the SPCs

As it has been described earlier, SPC -coordinators are required to give a lot of services to teachers and students. However, to accomplish all the expected services the coordinators should trained in personnel management, material production, Educational Psychology, library science, media services and evaluation techniques.

However, the findings in this study show that the SPCs staffed by teachers who did not trained to be SPC-coordinators. Most of them have TTI certificate and few indicated that they took training in material production and evaluation techniques for a short period of time once or twice. One of the coordinator has got a chance of frequent training. All the trainings were given before 1984 E.C. and those who took the training evaluated it as good and very good. But, the data in Table 11 shows that

most of the SPC-coordinators did not take training. The absence of skilled manpower made the position to have no uniform guideline to assign the coordinator. The W.E.O., the principal or the staff could assign any teacher who has lower teaching load or who have got health problem as SPC-coordinator.

Therefore, from the findings of this study it is possible to say SPC suffered from lack of trained manpower. The result is consistent with the findings of Berhane (1999: 74) and Amare and Tassew (1996: 37) which indicate the lack of skilled manpower in SPCs.

Regarding the facilities available in the school to produce and display IMs in the SPCs, the data in Table 15, presents the availability of row materials to produce IMs in most SPCs but not sufficient. The finding also shows that the lack of guide materials in the SPCs. For instance, the syllabuses and teacher's guide contain a list of IMs, which help the SPC-coordinator to identify the type of IMs needed for a certain content and prepare it instead of waiting for the teacher's request or order.

But, only student textbook found in few SPCs and no syllabus and teacher guide found in all SPCs. To organize the IMs for convenience, availability, effective use and to keep the collection functional the availability of the facilities such as separate rooms for different purposes, display shelves, workbench, and hand tools are the minimum requirements to SPC.

Regarding this, the findings show that few sample schools have separate rooms for production and display of the IMs. The size of the display rooms in most of the SPCs greater than 40 sq. meters. From the observation it is possible to say that the rooms are wide, the number of IMs is few and this made the SPCs to look like empty rooms.

Few SPCs have display shelves with very few IMs on them. Others use the floor or broken tables to display the available IMs. Therefore, from the above findings it is possible to say that the size and the number of rooms in the sample SPCs are not problems to strengthen their contribution for the time being, though most of them do not have separate rooms for production, storage and display the IMs. Most of the SPCs do not have shelves which help to arrange and display IMs and help to make them found easily for use and as well as to make them attractive.

Classroom Environment

The internal conditions of classrooms directly or indirectly influence the communication in the teaching and learning process and thereby affect the outcome of instruction. The findings in this study focus on the availability of the basic facilities and IMs in Urban and Rural Schools. So, the results presented in Table 15, show that most of the observed classrooms in urban and rural schools have inadequate blackboard and relatively the problem was high in rural schools. Tables and chairs for the teacher to use not available in all the sample schools while bulletin board was found in two urban classrooms. The data in the same table show that the majority of the sample classrooms have inadequate seat for students and the problem is high in urban schools than rural schools.

Therefore, the findings show that the majority of sample classrooms do not have adequate blackboard and student seat. Moreover, almost all classrooms do not have tables and chairs for the teacher to use and bulletin board to display IMs on it.

4.2.2. Utilization of IMs for Mathematics Instruction.

As it has been described earlier, the impact of enhanced IMs ultimately depends on how well teachers use available resources. The way teachers select, prepare and use IMs for the purpose of instruction in classroom greatly depends on their training. This is because; the human factors that influence teacher's utilization (selection, preparation and use) of IMS are their own skills, knowledge, attitude and preferences. But, these factors easily improved by appropriate training. So, in this subtopic an attempt is made to discuss the findings presented earlier in relation to utilization of IMs.

Mathematics Teacher's Training in Preparation and Use of IMs

The kind of training teachers passed through greatly determines their knowledge and skills in preparation and use of IMs. Regarding this the results presented in Tables (14,16,17, & 18) show mathematics teachers' knowledge & skill towards the role IMs play, the source and strategy they use to obtain IMs, and their training level.

As it can be seen from Table 17, fifty percent of the sample teachers have the appropriate training to the level. They have diploma either major or minor mathematics. Others have diploma in other subjects or do not have diploma, which is below the requirement. Fifty percent of the sample teachers indicated that they took training in selection, preparation and use of IMs at the college /TTI level and evaluated the training as good and very good. Additionally they indicated that they took seminar/ workshop once about utilization of IMs.

To substantiate this result teachers were asked the criteria(s) and the source(s) they use to select and obtain IMs for the lesson. Regarding the criteria(s) the majority of them indicated that they use the objective as the major criteria and some of them the teaching method. There are few teachers, which indicated they use both the objective and the teaching method. In addition to this the findings presented in Table 17, show teachers knowledge of the sources and strategy to obtain IMs. Here most of them indicated the SPC, was their source to obtain IMs while few respondents indicated that they use both the library and SPC, and others use three sources namely the neighboring schools, library and SPC. Regarding the strategies teachers use to prepare and use IMs, some of them indicated that they select the available IMs from the SPC, some indicated they produce from the local resources and few indicated they use both selecting from the SPC and produce from the local resources. During selection of IMs majority of them indicated that they use pair of methods like participate the SPC-coordinator and use the teacher guide, with SPC-coordinator & use the textbook, and teacher guide and student textbook. Pertaining the role IMs play in the teaching-learning process most of them rated their agreement to the statements that describe the role of IMs (Table 18).

Therefore, from the above findings it is reasonable to say that half of the respondents have the required qualification and training to the level. Besides, some of the sample teachers have the knowledge of sources and criteria(s) to select the appropriate IMs for their lesson. It is also reasonable to say the majority of the respondents have the theoretical knowledge about the role IMs play in the teaching and learning process. The result also shows that there are a considerable number of

teachers who do not have the knowledge of the role IMs play in the teaching and learning process.

Attitude of Grade 7/8 Mathematics Teachers Towards Utilization of IMs.

Attitude is one of the factors that influence the utilization of IMs. However, the attitude of an individual towards a particular thing or issue emerges from his/her knowledge and understanding of the thing or issue. So, grade 7/8 mathematics teachers have attitude (positive or negative) towards the utilization of IMs since it is assumed that they have the knowledge of utilizing IMs to teach the subject effectively. Based on the assumption that attitude of teachers influences the utilization of IMs an attempt was made to assess sample teachers' attitude towards utilization of IMs. So, the finding in Table 26, shows the attitude score of the teacher respondents out of 100 percent and their group by qualification. From the table it is possible to see two respondents from each group have score less or equal to the neutral score. Hence, this shows 4 (20%) respondents have negative attitude or neutral towards utilization of IMs. The rest 16 (80%) respondents have the score greater than the neutral score, which show they have positive attitude towards utilization of IMs. Therefore, the finding in this study appears that the majority of respondents have favorable attitude towards the utilization of IMs.

In addition to this, the value of the standard deviation of the scores is greater (9.3) which implies the considerable variation between attitudes of respondents. Hence, though 16 (80%) respondents exhibited positive attitude the majority of them have got score greater than the mean which show they exhibited high level of agreement than the rest to the utilization of IMs.

The result of the study also shows greater number of unqualified teachers exhibited high level of agreement. Moreover, it is reasonable to say that the result of the study appears to show the attitude of teachers was not the factor for under utilization of IMs.

Curricular Materials Utilization by Grade 7/8 Mathematics Teachers

As it has been described earlier, curricular materials include the syllabus, the teacher's guide and the student textbook. When the teacher prepares a lesson plan

the syllabus helps him/her a lot. It provide, the outline of the content of the lesson, contains the objectives of learning the content, guides the teaching method, contains the periods allotted to the content, suggests a list of IMs, and the time to make evaluation. But, it was found that almost all teachers did not exploit the advantages of using the syllabus. Likewise, using the teacher guide also give information on what to teach and on how to teach, model of diagnostic tests that help teachers monitor student learning and modify the daily lessons accordingly, suggestions on how to manage the classroom, and activities for classroom use.

As it has been described earlier, scholars pointed out the importance of using textbooks (Brown et al, 1985; Lockheed et al, 1991; Heinich et al, 1999). As to them textbook provides convenient and random access to the message it contains, it is user control, often contains visualizations of concepts and information with accompanying verbal elaborations and explanations. Using textbook helps to save the time wasted while a teacher and students copy text on and off the blackboard.

Having all these in mind, this study assessed mathematics teacher's utilization of curricular materials. The findings of the study presented in Box-3 and Tables (19, 20, 27). As it can be seen from the findings it was indicated some teachers use the teacher's guides only, some use the textbook and some use both the text and the guide in planning their lesson. It is also evident that only one teacher indicated that he uses all the curricular materials in planning the lesson. Regarding the textbook, most of the sample teachers indicated that they use only the textbook in classrooms while some sample teachers indicated they use both the text and the guide in classrooms.

Most of the sample teachers indicated that they use no mechanism to make students who have the text to use the text in the classroom .To substantiate this result during observation of classrooms students who have the textbook have been asked to tell their roll numbers. In addition to this in all observation sessions number of students who bring the text in to classroom recorded and the average number was taken. The result presented in Table 20, shows the average number of textbooks in each observed grades .It also shows only few students bring their textbook in classroom. It was also observed that those who bring the textbook did not use it. This is because the teacher writes every thing (the note, illustrations, class work or home

work) on the blackboard and the students copy it. Most of the sample teachers gave the reason that shortage of textbook and large class size forced them to use this method.

Therefore, based on these findings it is possible to say the following: A simple crosscheck of the results in Table 19 and Box-3 show inconsistency between the teachers' response in planning their lesson and the lesson plan observation result. For instance, a total of 12 (60%) teachers indicated that they use the teacher's guide when they plan their lesson but the IMs listed in the guide were not found in the Lesson plan of most of the teachers .It seems almost 5 (25%) teachers used the guide to plan their lesson.

Pertaining kind of curricular materials the teacher use in classrooms only 1(5%) teacher observed when he use both the guide and the text, but 8 (40%) teachers indicated that they used the guide and the textbook in classrooms.

Regarding utilization of textbook almost all sample teachers use the textbook in classrooms for themselves. They do not let the students use the textbook in classrooms. The researcher believes that, though there was a shortage of text book, teachers could change the condition by using different strategies and making the students bring the text book in classrooms and use it. Otherwise, as it has been done so far, copying the text on and off the black board wastes half of the semester instructional time. Of course, different respondents (students, teachers, librarians) indicated that teachers give assignment from the text sometimes.

Moreover, from the findings discussed above it is reasonable to say that almost all teachers do not use the syllabuses and do not have idea about its use in planning as well as in teaching-learning process.

Grade 7/8 Mathematics Teachers' Utilization of IMs (which are not Curricular Materials)

The contribution of using IMs in the teaching-learning process has been thoroughly described in chapter two and using them requires selecting, planning, and preparing for use. Regarding these the findings presented in Annex-B and Tables

(21to 32, except 23, 26, 28) show the status of utilization of IMs by grade 7/8 sample mathematics teachers found in the Sidama Zone.

As it can be seen from Tables (21 & 22), the majority (65%) of the sample teachers indicated that they prepare and use IMs either always or sometimes. At the same time most of the sample teachers (75%) indicated that they prepared three or less IMs in the past 1½ year. This indicates that three or less IMs in their response. On the other way, if the majority of the teachers prepare and use IMs frequently, then the number of IMs indicated as prepared by them would not be small as it is. The result presented in the study also shows half of the sample teachers give assignment from the library resources as indicated by students, librarians and teachers.

The findings in this study also show that the majority (60%) of the sample teachers rated the contribution of SPC to mathematics instruction is either high or average. However, the majority of SPC-coordinators (60%) and principals (70%) rated the participation of mathematics teachers in SPC to prepare IMs as either low or no. Further more, the majority of SPC-coordinators (60%) and librarians (71%) rated mathematics teachers use of the available IMs as either few times or no.

Therefore, from the findings described above it is reasonable to say that sample mathematics teachers prepared and used very few IMs and used the available IMs in the SPC/ library rarely. Besides, sample teachers' participation in the SPC to prepare IMs is also low and visits the SPC few times in the semester.

The result in the study also shows that the majority of the sample teachers ask the SPC-coordinators help for the preparation of IMs as indicated by both teacher and SPC-coordinator respondents. But, both respondents rated the provision of raw materials to prepare IMs as low or not at all. Based on this it is reasonable to say that low participation of teachers to prepare IMs in the SPCs might be due to the shortage of raw materials.

Based on the finding of Table 27, the majority of sample teachers use textbooks, figures in textbooks, and blackboard frequently and other IMs rarely even if they are necessary.

Regarding the suggested IMs in the syllabuses, based on the result of Annex-B, it is reasonable to say the majority of grade 7 sample teachers did not used IMs

like charts, tables, slide rule, survey of rules, balance and survey of theorems on circles. But, with little effort most of the IMs can be prepared from inexpensive local resources by the teacher or SPC-coordinator. On the other way, it is reasonable to say that the most frequent reason (for not using) given by the teachers (inavailability) can be improved by preparing the materials using the local resources. But, this did not happen in sample schools and it shows teachers participation in preparation and use of IMs is low. On the other hand, a close observation of IMs rated by teachers as used in classrooms was not available in SPCs (see Annex-A). Therefore, it seems teachers used the blackboard and chalk to draw the picture of suggested IMs. But, using only the blackboard to present the IMs decreases their variety, quantity, quality and increases the wastage of time. Moreover, it is observed that the inadequacy of blackboard force teachers to clean the picture and use the cleaned picture to discuss the content.

Similarly, a close observation of the finding in Grade 8 Mathematics teachers, it appears only IMs that can be drawn on the blackboard rated as used together with few numbers of models in the SPCs. The result also shows most of the suggested IMs in Grade 8 syllabus was not used. However, almost all the suggested IMs can be prepared with little effort at school level as described above.

On the other hand, in both grades teachers rated as used IMs like instruments and three-dimensional models found in few numbers in the SPCs. The borrowing list (Table 30) also shows teachers borrowed such materials from the SPC. Therefore, with this few numbers of IMs only the teacher has an access to use the materials and it appears student involvement in using the mathematical instrument (compass, protractor, set square, T-square) or model limited to sight / vision in the teachers hand (Table 31). This shows that the way teachers use the IMs is not appropriate in that student involvement is less.

The findings in Tables (29 & 30) show almost half of the sample teachers name were found in the borrowing list files for the past 1½ year. As it can be seen from the table, only 3 (15%) sample teachers used the SPC some what frequently in the past 1½ year, where as the majority of teachers used the SPC very few times. Moreover, the types of IMs borrowed from the SPC are mathematical instruments and

three-dimensional models. Of course, there are some IMs listed as borrowed from the SPC but they are not found in the SPC or in the teachers' hands.

Therefore, from the above findings it is reasonable to say only few teachers visit the SPCs to use the available IMs.

The data in Box-3, shows the type of IMs listed in the teachers weekly lesson plans under the column "teaching aids". Some of the sample teachers wrote similar common IMs throughout the semester and among these there are teachers not fill the column after they wrote few common IMs for one week.

Therefore, this might show teachers did not bother about the kind of IMs they are going to use while planning their lesson or they did not use the syllabuses/ Teacher guide. From the finding it is possible to see only few sample teachers appear to use the guide materials while they plan their lesson.

On the other hand, observing Table 3o and Box-3 shows, the list of 11 (55%) sample teachers found in the borrowing list file while 16 (80%) teachers list IMs in their lesson plans to use. Therefore, this seems to show some of the sample teachers did not use the SPC to find the IMs and this might be due to in availability of the IMs or they wrote most of IMs in their lesson plans that they are not going to use them in classrooms.

As it has been discussed so far the findings show that there are few mathematical instruments and three-dimensional models in SPC. It is also indicated that there are teachers who use these IMs in the teaching-learning process. But, the finding in Table 36 shows, the majority of students indicated their skills in performing the basic performances found in the curriculum, as they can't do it. For instance, most of them rated that they can't draw graphs for the given data and some can't interpret the information given in graphs, the majority of the sample students rated as they can't use the mathematical instruments to construct geometric figures, the majority of them can't define and even call the name of some plane figures and models, the majority of them rated as they can't use the compasses and protractors to draw circles and arcs and the majority of them rated as they can't apply formulae to find areas and volumes of plane figures and solid models respectively.

As it has been said earlier, this might be due to the way teachers use the IMs in that they did not involved students and the teachers used the instruments for themselves in teaching the students. Anyway, based on the finding, it is reasonable to say some of the objectives of Grade 7/8 Mathematics curriculum appear not attained by the majority of the students.

As it can be seen from the data in Table 32, the observation result shows that most of the urban classrooms have inadequate seats and this made the teacher movement limited to support students individually. No displays observed in all classrooms and in some classrooms the blackboard can not be viewed easily from the backside.

It was also observed when teachers write the note, class work and home work problems on the blackboard and also draw figures from the textbook on it. In most classrooms it was observed that the sample teachers did not use the IMs listed in their lesson plan. Only few sample teachers use the blackboard and chalk to present the IMs listed in their lesson plans. On the other hand, it is also observed when teachers use the diagrams on the blackboard but the diagrams were not listed in their lesson plans.

It was also observed when most of sample teachers draw diagrams they did not use the ruler, protractor, or compasses even when they are necessary. On the other hand, those sample teachers who use the IMs did not let students use the materials by themselves. However, most sample teachers observed when they involve few students by asking and answering questions. The majority of students were observed when they copy what their teachers write on the blackboard. Based on the observation it is reasonable to say most of the instructional time was as indicated earlier copying the text on and off the blackboard by the teacher and the students respectively.

Factors Affected Utilization of IMs by Mathematics Teachers

The major factors that can affect the utilization of IMs, as described earlier in chapter two, include the material, financial and human factors. Unplanned utilization of IMs is the material factor that affects their significance and importance. The finding

in this study shows unplanned selection and inappropriate use of IMs by some mathematics teachers made the IMs not to prove their full usefulness. The response of most of the sample students also indirectly indicates that the materials used by teachers with out a definite purpose. In addition to the above, there is no debate on the financial constraints facing our government schools and these constrains affect the budget allocation in the schools. The absence of adequate budget in turn affects the material inputs in the school. The lack of material inputs in schools leads to the shortage of IMs in schools, which consequently affect the selection, and use of IMs by teachers and students in the teaching and learning process.

Having in mind this, the finding in this study shows the lack of finance was the major factor that affects utilization of IMs by the sample mathematics teachers. The shortage and in some cases the absence of curricular materials, raw materials to produce IMs in SPCs, incentives, additional training on preparation and use of IMs for that observed in sample schools.

The human factors that affect the utilization of IMs by teachers include their own skills, knowledge, attitude, and preferences. The findings in this study shows the majority of the sample teachers have favorable attitude and their knowledge of the role IMs play to the teaching and learning process were also appears good. But, the findings also show the sample mathematics teachers made little effort and commitment to prepare and use IMs. To the reverse, they concentrate on the chalk and talk activities and focus on number related activities.

The sample teachers give reasons such as inavailability, the possibility of teaching without the IMs, lack of knowledge of the importance of some of suggested IMs, and need for support to their not using the suggested IMs. From the findings it reasonable to say some of the sample teachers lack the knowledge and skills on the practical applications of suggested IMs.

CHAPTER 5

5. SUMMARY, CONCLUSION & RECOMMENDATION

5.1 Summary

The study was intended to assess availability and utilization of IMs for mathematics instruction in grades 7 & 8. To achieve the purposes the following research questions were raised:

1. Are the curricular materials (of Grade 7 & 8 Mathematics) and instructional materials (suggested in them) available in schools/SPCs?
2. Do Educational Support Sections at the Zone and Wereda levels provide the schools instructional materials that help Mathematics instruction?
3. What are the sources of instructional materials (found in schools/SPCs that help mathematics instruction)?
4. Do SPCs have skilled manpower, adequate budget, and facilities to produce and display Mathematics instructional materials?
5. Do classrooms have adequate facilities, such as, blackboards, bulletin boards, adequate seats and a table for the teacher?
6. Do Mathematics teachers (in the level have the necessary training to) prepare and use instructional materials for their classroom instruction?
7. Do Mathematics teachers have favorable attitude toward preparing and using instructional materials for classroom instruction?
8. Do Mathematics teachers use the available instructional materials in classrooms?
9. What major factors hinder the utilization of instructional materials by Mathematics teachers in Grades 7 and 8?

The study was carried out in SNNP Region with specific reference to ten government primary and junior secondary schools in the three Weredas of Sidama Zone. To this effect, the Descriptive Survey approach was employed as a method of study. Questionnaire, observation of SPCs and classrooms, and document analysis were the data collection instruments. They were used to obtain information from Z.E.D and W.E.O Education Support Section officials, principals, teachers, SPC-coordinators, students, SPCs, and libraries of the sample schools.

The information obtained through these data gathering tools was analyzed using percentages, frequencies, mean, standard deviations, and descriptive statements. The summary of the study is presented as follows:

First, the major sources of IMs in the school are the SPCs and libraries. From the ten sample schools, seven schools have library and all sample schools have SPCs.

Second, the findings from different sources indicated a serious shortage and absence (in some cases) of curricular materials in the sample schools. The findings seems to show the syllabuses of Grade 7 and 8 Mathematics were not available in the schools and in the hands of the sample teachers. Forty five percent of the sample teachers did not have teacher guides. There is a serious shortage of student Mathematics textbooks in the schools, which is provided by the government freely to schools for the students. The finding also shows, there are a few number of non-textbook IMs in some SPCs and lack of other Mathematics reference books in all available libraries. The IMs found in SPCs were mostly three-dimensional models and mathematical instruments. Two-dimensional IMs such as graphs, charts, diagrams, venn diagrams& pictures were almost non-existent in SPCs.

Third, the findings in this study show that Mathematics curricular materials and blackboards were provided to schools by the Z.E.D / W.E.O Education Support sections. Non-textbook IMs like Mathematics reference books, Mathematical instruments, three-dimensional models, graphics, different color chalks and bulletin boards were not provided by the support sections. The finding also indicated that there is no balance among the subjects in the support made from the sections.

Fourth, the findings in this study showed that there was no budget allocated to SPCs / libraries from the Z.E.D / W.E.O to strengthen SPCs or libraries. Though it was not sufficient, some SPCs have got support from the community, NGO, educational institutions and the school, which give financial and material support. At the school level, some of the principals made a considerable effort to improve their school educational material inputs. The findings also show, the sample teachers and SPC-coordinators made little support to improve the shortage of IMs by preparing from local sources.

Fifth, the observation result made it clear that teachers and SPC-coordinators produced most of the available few IMs in SPCs during the past regime. No student-made materials were observed in SPCs.

Sixth, the findings in the study appeared to show that the SPCs staffed by teachers who were not trained to be the resource center coordinators. It was also observed that they were teachers who have lower teaching loads and in some cases teachers who have got health problems. Moreover, they were not assigned uniformly. Sometimes they are appointed by W.E.O, the principal or the staff. Most of them found that they did not have got training in preparation of IMs and indicated that they did not have the knowledge of mathematics curriculum. Regarding the facilities the findings show, few sample schools have separate rooms for production and display IMs. Few SPCs have display shelves and few IMs on them arranged by subject wise. It was found that the SPCs space do not seem the problem in the sample schools.

Seventh, it was observed that the majority of sample classrooms do not have adequate blackboard and student seats. Almost all sample classrooms do not have the facility for the teacher and bulletin boards. The blackboard in some sample classrooms do not viewed easily from the backside of the rooms. The problem of inadequacy of seats was more in urban and of blackboard was more in rural.

Eighth, fifty percent of the sample teacher respondents have the required qualification and training to the grades level. The result also show, most of the sample teachers appear as having the knowledge of utilization of IMs. But, it shows a considerable number of sample teachers do not have the knowledge of the role IMs play in instruction.

Ninth, the study shows the majority of the sample teachers appear as having the favorable attitude towards the utilization of IMs. This result might show the attitude of teachers was not the factor for under utilization of IMs which were said earlier.

Tenth, the observation result reveals, almost all sample teachers except one, do not use the syllabuses and do not have an idea about it use in planning the lesson. Only few teachers use the guide in planning and only one sample teacher was observed when he use it in classroom. Almost all sample teachers use the student's textbook in classrooms. However, it was observed that teachers' textbook utilization

hinder students from using the textbook by themselves. It appears students' activity limited to copying the text from the blackboard, which is written by the teachers.

Eleventh, as indicated by the sample teacher respondents, the majority of the sample teachers use textbook, figures in textbook, and the blackboard frequently and few indicated they use other IMs rarely even if they are necessary.

Twelvth, the response from principals, SPC-coordinators, librarians and sample teachers shows the majority of sample teacher's participation in preparation of IMs is low. It was also observed when most of them use the blackboard to draw diagrams and they do not prepare the diagrams from other local resources.

Thirteenth, the finding in observation of SPCs borrowing files and the response from SPC-coordinators reveals most of the sample teachers visit the SPC few times in the semester or not all to use the available IMs. Lesson plan observation of sample teachers also shows most of them do not list the IMs they are going to use in their lesson plan. Those who wrote the list of few IMs in their plan were also observed that they do not present the materials in the classrooms.

Fourteenth, the rating by students and lack of IMs in the schools indicate that most of the sample students did not learn some of the basic skills which show they were not attained the intended objectives of grade 7& 8 mathematics curriculum.

Fifteenth, most of the sample teachers were observed when they involve few students in oral questions and answers while most of the students copy from the blackboard .It was also observed the activity in most of the instructional time is writing on and off the blackboard by the teacher and the students respectively. It was also observed that most of the discussions focused on sums and products of numbers. Only few teachers were observed when they discuss names and concepts using a picture drawn on the blackboard.

Sixteenth, the findings in this study appear to show the factors that affect the utilization of IMs. Among these, unplanned selection and use of IMs that made them not to prove their usefulness is the notable ones. Moreover, most of the sample student's response indirectly seems to indicate that the materials used by teachers without purpose. It was also found that the lack of finance is the major factor that affects the utilization of IMs by the sample teachers. Based on the findings in this

study it is reasonable to say that the majority of the sample teachers' commitment to prepare and use IMs was found less. Most of them indicated that they lack the knowledge of the use of some of the suggested IMs and the skill in practical application of them.

5.2. Conclusion

Based on the findings the following conclusions were drawn:

1. Almost all sample schools seem to have a place to display IMs intended for use by teachers in the teaching and learning process. But, some of the schools do not have library, which is the major source of print IMs in the school. More over, only few number and variety of suggested IMs observed in some SPCs and almost no other mathematics reference books available in libraries except few copies of text. It was also observed almost no suggested charts, graphs, Venn diagrams, pictures of different types of plane figures, survey of rules, etc available in the sample SPCs and in the hands of teachers. This might be due to the knowledge of the sample teachers and SPC-coordinators that they think the IMs can be drawn easily on the blackboard whenever they need it to teach. In general, based on the findings it seems reasonable to conclude that the shortage of curricular materials and IMs suggested in them appear the most critical educational problems, which affect the quality of education in the schools.
2. Only the mathematics curricular materials and blackboards seem provided to schools by the government educational support sections at the Zone and Wereda levels. Other non-textbook IMs appear not to be provided by the indicated sections. Moreover, in providing IMs by the above sections it seems there is no balance among subjects. To this end, it is indicated that science subjects benefit more than mathematics. This might be due to the misunderstanding of planners in that mathematics need no IMs to teach.
3. Regarding the material and financial support made to SPCs and libraries, it seems there is no budget allocated to streng|hen SPCs/libraries from the government sources. But, some of the resource centers seem to have little

material support from the community, NGO, Institution, and the school. The school appears the major financial and material source of most of the sample SPCs.

In this regard, some of the principals made a considerable effort to support the SPCs / libraries that consequently improve the shortage of IMs. But, teachers and SPC-coordinators seem to made little effort in preparation of IMs from the local resources while students seem not participated in preparation of IMs. Anyway, among the few available IMs in the sample SPCs teachers and SPC-coordinators make most of them from local resources many years ago. During the past regime NGOs appear to support mathematical models and reference books to one of the sample schools.

4. Most of the sample SPC-coordinators appears that they do not have training to IMs production and evaluation. Most of them appear do not have the knowledge of mathematics curriculum in order to prepare IMs to the level. Due to this and many other factors SPC-coordinators contributed little to mathematics instruction. Therefore, it seems reasonable to conclude that the sample SPCs suffered from the lack of skilled manpower. Regarding the facilities most of the sample SPCs have single room for production and display IMs. Lack of production tools, raw materials and display shelves seem the common problems of the SPC. The lack of these materials inhibits preparation and display of IMs. But, the space doesn't seem the problem of SPCs for the time being in the sample schools.
5. The majority of sample classrooms do not have adequate seats and blackboards so as to conduct the teaching and learning process in a comfortable environment. In all sample classrooms teachers do not have a chair to sit and table to put the IMs he/she uses in the classroom. Bulletin boards appear not available except in few classrooms. Therefore, it is reasonable to conclude that the sample classrooms lack the basic facilities and IMs needed to the teaching and learning process.

6. Half of the sample teachers have the required qualification and training to the primary second cycle level. Most of them also have the theoretical knowledge of the contribution of using IMs and their source. But, there are a considerable number of sample teachers who do not have the training and knowledge of the contribution of using IMs in order to prepare and use them in classrooms.
7. The majority of the sample mathematics teachers appear to have a positive attitude towards the utilization of IMs in classroom instruction. Therefore, it is likely to conclude that the attitude of the sample teachers doesn't seem the factors to hinder the utilization of IMs in the sample schools.
8. Almost all the sample teachers seem that they do not use the curricular materials appropriately either in planning or in classrooms. This seems due to the lack of the materials or lack of knowledge on what material to use, when to use and how to use. The majority of sample teachers appear not to use the available textbooks in the way that students use them in classroom and home. The majority of teachers appear to prepare and use IMs rarely, and some borrow from the SPCs to use the available IMs few times in the semester. This also seems due to the lack of raw materials to prepare the necessary IMs in the SPCs or the center closed when teachers need to borrow IMs. The shortage of variety and quantity of IMs in SPCs may also account for the sample teachers limited visit to the center.

Most of the sample students appear do not able to perform some of the basic skills they supposed to be able. It seems that they do not attained some of the objectives of grade 7 and 8 mathematics curriculum. This may be due to the lack of the necessary mathematical instruments and other IMs in the hands of students and sample teachers do not focus on such skills due to lack of their own skills to use the instruments.

Therefore, it seems reasonable to conclude that the majority of the sample teachers do not use the available IMs in the SPC/school.

9. The lack of finance seems the major factor that affects utilization of IMs by the sample teachers. Moreover, unplanned utilization, shortage of IMs, and lack of skilled manpower and resource to prepare IMs also affect the selection and use of IMs by the sample teachers. Besides, the absence of commitment and the lack of knowledge and skills in practical application of suggested IMs in the classroom by the sample teachers appear to affect the utilization of IMs by them.

5.3 Recommendation

An attempt was made to collect relevant information regarding the availability and utilization of IMs for mathematics instruction in primary second cycle government schools. Thus, based on the preceding conclusion it is possible to recommend that:

1. Instructional materials are the critical ingredients in learning and the intended curriculum cannot be easily implemented without them. To this end, the resource centers in the schools are the sources of IMs and have a great role to play in providing quality education at the classroom level. Therefore, SPCs and libraries must have to be strengthened or established in the schools in order to play their respective roles in improving the availability of IMs, which help to effective teaching and learning process.
2. The students' national examination achievement is one of the measures of the outcome of the teaching-learning process in the school. Thus, the result must be provided to schools subject wise so that the schools can analyze their weakness area, which might help to investigate the problem in the teaching and learning process and make the necessary effort to improve the situation.
3. As it is known, reaching the desired level of enrollment without improving student achievement may not be meaningful if large numbers of students do not learn the curriculum of the level. Moreover, if the government does not invest in improving quality education, enrollment may also be severely constrained. To this end, increasing student enrollment, while also providing quality education is too costly for country like Ethiopia. Increasing student learning requires at least the provision of textbooks. Therefore, education

management members at all levels must be aware of the role of IMs which enhance student achievement and must provide educational material inputs to schools. Besides, it is time to the SNNP Region government to give emphasis to the quality aspect of education and must invest in providing sufficient IMs and budget to strengthen the resource centers.

4. At the school level principals, teachers, SPC-coordinators and students can play their respective roles towards increasing the availability of non-textbook IMs by preparing them from inexpensive local resource. Participating students in preparation of charts, graphs, survey of rules, and models also help to improve the raw material shortage in SPCs by reusing the materials.
5. The findings show that mathematics teachers and SPC-coordinators lack the guide materials which could help them in identifying the necessary IMs for a specific topic / content. Providing syllabuses & teacher guides to SPCs & teachers can help them to have prehand information to prepare the IMs before hand.

   Moreover, training must be given to teachers' linked with utilization of IMs which have a great importance in improving their knowledge and skills on the practical application of the suggested IMs.
6. The initiatives started by few school principals like working project proposals to find support from NGOs to strengthen their school resource centers and creating link with the surrounding educational institutions to find material support must be encouraged and extended to other schools.

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Annex-A: Availability of Grade 7 and 8 Mathematics Curricular Materials and IMs Suggested by them in SPC.

№	Type of IMs found in SPC	Distribution of available quantities	The source of IMs.
1	Math syllabuses	–	–
2	Math Teacher's guides	–	–
3	Grade 7 Math student Textbook	1,1,1	Provided by government
4	Grade8 Math Student Text book	1,1,1	Provided by government
5	Pictures of parts of whole	2,7	SPC-coordinators made
6	Slide rule for addition of rational numbers.	2	Teachers made. Teacher -made
7	Survey of rules	2	Teacher made
8	Ruler.	2,1,1,1	Teacher-made, SPC-co. made
9	Compasses	2,1,1,1	Teacher-made, SPC-co.made
10	Model of circles	1,3,3,6,3,2,1	Teacher-made, SPC coor
11	Protractor(s)	1,4,2,1	Teacher-made, SPC coor
12	Models of right prisms (not cubes)	2,7,4,7	Teacher made, SPC-Coor.
13	Models of right Cylinders	1,1,1,3	made donated
14	Models of cubes	2,20,4,4,7	>>
15	Models of triangular right prisms	1,4,3	>>
16	Set square	1,1,1,1,1,2	>>
17	Models of different prisms & cylinders (not right ones)	5	>> >>
18	Models of different pyramids	5,2,3,1	Donated, teacher -made, SPC-coord made
19	Models of circular cones	2,2,1	Teacher made
20	Models of sphere	1,1	

Source: Inventory by the researcher and SPC -coordinator

Annex-B: Grade 7/8 Math Teachers' Rating on Suggested IMs Utilization for the Past 1½ Years and the Reason for not Using

N.B: The reasons for not utilizing are given as follows.

A. The IM(s) are not available

B. I need help to choose the appropriate IM(s)

C. I need assistant to prepare the IM(s)

D. I can't use the IM(s) in the proper way

E. I have no idea about its importance

F. I can teach without the IM(s).

Unit	IMs Suggested in Grade 7 Syllabuses	Ratings N=10				
		Used		Not used		Reason(s) for not using
		No	%	No	%	
1	• Graphs on coordinate system	7	70	3	30	A, C, D
	• Square with 100 equal unit subdivision	7	70	3	30	A, C, E
	• Pictures of parts of whole	8	80	2	20	A, C
	• Table of proportion	6	60	4	40	A, C
	• Charts showing algorithms for solving problems of percent	5	50	5	50	A, C, F
	• Survey of line, bar, and circle graphs	8	80	2	20	A, C
2	• Picture of number ray	9	90	1	10	F
	• Slide rule for addition of rational numbers	3	30	7	70	A, C, D, F
	• Survey of rules for add., multi., dividing with rational numbers	2	20	8	80	A, C, E, F
3	• Balance	2	20	8	80	B, D, E, F
	• Survey of rules of transformation	4	40	6	60	A, E, F
	• Picture of number line	10	100	-	-	
4	• Ruler	7	70	3	30	A, F
	• Compasses	7	70	3	30	A, F
	• Model of circles	6	60	4	40	A, F
	• Survey of theorems on circles	-	-	10	100	A, E
	• Protractor	7	70	3	30	A
	• Summary table of the unit	-	-	10	100	A, E
5	• Numerical table	2	20	8	80	A
	• Models of right prisms	6	60	4	40	A, B, C, F
	• Models of right cylinders	7	70	3	30	A, F, C
	• Models of cubes	8	80	2	20	A, C, F
	• Models of rectangular right prisms	8	80	2	20	A, C, F
	• Models of triangular right prisms	8	80	2	20	A, C, F
	• Summary table of the unit	-	-	10	100	A, E

Unit	IMs Suggested in Grade 8 Syllabuses	Used		Not used		Reason(s) for not using
		No	%	No	%	
1	• Charts showing properties of operations with rational nos	4	40	6	60	A, B
	• Charts showing the rule for multiplying two binomials	4	40	6	60	A, B, E
	• Charts showing the rules for converting products into sums	3	30	7	70	A, B
2	• Tables and venn diagrams showing representations of relations	5	50	5	50	A, E
	• Graphs of simple relations	10	100	-	-	
	• Ruler	6	60	4	40	A, F
	• Charts showing sequences	5	50	5	50	A
	• Charts showing the four quadrants of coordinate plane	9	90	1	10	A
	• Squared paper	2	20	8	80	A, E
	• Flash cards containing rule of transformation	1	10	9	90	A, E, F
	• Charts containing the rules for removing brackets	6	60	4	40	A, E, F
	• Charts showing the steps for solving word problems	6	60	4	40	A, F
3	• Numerical table & Table of Values	3	30	7	70	A, E
	• Charts showing the relationship between squaring and extracting square roots	2	20	8	80	A, F
	• Charts which shows the steps how the point which corresponds to V2 is obtained by construction	1	10	9	90	A, D
4	• Figures representing a path, closed path, simple closed path	7	70	3	30	F, A
	• Models showing different plane figures	4	40	6	60	A, F,
5	• Set square, Ruler, Colored Chalk , Compass	3	30	7	70	A, C, D, F
	• Charts with similar triangles	4	40	6	60	A, C, F
	• Charts containing steps for constructing similar triangles using similarity theorems	-	-	10	100	A,B,C,D,F
6	• Protractor, set square, ruler	3	30	7	70	A, C, D, F
	• Flash cards containing the similarity theorems	-	-	10	100	A, C, E
7	• Models of cylinders and prisms	8	80	2	20	A, C
	• Models of different pyramids	8	80	2	20	A, B, C
	• Models of circular cones	8	80	2	20	A, B, C
	• Models of sphere	8	80	2	20	A, C

APPENDIX-A

ቅጽ 1-01

አዲስ አበባ ዩኒቨርሲቲ
የካሪኩለምና ኢንስትራክሽን ት/ክፍል
የድህረ-ምረቃ ፕሮግራም
አዲስ አበባ

በሂሳብ መምህራን የሚሞላ የጽሁፍ መጠይቅ

አጠቃላይ መምሪያ

ይህ መጠይቅ በአንደኛ ደረጃ ሁለተኛ ሣይክል ት/ቤቶች ውስጥ የ7ኛና የ8ኛ ክፍል የሒሳብ ትምህርት መርጃ መሣሪያዎች ያሉበትን ደረጃ ለማወቅና እንዲሁም መምህራን በመርጃ መሣሪያዎቹ አመራረጥ፣ አዘገጃጀትና አጠቃቀም ላይ ያላቸውን ሥልጠና፣ ዝንባሌና ተሞክሮ በመሰብሰብ ላይ ያተኮረ ነው:: በመሆኑም በዚህ ረገድ ባሉት ችግሮች አኳያ *የመምህራን* አመለካከት ምን እንደሚመስል መረጃዎችን ለመሰብሰብና ተስማሚ ሊሆኑ የሚችሉ የመፍትሔ ሃሳቦችን ለመጠቆም ነው::

በዚህ ረገድ ለዚህ ጥናት መሳካት እርስዎ ለመጠይቁ የሚሠጡት እውነተኛ ምላሽ ከፍተኛ አስተዋፅኦ ስለሚኖረው የተሟላ ምላሽ እንዲሰጡኝ እጠይቃለሁ:: ስምዎን መፃፍ አያስፈልግም:: ግልፅ ሆነው የሚሰጡት ማንኛውም መረጃ ለጥናቱ አላማ ብቻ ከሚውል በቀር በሚስጥር እንደሚያዝ አረጋግጣለሁ:: ጊዜዎን ሰውተው ላደረጉልኝ ትብብር በቅድሚያ ከልብ የመነጨ ምስጋናዬን አቀርባለሁ::

መምሪያ አንድ፣

ከዚህ በታች ላሉት ጥያቄዎች አማራጭ መልሶች ለተሰጣቸው የ"ሀ" ምልክት በተሰጠው ቅንፍ ውስጥ በማስቀመጥ መልሱን ያመልክቱ:: አማራጭ መልሶች ላልተሰጣቸው በክፍት ቦታው ላይ አጭር መልስ እንዲሰጡኝ እጠ ይቃለሁ::

1. ፆታ ወንድ ( ) ሴት ( )
2. ዕድሜ _____
3. አሁን የሚያስተምሩበት ት/ቤት ስም _____
4. የትምህርት ደረጃ
   ሀ. 12 + TTI ( )
   ለ. ኮሌጅ ዲፕሎማ ( )፣ ማይነር _____ ሜጀር _____
   ሐ. ኮሌጅ ዲግሪ ( )፣ ማይነር _____ ሜጀር _____
   መ. ሌላ ከሆነ ይፃፉ _____
5. የተመረቁበት ኮሌጅ ወይም ተቋም ስም _____
6. የሰለጠኑበት የመምህራን ሥልጠና ፕሮግራምና ዓመታት
   ሀ. መደበኛ ( )፣ ከ19___ ዓ.ም. እስከ 19___ ዓ.ም.
   ለ. ክረምት ( )፣ ከ19___ ዓ.ም. እስከ 19___ ዓ.ም.
7. በአሁኑ ጊዜ የሚያስተምሩበት ክፍል ደረጃ
8. በሳምንት የሚያስተምሩት የክ/ጊዜያት ብዛት
9. በአሁኑ ጊዜ ከሂሳብ ትምህርት ሌላ የሚያስተምሩት ትምህርት ካለ
10. በአጠቃላይ በመምህርነት ያገለገሉባቸው ዓመታት
11. የጋብቻ ሁኔታ፣ ያገባ ( ) ያላገባ ( )

መምሪያ ሁለት፣

ከዚህ በታች ላሉት ጥያቄዎች ከተሰጡት አማራጭ መልሶች ውስጥ ትክክለኛውን ፊደሉን በመክበብ ይመልሱ:: አማራጭ ላልተሰጣቸው ደግሞ አጭር መልስ በተሰጠው ቦታ ይፃፉ::

1. ከዚህ በታች ከተዘረዘሩት ውስጥ ለሂሳብ ትምህርት የመርጃ መሣሪያ ሊሆን የማይችለው የትኛው ነው ብለው ያምናሉ? (ከአንድ በላይ መመለስ ይቻላል)::

   ሀ. የተለያዩ ግራፎች
   ለ. የተለያዩ ቻርቶች
   ሐ. ቴሌቪዥን
   መ. የተለያዩ ሞዴሎች
   ሠ. ሲለበስ
   ረ. የመምህሩ መምሪያ
   ሰ. የተማረው መማሪያ መፅሐፍ
   ሸ. ትምህርታዊ ጉብኝት
   ቀ. ስዕሎች
   በ. የጥቁር ሠሌዳ
   ተ. በቃል ብቻ ማስተማር
   ቸ. በላይብራሪ ውስጥ ያሉ የሂሳብ መፃህፍት

2. ለሚያስተምሩት ትምህርት የሚያስፈልግዎትን የትምህርት መርጃ መሣሪያዎች ለማግኘት እንደ ምንጭነት የሚገለገሉት የትኛውን ነው?

   ሀ. ቤተ መፅሐፍ
   ለ. የትምህርት ማበልፀጊያ ማዕከል
   ሐ. በአካባቢው የሚገኝ ሌላ ት/ቤት
   መ. ሁሉንም
   ሰ. ሌላ ካለ ይጻፉ _____

3. እርስዎ የሚያስፈልግዎትን የሂሳብ ትምህርት መርጃ መሣሪያዎች ለማግኘት የትኛውን አማራጭ ነው ብዙ ጊዜ የሚጠቀሙት?
   ሀ. በት/ቤቱ የት/ማበልፀጊያ ማዕከል ውስጥ ካሉት መምረጥ
   ለ. በት/ቤቱ ውስጥ ያገኟቸውን ማሻሻል
   ሐ. በአካባቢው ካሉ ነገሮች አስመስሎ መስራት
   መ. በቃል ብቻ ማስተማር
   ሠ. ሌላ ካለ ይፃፉ _____

4. ለአንድ የሚያስተምሩት ሂሳብ ትምህርት ይዘት ተስማሚ የሆኑትን የትምህርት መርጃ መሣሪያዎች በሚመርጡበት ጊዜ የትኛውን ስልት ይከተላሉ? (ከአንድ በላይ መልስ መስጠት ይቻላል)
   ሀ. የት/ቤቱን የማዕከል ተጠሪ አሳትፋለሁ ለ. ሲለበሱን እጠቀማለሁ
   ሐ. የመምህሩን መምሪያ እጠቀማለሁ መ.ሌላ ካለ ይፃፉ _____

5. የሂሳብ ትምህርት መርጃ መሣሪያዎችን በሚመርጡና በሚያዘጋጁበት ጊዜ በአብዛኛው እንደዋነኛ መስፈርት የሚወስዱት የትኛውን ነው?
   ሀ. የትምህርቱ ዓላማን መ. ቀልብ የሚስብ መሆኑን
   ለ. የማስተማር ዘዴን ሠ. ሌላ ካለ ይፃፉ
   ሐ. ቀለሙ የሚያስደስተውን _____

6. ለሚያስተምሩት የክፍል ደረጃ ከሚከተሉት የሂሳብ ሥርዓተትምህርት ማቴሪያሎች ውስጥ እርስዎ ያልዎትን ይክበቡ::
   ሀ. ሲለበስ ለ. የመምህሩ መምሪያ ሐ. የተማሪው መፅሐፍ

7. የትምህርት ዕቅድዎን ለመንደፍ አዘውትረው የሚጠቀሙት የትኛውን ነው?
   ሀ. ሲለበሱን ለ. የመምህሩን መምሪያ ሐ. የተማሪውን መፅሐፍ መ. ሌላ _____

8. የመምህሩ መምሪያ ወይም ሲለበሱ ካለዎት በውስጣቸው ከተገለፁት መርጃ መሣሪያዎች ውስጥ በቀላሉ ሊገኙ ወይም ሊሰሩ የሚችሉት ምን ያህሎቹ ናቸው?
   ሀ. በጣም ብዙዎቹ ሊገኙ/ሊሰሩ አይችሉም ለ. ጥቂቶቹ ሊገኙ/ሊሰሩ አይችሉም
   ሐ. ሁሉም ሊገኙ/ሊሰሩ ይችላሉ
   መ. ሌላ ካለ ይገለፅ _____

9. የሒሳብ የተማሪው መማሪያ መፅሐፍ እርስዎ በሚያስተምሩባቸው ክፍሎች ውስጥ ለተማሪዎቹ ምን ያህል ተዳርሷል? _____ ሀ. አንድ መፅሐፍ ለአንድ ተማሪ ለ. አንድ መፅሐፍ ለሁለት ተማሪ
   ሐ. ሌላ ካለ ይገለፅ

10. በክፍል ውስጥ አዘውትረው የሚጠቀሙት የትኛውን ነው?
   ሀ. ሲለበሱን ሠ. "ሀ" እና "ሐ"ን
   ለ. መምህሩን መምሪያ ረ. "ለ" እና "ሐ"ን
   ሐ. የተማሪውን መማሪያ መፅሐፍ ሰ. ሁሉንም እጠቀማለሁ
   መ. "ሀ" እና "ለ"ን ሸ. ሁሉንም አልጠቀምም

11. ተማሪዎች የሂሳብ መፅሐፋቸውን ሁልጊዜ ክፍል ውስጥ ይዘው እንዲመጡና እንዲጠቀሙበት ያደርጋሉ?
   ሀ. አደርጋለሁ ለ. አላደርግም ሐ ሌላ ምላሽ ካለ

12. እርስዎ በአሁኑ ጊዜ ሒሳብን ሲያስተምሩ ለትምህርቱ ይዘት የሚያስፈልጉትን የትምህርት መርጃ መሣሪያዎች በራስዎ አዘጋጅተው ምን ያህል አዘውትረው ይጠቀማሉ?
   ሀ. ሁል ጊዜ ሐ. በጣም ጥቂት ጊዜ
   ለ. አንዳንድ ጊዜ መ. አዘጋጅቼ ተጠቅሜ አላውቅም

13. ሌሰን ፕላን ለማዘጋጀት፣ ለኖት ማውጫና ሂሳብ ለመስሪያ፣ ዎርክሽት ለማዘገጀትና ለመሳሰሉት የሚያስፈልጉ የፅህፈት መሣሪያዎች በት/ቤቱ ይሰጣሉ?
   ሀ. በበቂ ሁኔታ ይሰጣሉ ለ. በቂ ባይሆንም ይሰጣሉ ሐ. አይሰጥም

14. የሂሳብ ት/መርጃ መሣሪያዎችን ለማዘጋጀትም ሆነ በአግባቡ ለመጠቀም በኮሌጅ/በተቋም ደረጃ የወሰዱት ስልጠና ወይመ ትምህርት አለ? ሀ. አለ ለ. የለም

15. የጥያቄ "14" መልስዎ "አለ" ከሆነ ትምህርቱ የእርሶን የትምህርት መርጃ መሣሪያዎች አመራረጥና አጠቃቀም አሻሽሎልኛል ይላሉ?
   ሀ. በጣም አሻሽሎልኛል ለ. መጠኑ አሻሽሎልኛል ሐ. አላሻሻለም

16. የትምህርት መርጃ መሣሪያዎችን አዘገጃጀትና አጠቃቀም ላይ ባተኮረ ወርክሾፕ ወይም ሴሚናር ላይ ተካፍለው ያውቃሉ?
   ሀ. አንድ ጊዜ ተካፍያለሁ መ. ተካፍዬ አላውቅም
   ለ. ሁለት ጊዜ ተካፍያለሁ ሠ. ሌላ ካለ ይገለፅ_____
   ሐ. ከሦስት ጊዜ በላይ

17. ተካፍለው ከሆነ በምን ደረጃ የተዘጋጀ ወርክሾፕ ወይም ሴሚናር ነው?
   ሀ. በክልል መ. በት/ቤት

ለ. በዞን ሠ. በፌደራል
ሐ. በወረዳ ረ. ሌላ ካለ ይገለፅ _____

18. የተካፈሉበት ወርክሾፕ ወይም ሴሚናር የተሰጡዋቸውን ቀናት ርዝመት ይግለፁ?
ሀ. ለአንድ ቀን ለ. ለሦስት ቀን ሐ. ሌላ ካለ ይግለፁ _____

19. የተሳተፉበትን ወርክሾፕ ወይም ሴሚናር ጠቀሜታውን እንዴት ይገመግሙታል?
ሀ. በጣም ጥሩ ነበር ሐ. ዝቅተኛ ነበር
ለ. መካከለኛ ነበር መ. ሌላ ካለ ይገለፅ _____

20. ለእርስዎ የትምህርት መርጃ መሣሪያዎች እውቀትም ሆነ ግንዛቤ እገዛ አድርጋል የሚሉት የትኛው ነው?
ሀ. የማስተማር ልምድ ሐ. ወርክሾፕ/ሴሚናር
ለ. የኮሌጅ/ተቋም ትምህርት መ. ሌላ ካለ ይገለፅ _____

21. በት/ቤትዎ የት/ማበልፀጊያ ማዕከል ካለ ሒሳብን ለማስተማር መማር ሂደት ስኬታማነት የሚያደርገውን አሰተዋፅኦ እንዴት ይገመግሙታል?
ሀ. በጣም ከፍተኛ ነው ለ. መካከለኛ ነው ሐ. ዝቅተኛ ነው መ. በጣም ዝቅተኛ ነው

22. የትምህርት መርጃ መሣሪያዎችን እንዲያዘጋጅልዎት የማዕከሉን አስተባባሪ(ዎች) ጠይቀው ያውቃሉ?
ሀ. አዎን ጠይቄ አግኝቻለሁ ሐ. ጠይቄ አላውቅም
ለ. አዎን ጠይቄ አላገኘሁም

23. በት/ቤቱ ማዕከል ውስጥ ለሚያስተምሩበት የክፍል ደረጃ የሚጠቀሙ የሂሳብ ትምህርት መርጃ መሣሪያዎች በምን ያህል ደረጃ ይገኛሉ?
ሀ. በቂ ሐ. ጥቂት መ. ምንም
ለ. መካከለኛ ሠ. ተጠቅሜ ስለማላውቅ መገመት አልችልም

24. በአለፈው አንድ ዓመት ተኩል ጊዜ ውስጥ ለማስተማር መማር ሂደት የሚያግዙ የሂሳብ ትምህርት መርጃ መሣሪያዎች በአካባቢው ከሚገኙ ቁሳቁሶች ምን ያህል ሰርተዋል/አዘጋጅተዋል? _____

25. እርስዎ የሂሳብ ትምህርት መርጃ መሣሪያዎችን ከተለያየ ስፍራ አፈላልጎ ማምጣትም ሆነ አዘጋጅቶ መጠቀም የዘወትር ተግባርዎ ከሆነ፣ ከት/ቤቱ አስተዳደር የተሰጠዎት ማበረታቻ አለ?
ሀ. የቃል ማበረታቻ ተሰጥቶኛል
ለ. የፅሁፍ ማበረታቻ ተሰጥቶኛል
ሐ. ወርክሾፕና/ሴሚናር ቅድሚያ ተሰጥቶኛል
መ. የከፍተኛ ት/ዕድል ተሰጥቶኛል
ሠ. ምንም ዓይነት ማበረታቻ አልተሰጠኝም

26. ተማሪዎች የት/መርጃ መሣሪያዎችን እንዲሰሩ የቤት ስራ ወይም አሳይመንት ሰጥተው ያውቃሉ?
ሀ. አዎ ለ. አላውቅም

27. የሒሳብ ትምህርት መርጃ መሳሪያዎችን ተማሪዎች እንዲሰሩና የሰሩትንም እንዲጠቀሙበት በማድረግ ረገድ እርስዎ ምን ያህል ጊዜ ጥረት አድርገዋል?
ሀ. ለበርካታ ጊዜያት መ. ምንም ጥረት አላደረኩም
ለ. አልፎ አልፎ ሠ. ሌላ ካለ ይገለፅ_____
ሐ. ጥቂት ጊዜ

28. በእርስዎና በት/ማዕከሉ አስተባባሪ(ዎች) መካከል ያለውን የስራ ግንኙነት እንዴት ይገመግሙታል?
ሀ. በጣም ጥሩ ነው ሐ. ዝቅተኛ ነው
ለ. መካከለኛ ነው መ. በስራ አንተዋወቅም ሠ. ሌላ ካለ ይጻፉ

29. በት/ቤቱ ቤተ-መፅሐፍ ውስጥ ለሂሳብ ትምህርት ማጣቀሻ የሚሆኑ መፃህፍት በምን ያህል ደረጃ ይገኛሉ?
ሀ. በበቂ ሁኔታ ይገኛሉ መ. ተጠቅሜ ስለማላውቅ መገመት ያዳግተኛል
ለ. ጥቂት ይገኛሉ ሠ. ሌላ ካለ ይገለፅ _____
ሐ. ምንም የለም

30. ተማሪዎችዎ ከመማሪያ መፅሐፉ በተጨማሪ ሌላ ማጣቀሻ የሂሳብ መፅሐፍትን ቤተ መፅሐፍ ገብተው እንዲጠቀሙ ለማድረግ የቤት ስራ ወይም አሳይንመንት ሰጥተው ያውቃሉ?
ሀ. አዎ ለ. አላውቅም

31. ከተለያዩ መፅሐፍት ጥያቄዎችን በመሰብሰብ ዎርክሸቶችን አዘጋጅተው ለተማሪዎችዎ ሰጥተው ያውቃሉ?
ሀ. አዎ ለ. አላውቅም

መምሪያ ሦስት፣

ከዚህ በታች ከተዘረዘሩት ምክንያቶች ውስጥ የሂሳብ ትምህርት መርጃ መሣሪያዎችን እርስዎ በክፍል ውስጥ የሚጠቀሙት ለምን እንደሆነ የሚገልፁና የማይገልፁ ሃሳቦች ይገኛሉ። ለእያንዳንዱ ምክንያት በሃሳቡ መስማማትዎን፣ አለመስማማትዎን ወይም ስለተጠቀሰው ሃሳብ ግንዛቤ ከሌለዎት "እውቀቱ የለኝም" በማለት ምርጫዎትን በሚያመለክተው ኮለም የ"✓" ምልክት ያድርጉ።

	የት/መርጃ መሣሪያዎችን በክፍል ውስጥ የምጠቀመው	እስማማለሁ	አልስማማም	እውቀቱ የለኝም
1	የተማሪዎችን ቀልብ ለመሳብ ነው			
2	ተማሪዎችን ለማነቃቃት ነው			
3	እንዲሁ ለመጠቀም ስል ነው			
4	ሃሳብን በቃል ብቻ ለማስተላለፍ በመሞከር የሚባክነውን ጊዜ ለመቆጠብ ነው			
5	የተማሪዎችን የቋንቋ ችሎታ ለማሳደግና ለማዳበር ነው			
6	የተማሪዎችን ተግባራዊ ተሳትፎ ለማሳደግ ነው			
7	በተማሪዎች ለሚደረገው ግምገማ እንዲረዳኝ ነው			
8	ትምህርቱን ይበልጥ ግልፅና ተጨባጭ ለማድረግ ነው			
9	የክ/ጊዜውን ሰዓት ለማባከን ነው			
10	የትምህርቱን ፍሬ ሃሳብ በተሻለ ሁኔታ ተማሪዎቹ እንዲገነዘቡ ለማድረግ ነው።			
11	ትምህርቱን በስፋትና በጥልቀት ለመመልከት ለተማሪው ዕድል ስለሚሰጡ ነው።			
12	በነባራዊው ቁስአካልና እርሱን በሚወክሉት ምልክቶች ስያሜ መካከል ግንኙነት ለመፍጠር ነው።			
13	የመማር ፍላጎትን ለመቀስቀስ ነው።			

መምሪያ አራት፣

ከዚህ በታች ከተዘረዘሩት የት/መርጃ መሣሪያዎች ውስጥ እርስዎ በሂሳብ መምህርነትዎ መርጃ መሣሪያዎቹ በሚያስፈልጉበት ጊዜ ሁሉ የአጠቃቀምዎን ደረጃ ወይም አለመጠቀምዎን የሚገልፀውን ከተሰጡት አማራጮች ውስጥ አንዱን በመምረጥ በተገቢው ኮለም የ"✓" ምልክት በማድረግ ያሳዩ።

	የት/መርጃ መሣሪያ(ዎች)	ሁልጊዜ እጠቀማለሁ	አልፎ አልፎ ተጠቅሜአለሁ	ጥቂት ጊዜ ተጠቅሜአለሁ	አልተጠቀምኩም
1	የ7ኛ/የ8ኛ ክፍል ሒሣብ ሲለበስ				
2	የ7ኛ/የ8ኛ ክፍል ሒሣብ የመምህሩ መምሪያ				
3	የ7ኛ/የ8ኛ ክፍል ሒሣብ የተመሪው መማሪያ መፅሐፍ				
4	ሌላ የሂሳብ ት/ማጣቀሻ መፅሐፍት				
5	በተማሪው መፅሐፍ ውስጥ ያሉ ሥዕሎች				
6	ዎርክሽቶች				
7	በተለያዩ ጋዜጦችና የሂሳብ ት/መፅሐፍት ውስጥ የሚገኙ ሥዕሎችንሃ ግራፎች				
8	የተለያየ ቀለም ያላቸውን ጠመኔዎች				
9	የጥቁር ሠሌዳ				
10	የማሳያ ሠሌዳ				
11	ቴሌቪዥን				
12	የሒሳብ ት/የሚያሳይ ፊልሞች				
13	የሒሳብ ት/የሚያሳዩ ቪዲዮ ፊልሞች				
14	ኮምፒውተር				

መምሪያ አምስት፣

በ7ኛ እና 8ኛ ክፍል የሂሳብ ትምህርት ሲለበስና የመምህሩ መምሪያ ውስጥ የተጠቆሙት የት/መርጃ መሣሪያዎች በሚቀጥሉት ገጾች ተዘርዝረዋል። እርስዎ ባለፈው አንድ ዓመት ተኩል በተገቢው ጊዜ በክፍል ውስጥ የተጠቀሙባቸውን "√" ምልክት፣ ያልተጠቀሙባቸውን የ"X" ምልክት በተገቢው ኮለም ያድርጉ። ያልተጠቀሙበትን ምክንያት ከታች ከተሰጡት ወይም የራስዎን ምክንያት በፊደል በመወከል እሱን የሚወክለውን ፊደል በተገቢው ኮለም ውስጥ ይፃፉ።

ያልተጠቀምኩበት ምክንያት፣

ሀ. የት/መርጃ መሣሪያው በአካባቢዬ ስለሌለ ነው
ለ. አስፈላጊውን/ተስማሚውን የት/መርጃ መሣሪያ ለመፈለግ እርዳታ ስለምፈልግ ነው
ሐ. የት/መርጃ መሣሪያ ለማዘጋጀት ረዳት ስለምፈልግ ነው
መ. በተገቢው ሁኔታ ለመጠቀም ስለማልችል ነው
ሠ. መሣሪያውን ለመጠቀም ስለማልችል ነው
ረ. ሌላ ምክንያት ካለዎት ይፃፉ _____

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ምዕራፍ	የ7ኛ ክፍል ሲለበስ ላይ የተጠቆሙት የት/መርጃ መሣሪያዎች	ተጠ ቅሜአለሁ	አልተጠ ቀምኩም	ያልተጠቀሙበት ምክንያት
1	• Graphs on coordinate system • Square with 100 equal unit subdivision • Pictures of parts of whole • Table of proportions • Charts showing algorithms for solving problems of percent • Survey of line ,bar ,and circle graphs			
2	• Picture of number ray • Slide rule for addition of rational numbers • Survey of rules for add.,multi.,dividing with rational numbers			
3	• Balance • Survey of rules of transformation			
4	• Picture of number line • Ruler • Compasses • Model of circles • Survey of theorems on circles • Protractor • Summary table of the unit			
5	• Numerical table • Models of right prisms • Models of right cylinders • Models of cubes • Models of rectangular right prisms • Models of triangular right prisms • Summary table of the unit			

ምዕራፍ	የ8ኛ ክፍል ሲለበስ ላይ የተጠቆሙት የት/መርጃ መሣሪያዎች	ተጠ ቅሜአለሁ	አልተጠ ቀምኩም	ያልተጠ ቀሙበት ምክንያት
1	• Charts showing properties of operations with rational nos			
	• Charts showing the rule for multiplying two binomials			
	• Charts showing the rules for converting products into sums			
2	• Tables and venn diagrams showing representations of relations			
	• Graphs of simple relations			
	• Ruler			
	• Charts showing sequences			
	• Charts showing the four quadrants of coordinate plane			
	• Squared paper			
	• Flash cards containing rule of transformation			
	• Charts containing the rules for removing brackets			
	• Charts showing the steps for solving word problems			
3	• Numerical table			
	• Charts showing the relationship between squaring and extracting square roots			
	• Charts which shows the steps how the point which corresponds to V2 is obtained by construction			
4	• Figures representing a path,closed path, simple closed path			
	• Models showing different plane figures			
5	• Set square			
	• Charts with similar triangles			
	• Charts containing steps for constructing similar triangles using similarity theorems			
6	• Protractor ,set square,ruler			
	• Flash cards containing the similarity theorems			
7	• Models of cylinders and prisms			
	• Models of different pyramids			
	• Models of circular cones			
	• Models of Sphere			

መመሪያ ሰጭ ሥነ-ምግባር፣

ከዚህ በታች የተሰጡትን ዓረፍተ ነገሮች አንብበው ለእያንዳንዱ ዓረፍተ ነገር ከተሰጡት አማራጮች ውስጥ የእርሶን አመለካከት ወይም ዝንባሌ በይበልጥ የሚገልፀውን አንዱን ብቻ በመምረጥ በተገቢው ኮለም የ«✓» ምልክት ያድርጉ:: የአማራጮች አፀህሮተ ቃል ቢ.እ. = በጣም እስማማለሁ፣ እ. = እስማማለሁ፣ አ.የ. = አቋም የለኝም፣ አል = አልስማማም፣ ቢ.አል. = በጣም አልስማማም::

	ዓረፍተ ነገሮች	ቢ.እ.	እ.	አ.የ.	አል.	ቢ.አል.
1	በማስተማር መማር ሂደት ውስጥ የሚያስፈልጉ የት/መረጃ መሣሪያዎች መጠቀም ጠቃሚ ሲሆን አመርቂ ውጤትም ያስገኛል					
2	የት/መርጃ መሣሪያዎችን ለመጠቀምና ላለመጠቀም ወሳኝ የሚሆነው የማስተምረው የት/ዓይነት ነው::					
3	የት/መርጃ መሣሪያዎችን ለመጠቀም በሚታቀድበት ጊዜ በአብዛኛው የት/ማበልፀጊያ ማዕከላትና ቤተ መፅሐፍን መጠቀም አስፈላጊ ነው::					
4	የ7ኛ/የ8ኛ ክፍል የሂሳብ ትምህርት ሲለበስና የመምህሩ መመሪያ የት/መ/መሣሪያዎችን ማዘጋጀትም ሆነ መጠቀምን በተደጋጋሚ ስለሚጠይቁ በመምህራን ላይ ጫና ፈጥሯል::					
5	የሂሳብ ትምህርትን በግልፅና በተጨባጭ ለማስተማር የት/መርጃ መሣሪያዎችን መጠቀም ለማስተማር መማሩ ሂደት ከፍተኛ ጠቀሜታ አለው::					
6	አብዛኞቹን የ7ኛን እና የ8ኛ ክፍሎች የሂሳብ ት/መርጃ መሣሪያዎች በአካባቢው ከሚገኙ ቁሳቁሶች ማዘጋጀት አይቻልም::					
7	ት/ቤቱ አላቀረበልኝም በሚል ሰበብ የት/መርጃ መሣሪያዎችን ከአካባቢው ከሚገኙ ነገሮች አዘጋጅቶ አለመጠቀም የመምህሩ(ሯ)ን ለሥራው(ዋ) ያለውን /ያላትን ዝቅተኛ ዝንባሌ ያሳያል::					
8	የሂሳብ ትምህርትን በማስተምርበት ጊዜ ብዙዎቹ ተማሪዎች ስለማይገባቸውና ስለማይከታተሉኝ ደስተኛ አይደለሁም::					
9	የት/ማበልፀጊያ ማዕከላት የሂሳብ ማስተማር መማር ሂደትን ለማገዝ ያላቸው ሚና በጣም ዝቅተኛ ነው::					
10	ለማስተማር ከተሰጠኝ ክ/ጊዜ ውጭ ጥቂት ጊዜም ቢሆን የራሴን ተጨማሪ ጊዜ የት/መ/መሣሪያዎችን ለመምረጥም ሆነ ለማዘጋጀት ማጥፋት አልፈልግም::					
11	የሂሳብ መምህር የተለያዩና ብዙ የት/መ/መሣሪያዎችን መጠቀም አለበት::					
12	አንድ መምህር የክፍሉን ዲሲፕሊን ለመጠበቅ ተማሪዎች ሲያጠፉ መቅጣት /መግረፍ አለበት::					

APPENDIX-B

የአዲስ አበባ ዩኒቨርስቲ
የካሪኩለምና ኢንስትራክሽን ትምህርት ክፍል
የድህረ ምረቃ ፕሮግራም
አዲስ አበባ

<u>አጠቃላይ መምሪያ</u>

ይህ መጠይቅ በአንደኛ ደረጃ ሁለተኛ ሳይክል ት/ቤቶች ውስጥ የ7ኛ እና 8ኛ ክፍል የሂሳብ ትምህርት መርጃ መሳሪያዎች ያሉበትን ደረጃ ለማወቅና እንዲሁም የዞኑ/ የወረዳው ት/ቤቶች ጽ/ቤት በዚህ ረገድ የሚያደርገውን ድጋፍ ዐይነትና ብዛት በመሰብሰብ ላይ ያተኮረ ነው :: በመሆኑም ይህንን በሚመለከት ባሉት ችግሮች አኳያ <u>የሃላፊዎች</u> ምላሽ ምን እንደሆነ መረጃዎችን ለመሰብሰብና ተስማሚ ሊሆኑ የሚችሉ ሀሳቦችን ለመጠቆም ነው ::

ለዚህ ጥናት መሳካት እርስዎ ለመጠይቁ የሚሰጡት እውነተኛ ምላሽ ከፍተኛ አስተዋጽኦ ስለሚኖረው የተሟላ ምላሽ እንዲሰጡኝ እጠይቃለሁ::ስምዎን መጻፍ አያሥፈልግም :: ግልጽ ሆነው የሚሰጡት ማንኛውም መረጃ ለጥናቱ ዓላማ ብቻ ከሚውል በቀር በሚስጥር እንደሚያዝ አረጋግጣለሁ:: ጊዜዎን ሰውተው ላደረጉልኝ ትብብር በቅድሚያ አመሰግናለሁ::

የወረዳው ስም _____

መጠይቁን የሞላው ግለሰብ የሀላፊነት ቦታ_____

<u>መምሪያ አንድ</u>

ከዚህ በታች ላሉት ጥያቄዎች ከተሰጡት አማራጭ መልሶች ውስጥ ትክክለኛውን ፊደሉን በመክበብ ይመልሱ:: አማራጭ ላልተሰጣቸው ደግሞ አጭር መልስ በተሰጠው ቦታ ይጻፉ::

1. የሂሳብ ትምህርት መማር ማስተማር ሂደት የሚያግዙ የትምህርት መርጃ መሣሪያዎችን በተመለከተ ዞኑ ወረዳው ለትምህርት ቤቶች የሚሰጠው ድጋፍ አለ?

   ሀ. አለ ለ. የለም

2. የጥያቄ "1" መልስዎ "አለ" ከሆነ ከዚህ በታች ከተዘረዘሩት የሂሳብ ትምህርት መርጃ መሣሪያዎች ውስጥ ዞኑ / ወረዳው ለት/ቤቶች የሰጣቸውን ብቻ የ "✓" ምልክት በተሰጠው ቅንፍ ውስጥ ያድርጉ ::

   ( ) ሲለበሶች የሂሳብ
   ( ) የመምህሩ መምሪያ የሂሳብ
   ( ) የተማሪው መማሪያ መጽሐፍ የሂሳብ
   ( ) የተለያዩ ማጣቀሻ መፃህፍት የሂሳብ
   ( ) ሞዴሎች ሲሊንደር ፕሪዝም ፒራሚድ ወዘተ
   ( ) ኮምፓሶችና ፕሮትራክተሮች
   ( ) ማስመሪያዎች
   ( ) ጥቁር ሰሌዳ
   ( ) የግራፍ ሰሌዳ
   ( ) የማሳያ ሰሌዳ
   ( ) ቻርቶች ግራፎችና የተለያዩ ስዕሎች
   ( ) የተለያዩ ከለር ኖክ
   ( ) ቴሌቪዥን
   ( ) ቪዲዮ
   ( ) ፊልም
   ( ) ኮምፒውተር

3. ለት/ቤቶች ቤተ መፃሕፍትና የት/ማበልፀጊያ ማዕከል የሚያዝ በጀት አለ ?

   ሀ. አለ ለ. የለም

4 .የጥያቄ (3) መልስዎ አለ ከሆነ ከዚህ በታች ካሉት ውስጥ ለየትኛው ነው በጀት የሚያዘው ከአንድ በላይ መልስ መስጠት ይቻላል

ሀ. ለቤተ መፅሐፍ ማጣቀሻ መፅሐፍት መግዣ

ለ. ለት/ ማበልፀጊያ ማዕከል የት/መርጃ መሣሪያዎች ለማዘጋጀት የሚያስፈልጉ ጥሬ ዕቃዎች መግዣ

ሐ. በማዕከላዊ ደረጃ ለተዘጋጁ የት/መርጃ መሣሪያዎች መግዣ

መ. ሌላ ካለ ይግፉ _____

5. የት/መርጃ መሣሪያዎችን ለማጠናከር የሚያዘውን በጀት እንዴት ያዩታል?

ሀ. በጣም በቂ ነው

ለ. በቂ ነው

ሐ. ዝቅተኛ ነው

መ. በጣም ዝቅተኛ ነው

6. የዞን / የወረዳ ት/ ቤቶች ጽ/ቤት ለት/ማበልፀጊያ ማዕከላት የሚያደርጉትን ድጋፍ እንዴት ያዩታል?

ሀ. በቂ ነው

ለ. መካከለኛ ነው

ሐ. ዝቅተኛ ነው

7. የዞን / የወረዳ ት/ቤቶች ጽ/ቤት ለቤተ መፅሐፍት የሚያደርጉትን ድጋፍ እንዴት ያዩታል?

ሀ. በቂ ነው

ለ. መካከለኛ ነው

ሐ. ዝቅተኛ ነው

8. ሲለበሶችን የመምህሩ መምሪያዎችን የተማሪውን መማሪያ መፅሐፍትና የት/መርጃ መሣሪያዎችን የምታሰራጩበት መንገድ እንዴት ነው?

ሀ. በቅናሽ ለት/ቤቶች በመሸጥ

ለ. በነፃ በመንግስት በሚሸፈን ወጪ

ሐ. ሌላ ካለ ይገለጽ _____

9. የት/መርጃ መሣሪያዎችን ለማዘጋጀትና መጠቀምን በተመለከተ በዞኑ / በወረዳው የተሰጠ ወርክ ሾፕ / ሴሚናር አለ?

ሀ. አለ ለ. የለም

10 የጥያቄ (9) መልስዎ አለ ከሆነ ለምን ያህል ጊዜና ለማን እንደተሰጠ ይግለፁ?

_____

11. ለት/ቤቶች የሚሰጠው የት/መርጃ መሣሪያዎች ድጋፍ በተለያዩ የት/ዓይነቶች መካከል ሚዛናዊነታቸው ምን ያህል ነው?

ሀ. ሚዛናዊ ነው

ለ. ሚዛናዊ አይደለም

12. ሚዛናዊ ካልሆነ ለየትኛው የት /ዓይነት (ቶች) ያዳላል?

_____

13. የአንድ የ (7) ኛ ወይም የ (8) ኛ ክፍል የሂሳብ የተማሪው መፅሐፍ የአገልግሎት ጊዜ በእርስዎ አስተያየት ምን ያህል ነው?

_____

14. ከአገልግሎት ውጭ የሚሆኑ መፅሐፍትን ለመተካት የሚደረግ ጥረት ካለ ባጭሩ ቢገልፁልኝ?

_____

15. ባለፉት ሦስት ዓመታት የተመረቱ የተገዙ የ (7) ኛና የ (8) ኛ ክፍል የሂሳብ የተማሪው መፅሐፍትን ብዛትና የእያንዳንዱን መፅሐፍ ለተማሪ መሸጫ ዋጋ ቢገልፁልኝ?

ዓ.ም	ክፍል ደረጃ	ብዛት	ዋጋ
1991	7ኛ		
1991	8ኛ		
1992	7ኛ		
1992	8ኛ		
1993	7ኛ		
1993	8ኛ		

APPENDIX-C

አዲስ አበባ ዩኒቨርሲቲ
የካሪኩለምና ኢንስትራክሽን ትምህርት ክፍል
የድህረ ምረቃ ፕሮግራም
አዲስ አበባ፣

በተማሪ የሚሞላ መጠይቅ
መምሪያ አንድ፣

ከዚህ በታች ላሉት ጥያቄዎች አማራጭ መልሶች ለተሠጣቸው ትክክለኛውን ፊደሉን በመክበብ መልስ/ሽ/:: አማራጭ ላልተሠጣቸው ደግሞ አጭር መልስ በተሰጠው ቦታ ጻፍ /ፊ/

1: ጾታ _____ዕድሜ _____ክፍል_____
2: የትምህርት ቤቱ ስም _____
3: ከምትማራቸው የአካዳሚክ ትምህርቶች መካከል የትኛውን በይበልጥ ትወዳለህ/ትወጃለሽ? (አንዱን ብቻ)
ሀ. አማርኛ መ. ሂሳብ ሰ. ባዮሎጂ
ለ. እንግሊዝኛ ሠ. ፊዚክስ ሸ. ታሪክ
ሐ. የአፍ መፍቻ ቋንቋ ረ. ኬሚስትሪ ቀ. ጂኦግራፊ
4: በጥያቄ '3' ላይ ከተዘረዘሩት ትምህርቶች ውስጥ በይበልጥ ለመማር ያለህን/ሽን/ ፍላጎት በደረጃ አስቀምጥ/ጭ/::
1ኛ/ _____ 4ኛ/ _____ 7ኛ/_____
2ኛ/ _____ 5ኛ/ _____ 8ኛ/_____
3ኛ/ _____ 6ኛ/ _____ 9ኛ/_____
5. የሂሳብ ትምህርት መማሪያ መጽሐፍ አለህ/ሽ/?
ሀ. አለኝ ለ. የለኝም
6. የሂሳብ መፅሐፍ ካለህ/ሽ/መፅሐፉን የምትጠቀመው/የምትጠቀሚው
ሀ. ክፍል ውስጥ ነው ሐ. ሀ ና ለ
ለ. መኖሪያ ቤት ነው መ. አልጠቀምበትም
7. በት/ቤቱ ቤተ መፅሐፍ የሂሳብ ትምህርትን ለማጥናት ትጠቀማለህ/ሽ/?
ሀ. እጠቀማለሁ ለ. አልጠቀምበትም
8. በት/ቤቱ ቤተ መፅሐፍ የምትጠቀም/ሚ/ከሆነ የሂሳብ ትምህርትን ለማጥናት የሚረዱ የተለያዩ መፅሐፍቶች በቤተ መፅሐፉ ውስጥ ምን ያህል ይገኛል::
ሀ. በቂ አለ ሐ. ብዛቱን አላውቅም
ለ. መካከለኛ አለ መ. ምንም የለም
9. የቤተ መፅሐፍ ሀላፊው መፅሐፍትን በማሳየት ወይም አብሮ በመፈለግ ረድቶህ/ሽ/ ያውቃል?
ሀ. አዎን ያውቃል ለ. ረድቶኝ አያውቅም ሐ. እርዳታ አልጠየኩም
10. በት/ቤቱ ቤተ መፅሐፍ የማትጠቀም/ሚ/ከሆነ ምክንያቱን ጻፍ/ፊ/::
_____
11. የሂሳብ መምህራችሁ ከቤተ መፅሐፍ መጻህፍት ፈልጋችሁ የምትሠሩት የቤት ሥራ ወይም አሳይመንት ሰጥተዋችሁ ያውቃሉ?
ሀ. ብዙ ጊዜ ሰጥተውናል ሐ. ሰጥተውን አያውቁም
ለ. ጥቂት ጊዜ ሰጥተውናል
12. የሂሳብ መምህራችሁ ለትምህርቱ የሚያስፈልጉትን የተለያዩ ግራፎች፣ ቻርቶች፣ የጂኦሜትሪ ሥዕሎችና ሞዴሎችን በሚያዘጋጁበት ጊዜ ተማሪዎችን ያሳትፋሉ?
ሀ. ብዙ ጊዜ ያሳትፋሉ ለ. አልፎ አልፎ ያሳትፋሉሐ. አያሳትፉም
13. በጥያቄ '12' ላይ የተገለፁትን የትምህርት መርጃ መሣሪያዎች መምህራችሁ በክፍል ውስጥ በመሣል ወይም የተዘጋጀውን ይዞ በመምጣት ለማሥተማሪያ ይጠቀማሉ?
ሀ. ብዙ ጊዜ ይጠቀማሉ ለ. አልፎ አልፎ ይጠቀማሉ ሐ. አይጠቀሙም
14. በት/ቤቱ በአሁኑ ጊዜ የትምህርት ማበልፀጊያ ማዕከል አለ?
ሀ. አለ ለ. የለም

15. በት/ቤቱ የትምህርት ማበልፀጊያ ማዕከል ካለ ተማሪዎች በማዕከሉ የሚጠቀሙት እንዴት ነው?
    ሀ. የት/መርጃ መሣሪያዎችን በማዘጋጀት
    ለ. በማዕከሉ ያሉትን የት/መርጃ መሣሪያዎች በመዋስ
    ሐ. ተማሪዎች እንዲገቡ አይፈቀድም
    መ. ሌላ ካለ ይገለፅ _____
16. በት/ቤቱ የት/ማበልፀጊያ ማዕከል ተማሪዎች የሚጠቀሙ ከሆነ የማዕከሉ ሀላፊ የሚያደርግላቸው እገዛ ምን ይመሥላል?
    ሀ. ተማሪዎች በማዕከሉ የት/መርጃ በሚያዘጋጁ ጊዜ ይረዳል
    ለ. አስፈላጊውን የት/መርጃ መሣሪያ በመምረጥ ይረዳል፣ያብራራል
    ሐ. በማዕከሉ ያለውን ነገር ሁሉ እንድንጠቀም ያበረታታል
    መ. ሌላ ካለ ይገለፅ _____
17. በት/ቤቱ የሂሳብ ትምህርት በቴሌቪዥን ይሠጣል?
    ሀ. አዎ ይሠጣል ለ. አይሠጥም
    ሐ. የቴሌቪዥን ስርጭት በአካባቢው የለም
18. የሂሳብ ትምህርት በቴሌቪዥን የሚሰጥ ከሆነ ስለትምህርት አሰጣጡ ያለህ/ሽ/ ሀሳብ ምንድ ነው?
    ሀ. በጣም ጥሩ ነው ለ. ጥሩ ነው ሐ. ጥሩ አይደለም
    መ. በጣም ጥሩ አይደለም
19. የሂሳብ ትምህርት የአንደኛው ሴሚስተር ውጤትህ/ሽ/ እንዴት ነው?
    ሀ. ከ75% በላይ ነው
    ለ. ከ74% - 50% ባለው መካከል ነው
    ሐ. ከ50% በታች ነው

<u>መምሪያ ሁለት</u>

ከዚህ በታች ለተሰጡት ተግባሮች የችሎታህን /ሽን/ መጠን ወይም ደረጃ ከተሠጡት አማራጮች ውስጥ በመምረጥ በተገቢው ኮለም '✓' ምልክት በማድረግ ግለጽ::

ተ.ቁ	ተግባሮች	እችላለሁ	በመጠኑ እችላለሁ	አልችልም
1	በግራፍ የተሰጡ መልዕክቶችን መረዳትና መተረጎም			
2	ለተሰጠኝ ዳታ የተለያዩ ግራፎችን መሣል			
3	የተለያዩ የጂኦሜትሪ ስዕሎችን በማሥመሪያና የተለያዩ መሣሪያዎችን በመጠቀም መሣል			
4	የተለያዩ የተሰጠ ሥዕሎችንና ሞዴሉን መግለጽ /Definition/			
5	ኮምፖሶችንና ኘሮትራክተር በመጠቀም ሰርክልና አርኮችን መሣል			
6	በእስላይድ ሩል በመጠቀም ስሌቶችን መሥራት			
7	ውስን መስመሮችን መለካት			
8	በኘሮትራክተር እንገሎችን መለካት			
9	የተለያዩ የጂኦሜትሪ ሥዕሎችንና ሞዴሎችን መለየም			
10	የተለያዩ የጂኦሜትሪ ስዕሎችንና ሞዴሎችን መጠንና ይዘት መፈለግ			

APPENDIX-D

የአዲስ አበባ ዩኒቨርስቲ
የካሪኩለምና ኢንስትራክሽን ትምህርት ክፍል
የድኅረ ምርቃ ፕሮግራም
አዲስ አበባ

በትምህርት ማበልጸጊያ ማእከል አስተባባሪዎች የሚሞላ የጽሑፍ መጠይቅ

<u>አጠቃላይ መመሪያ</u>

ይህ መጠይቅ በአንደኛ ደረጃ ሁለተኛ ሳይክል ትምህርት ቤቶች ውስጥ የሂሳብ ትምህርት መርጃ መሳሪያዎች ያሉበትን ደረጃ ለማወቅና እንዲሁም መምህራንና ተማሪዎች መርጃ መሳሪያዎቹን ለማዘጋጀትና በክፍል ውስጥ ለመጠቀም ያላቸውን ተሳትፎ፣ ትምህርት ቤቱ፣ የትምህርት ቤቱ ትማበልፀጊያ ማዕከልና ቤተ መጽሐፍ የትምህርት መርጃ መሳሪያዎቹን በማዘጋጀት ረገድ የሚሰጡትን ድጋፍ በማሰባሰብ ላይ ያተኮረ ነው። በመሆኑም ብዚህ ረገድ ባሉት ችግሮች አኳያ <u>የማዕከል አስተባባሪ(ዎች)</u> አመለካከት ምን እንደሚመስል መረጃዎችን ለመሰብሰብና ተስሞሚ ሊሆኑ የሚችሉ የመፍትሄ ሐሳቦችን ለመጠቆም ነው።

ስለዚህ ለዚህ ጥናት መሳካት እራሪስዎ ለመጠይቁ የሚሰጡት እውነተኛ ምለሽ ከፍተኛ አስተዋጽኦ ስለሚኖረው የተሟላ ምላሽ እንዲሰጡኝ እጠይቃለሁ። ስምዎን መጻፍ አያስፈልግም። ግልፅ ሆነው የሚሰጡት ማንኛውም ምረጃ ለጥናቱ አላማ ብቻ ከሚውል በቀር በሚስጢር እንደሚያዝ አረጋግጣለሁ። ጊዜዎን ሰውተው ላደረጉልኝ ትብብር በቅድሚያ ከልብ የመነጨ ምስጋናዬን አቀርባለሁ።

የት/ቤቱ ስም _____
የማዕከሉ አስተባባሪ የት/ደረጃ _____ እድሜ _____ ጸታ_____
አሁን በያዙት ቦታ የሥራ ልምድ_____ ዓመት

መምሪያ አንድ

ከዚህ በታች ላሉት ጥያቄዎች ከተሰጡት አማራጮች ውስጥ ትክክለኛውን መልስ ፊደሉን በመክበብ ይመልሱ። አማራጭ ላልተሰጣቸው ደግሞ አጭር መልስ በተሰጠው ቦታ ላይ ይጻፉ።

1. የት/መርጃ መሳሪያዎች ማዘጋጀትን በተመለከተ የወሰዱት ሥልጠና ካለ በምን ደረጃ ነው?
   ሀ. በኮሌጅ ለ. በተቁዋም ሐ. ሌላ ካለ ይግለፁ_____
2. ለማእከል አስተባባሪነት የሚያበቃ ልዩ ሥልጠና ወይም ዋርክሾፕ ወስደዋል?
   ሀ. ወስጃለሁ ለ. አልወሰድኩም
3. ሥልጠና ወስደው ከሆነ ለምን ያህል ጊዜ በተደጋጋሚ ወስደዋል?_____
4. የስልጠናው ጊዜ ርዝመት፣
   ሀ. ሎአንዲ ወረ ለ. ለሁለት ወር ሐ. ለሦስት ወር መ. ሌላ ካለ _____
   ስልጠናውን የወሰዱበትን ዓ.ም. ይግለጹ _____
5. የሥልጠናው አይነት ምን ይመስላል?
   ሀ. ማቴሪያል ፕሮዳክሽን ለ. ሚዲያ ሰርቪስ ሐ.የማቴሪያል ግምገማ ቴክኒክ
   መ.ፕሮሶኔል ማኔጅመንት ሠ. ኢዱኬሽናል ሳይኮሎ
6. የማዕከሉ የሥራ ስዓት መቼ ነው?
   ሀ. ሙሉ የሥራ ቀን ለ. ግማሽ የሥራ ቀን
   ሐ. ሳምንቱን በሙሉ የእረፍት ቅናትን ጨምሮ መ. የተለየ ከሆነ ይግለጹ
7. የማዕከሉ አስተባባሪ በግልጽ የታወቀ የሥራ ድርሻ አለው?
   ሀ. አለው ለ. የለውም
8. የማዕከሉን ዓላማና ተግባር የሚገልጽ መመሪያ አለ?
   ሀ. አለ አውቀዋለሁ ለ. የለም አውቀዋለሁ ሐ. የለም አላውቀውም
   መ. ሌላ መልስ ካለ _____
9. ከማዕከል አስተባባሪነት በተጨማሪ የሚያስተምሩት ትምህርት ካለ በሳምንት ስንት ክፍለ ጊዜ ነው? _____ የሚያስተምሩት የትምህርት ዓይነትስ? _____
10. የማዕከል አስተባባሪውን የሚመድበው የትኛው አካል ነው?
    ሀ. የወረዳው ት/ቤቶች ጽ/ቤት ለ. ርዕሰ መምህሩ
    ሐ. የመምህራን ጉባኤ መ. ሌላ ከሆነ ይገለጽ _____
11. ማዕከሉ የሚንቀሳቀስበት በጀት ካለው ከየት ነው የሚገኘው?
    ሀ. ከወረዳው ት/ቤቶች ጽ/ቤት
    ለ. ከት/ቤቱ የውስጥ ገቢ
    ሐ. ከሌላ ከሆነ ይገለጽ _____

12. ለማዕከሉ ከዞኑ/ከወረዳው ት/ቤቶች ጽ/ቤት የሚደረግለት ድጋፍ ምን ያህል ነው?
ሀ. በቂ ነው ለ. መጠነኛ ነው ሐ. ዝቅተኛ ነው መ. የለም
13. ለማዕከሉ ከት/ቤቱ አስተዳደር የሚደረግለት ድጋፍና ክትትል ምን ያህል ነው?
ሀ. በቂ ነው ለ. መጠነኛ ነው ሐ. ዝቅተኛ ነው መ. የለም
14. በማዕከሉ ውስጥ የት/መርጃ መሣሪያዎችን በማዘጋጀት ረገድ ዝግጅቱ ሁሉንም የት/ዓይነቶች ሚዛናዊ በሆነ መንገድ ይሸፍናል ብለው ያምናሉ?
ሀ. አምናለሁ ለ. አላምንም
15. በማዕከሉ ውስጥ ስለ ት/መርጃ ማሳሪያዎች አዘገጃጀትና አጠቃቀም የሚያብራሩ መጽሐፎች ወይም ጽሑፎች አሉ?
ሀ. አሉ ለ. የሉም
16. የአንዳኛ ደረጃ ሁለተኛ ሳይክል የሂሳብ ሥርዓተ ትምህርትን በምን ያህል ያውቁታል?
ሀ. በጥሩ ሁኔታ ለ. በመጠኑ ሐ. በጥቂቱ መ. አላውቅም
17. የ7ኛ እና የ8ኛ ክፍል የሂሳብ ሥርዓተ ትምህርት ማቴሪያሎች ማለትም ሲለበስ፣ የመምህሩ መምሪያና የተማሪው መጽሐፍ በማዕከሉ ውስጥ ይገኛሉ? የ«√» ምልክት ያድርጉባቸው::
( ) የ7ኛ የሒሳብ ሲለበስ ( ) የ8ኛ የሒሳብ ሲለበስ
( ) የ7ኛ የመምህሩ መምሪያ ( ) የ8ኛ የመምህሩ መምሪያ
( ) የ7ኛ የተማሪው መምሪያ ( ) የ8ኛ የተማሪው መምሪያ
18. በጥያቄ «16» ላይ የተገለጹት ማቴሪያሎች በማዕከሉ ካሉ በሲለበሱና በመምህሩ መምሪያ ላይ ከተጠቆሙት የት/ምርጃ መሳሪያዎች ውስጥ ምን ያህሉ በማዕከሉ ይገኛሉ?
ሀ. አብዛኞቹ ይገኛሉ ለ. ጥቂቶቹ ይገኛሉ
ሐ. ግማሾቹ ይገኛሉ መ. በጣም ጥቂቶቹ ይገኛሉ
19. በጥያቄ «16» ላይ ይተገለጹት የሥርዓተ ትምህርት ማቴሪያሎች በማዕከሉ ከሌሉ ለተጠቀሱት ክፍሎች የት/መርጃ መሣሪያዎችን ለማዘጋጀት ይሚጠቀሙት በምንድን ነው?
_____
20. በአሁኑ ጊዜ ማዕከሉ አገልግሎት ይሚሰጠው
ሀ. ለመምህራን ብቻ ነው ለ. ለተማሪዎት ብቻ ነው
ሐ. ለመምህራንና ለተማሪዎች ብቻ ነው መ. ሌላ ካለ ይገለጽ
21. በማዕከሉ ውስጥ የሚገኙትን የት/መርጃ መሳሪያዎች በትምህርት አይነት፣ በክፍል ደረጃ፣ ብዛትና ምንጫቸውን የሚያሳይ ዝርዝር መዝገብ አለ?
ሀ. አለ ለ. የለም
22. የመምህራንን ዕለታዊ የማዕከል ተሳትፎ የሚገልጽ መዝገብ አለ?
ሀ. አለ ለ. የለም
23. መምህራን ከማዕከሉ የሚዋሱትን የት/መርጃ መሳሪያ አይነትና መመለሳቸውን የሚገልጽ መዝገብ አለ?
ሀ. አለ ለ. የለም
24. የሂሳብ መምህራን ወደ ማዕከሉ ምን ያህል ጊዜ ይመጣሉ?
ሀ. ብዙ ጊዜ ለ. አልፎ አልፎ ሐ. ጥቂት ጊዜ መ. አይመጡም
25. ብዙዎቹ የሂሳብ መምህራን ማዕከሉን የሚያዘወትሩት መቼ ነው?
ሀ. በሴሚስተር መጀመሪያ ሰሞን ለ. በሴሚስተር ውስጥ ብዙውን ጊዜ
ሐ. በግምገማ ሰሞን መ. መቼም አይመጡም
26. የት/መርጃ መሳሪያዎችን ለማዘጋጀት የተለየ የሙያ ምክርና የቴክኒክ ድጋፍ የሚጠይቁ የሂሳብ መምህራን አሉ?
ሀ. አለ ለ. የለም
27. የሂሳብ መምህራን የሚያስፈልጋቸውን የትምህርት መርጃ መሳሪያ ራሳቸው ለማዘጋጀት ሲመጡ ማዕከሉ ጥሬ ዕቃዎችን በማቅረብ ይረዳቸውል?
ሀ. በበቂ ሁኔታ ይረዳል ለ. በመጠኑ ይረዳል
ሐ. አይረዳም መ. ሌላ ካለ ይገለጽ _____
28. የተማሪዎች የማዕከል ተሳትፎ ምን የመስለል?
ሀ. ከፍተኛ ነው ለ. በመጠኑ ይረዳል
ሐ. ዝቅተኛ ነው መ. ማዕከሉ ለተማሪዎች አይፈቀድም
ሠ. ሌላ ካለ ይገለጽ _____
29. የሂሳብ መምህራን የማዕከል ተሳትፎ ምን ይመስላል?
ሀ. ጥሩ ነው ለ. መካከለኛ ነው ሐ. ዝቅተኛ ነው መ. ሌላ ካለ ይገለጽ _____
30. ተማሪዎች በሂሳብ መምህራቸው የቤት ሥራ ወይም አሳይንመንት ሲሰጣቸው ወደ ማዕከል ይመጣሉ?
ሀ. ብዙዎች ይመጣሉ ለ. ግማሽ ያህሉ ይመጣሉ
ሐ. ጥቂቶቹ ይመጣሉ መ. አይመጡም

31. አብዛኞቹ በማዕከል ውስጥ ያሉት የሂሳብ ትምህርት መርጃ መሳሪያዎች ምንጫቸው ከየት ነው?
    ሀ. በማዕከሉ አስተባባሪ የተሰሩ ናቸው
    ለ. በሂሳብ መምህራን የተሰሩ ናቸው
    ሐ. ከመንግሥት በስጦታ የተገኙ ናቸው
    መ. በተማሪዎች የተሰሩ ናቸው
    ሠ. መንግስታዊ ካልሆኑ ድርጅቶች በእርዳታ የተገኙ ናቸው
    ረ. ሌላ ካለ ይገለጽ _____

32. በማዕከሉ ውስጥ ያሉትን የሂሳበ ት/መርጃ መሣሪያዎች የ7ኛ እና የ8ኛ ክፍል ሂሳብ መምህራን ምን ያህል ይጠቀሙባቸዋል?
    ሀ. ሁል ጊዜ ይጠቀሙባቸዋል ለ. አልፎ አልፎ ይጠቀማሉ
    ሐ. ጥቂት ጊዜ ብቻ ይጠቀማሉ መ. አይጠቀሙም

33. ለት/ማበልጸጊያ ማዕከሉ ዋና ዋና ችግሮች ናቸው የሚሏቸውን ከዚህ በታች ከተሰጡት ውስጥ (ሌላም ካለዎት ጨምረው) የችግሮቹን ክብደት 1ኛ፣ 2ኛ ... በማለት ክፌት በተሰጠው ቦታ ላይ ይጻፉ::
    _____ የማምረቻ መሳሪያዎች እጥረት
    _____ የት/መርጃ መሳሪያወችን ለማምረት የሚያስፈልጉ ጥሬ ዕቃዎች እጥረት
    _____ የሰለጠነ የሰው ኃይል እጥረት
    _____ በቂ ያልሆነ በጀት (የበጀት እጥረት)
    _____ የበላይ አለቆች ትኩረት ማነስ
    _____ ግልጽ የሆነ የሥራ መመሪያ አለመኖር
    _____ የመምህራን በማዕከሉ የመጠቀም ፍላጎት ማነስ
    _____ ልለ ካለ ይጨምሩ _____

APPENDIX-E

የአዲስ አበባ ዩኒቨርስቲ
የካሪኩለምና ኢንስትራክሽን ትምህርት ክፍል
የድኅረ ምርቃ ፕሮግራም
አዲስ አበባ

ባርዕሠ መምህራን የሚሞላ የጽሑፍ መጠይቅ

<u>አቀቃላይ መምሪያ</u>

ይህ መጠይቅ በአንደኛ ደረጃ ሁለተኛ ሣይክል ት/ቤቶች ውስጥ የሂሳብ ትምህርት መርጃ መሣሪያዎች ያሉበትን ደረጃ ለማወቅና እንዲሁም መምህራንና ተማሪዎች መርጃ መሣሪያዎቹን ለማዘጋጀትና በክፍል ውስጥ ለመጠቀም ያላቸውን ተሣትፎ፣ ት/ቤቱ የት/ቤቱ ት/ማበልፀጊያ ማዕከልና ቤተ መጽሐፍት የት/መርጃ መሣሪያዎቹን በማዘጋጀት ረገድ የሚሠጡትን ድጋፍ በማሣሠብ ላይ ያተኮረ ነው። በመሆኑም በዚህ ረገድ ባሉት ችግሮች አኳያ የርዕሰ መምህራን አመለካካት ምን እንደሚመስል መረጃዎችን ለመሰብሰብና ተስማሚ ሊሆኑ የሚችሉ የመፍትሄ ሐሳቦችን ለመጠቆም ነው።

ለዚህ ጥናት መሣካት እርስዎ ለመጠይቁ የሚሰጡት እውነተኛ ምላሽ ከፍተኛ አስተዋጽኦ ስለሚኖረው የተሟላ ምላሽ እንዲሰጡኝ እጠይቃለሁ። ስምዎን መጻፍ አያስፈልግም። በተጨማሪም ግልፅ ሆነው የሚሰጡት ማንኛውም ምረጃ ለጥናቱ አላማ ብቻ ከሚውል በቀር በሚስጢር እንደሚያዝ አረጋግጣለሁ። ጊዜዎን ሰውተው ላደረጉልኝ ትብብር በቅድሚያ ከልብ የመነጨ ምስጋናዬን አቀርባለሁ።

የወረዳው ስም _____
የት/ቤቱ ስም _____
የት/ቤቱ ርዕሰ መምህር የት/ደረጃ _____ ዕድሜ _____ ፆታ _____
አሁን በያዙት ቦታ የሥራ ልምድ _____ ዓመት

መምሪያ አንድ

ከዚህ በታች ላሉት ጥያቄዎች ከተሰጡት አማራጮች ውስጥ ትክክለኛውን መልስ ፊደሉን በመክበብ ይመልሱ። አማራጭ ላልተሰጣቸው ደግሞ አጭር መልስ በተሰጠው ቦታ ላይ ይጻፉ። በምልክት ለሚመለሱ ጥያቄዎች በተሰጠው ቦታ ምልክቱን በማድረግ ይግለጹ።

1. ት/ቤቱ የተመሠረተበት ዓ.ም _____
2. ት/ቤቱ ከዞን/ ከወረዳ ት/ቤቶች ጽ/ቤት የሂሳብ ት/መርጃ መሣሪያዎችን በተመለከተ የሚያገኘው ድጋፍ አለ? ሀ. በቂ ድጋፍ አለ ለ. ጥቂት ድጋፍ አለ ሐ. የለም
3. የጥያቄ «2» መልስዎ 'ሀ ወይም ለ' ከሆነ ከዚህ በታች ከተዘረዘሩት የት/መርጃ መሣሪያዎች ውስጥ ከዞኑ/ ከወረዳው ለት/ቤቶች የተሰጡትን ብቻ የ«√» ምልክት ከመሣሪያዎቹ ፊት በተሰጠው ቅንፍ ውስጥ ያኑሩ።

( ) የሂሳብ ትምህርት ሲለበሶች	( ) የግራፍ ሰሌዳዎች
( ) የሂሳብ/ የመምህሩ መምሪያዎች	( ) ግራፊክስ/ ቻርቶች፣ ግራፎች፣
( ) የሂሳብ ት/የተማሪው መማሪያ መጽሐፍት	ስዕሎች
( ) ሌላ የሂሳብ ት/ ማጣቀሻ መጽሐፍት	( ) የማሳያ ሰሌዳዎች
( ) ባለሦስት ጐን ሞዴሎች	( ) የተለያዩ ከለር ጠመኔዎች
/ሲሊንደር፣ ፕሪዝም፣ ኮን፣ ወዘተ.../	( ) ቴሌቪዢን
( ) ኮምፖሶችና ፕሮትራክተሮች	( ) ቪዲዮና የቪዲዮ ፊልሞች
( ) ማስመሪያዎች	( ) ፕሮጀክተርና ፊልሞች
( ) የጥቁር ሰሌዳዎች	( ) ኮምፒዩተር

4. ከላይ ከተዘረዘሩት የት/መርጃ መሣሪያዎች ውስጥ ዞኑ /ወረዳው ለት/ቤቱ የሚሰጠውን የምታገኙት በምን መልኩ ነው?
   ሀ. በቅናሽ ዋጋ ት/ቤቱ ይገዛል ለ. በመንግሥት ወጭ ለት/ቤቱ በነጻ ይሰጣል
   ሐ. ሌላ ካለ ይገለጽ _____
5. በት/ቤቱ የት/ማበልፀጊያ ማዕከል አለ? _____ካለ የተመሠረተበት ዓ.ም. _____
6. ከዞን/ ከወረዳ ለት/ማበልፀጊያ ማዕከልና ቤተ መጽሐፍ ማጠናከሪያ የሚሰጥ በጀት አለ?
   ሀ. ለማዕከል ብቻ አለ ለ. ለቤተ መጽሐፍ አለ
   ሐ. ለሁለቱም (ሀ እና ለ) አለ መ. የለም ሠ. የተለየ ካለዎት
7. የጥያቄ «6» መልስ ከዞን/ ከወረዳ የሚሰጥ በጀት አለ ከሆነ መጠኑን እንዴት ያዩታል?
   ሀ. በቂ ነው ለ. መካከለኛ ነው ሐ. ዝቅተኛ ነው
8. የጥያቄ «6» መልስዎ የለም ከሆነ የት/ማበልፀጊያ ማዕከሉ የሚንቀሳቀሰው በምን ገቢ ነው? _____
9. የት/ማበልፀጊያ ማዕከሉ የሥራ ስዓት፣ ሀ. አለው ለ. የለውም
10. የት/ማበልፀጊያ ማዕከሉ የሥራ ስዓት፣ ሀ. ሙሉ የሥራ ቀን ለ. ግማሽ የሥራ ቀን
    ሐ. ሳምንቱን ሙሉ የእረፍት ቀናትንም ጨምሮ መ. የተለየ ካለዎት

11. የት/ቤቱ የሂሳብ መምህራን የማዕከል ተሳትፎአቸውን እንዴት ይገመግሙታል?
ሀ. ከፍተኛ ነው ለ. መካከለኛ ነው ሐ. ዝቅተኛ ነው መ. በጣም ዝቅተኛ ነው
12. በት/ቤቱ ቤተ መጽሐፍ ካለ የሂሣብ ትምህርትን ለመማርና የሚረዱ ማጣቀሳ መጽሐፍት በምን ደረጃ ይገኛሉ? ሀ. በቂ አሉ ለ. ጥቂት አሉ ሐ. ጭራሽ የሉም
13. የት/መረጃ መሣሪያዎችን እጥረት ለመቅረፍ ት/ቤቱ ያደረገው ጥረት አለ?
ሀ. አለ ለ. የለም
14. የጥያቄ «13» መልስ 'አለ' ከሆነ ከዚህ በታች ከተዘረዘሩት ውስጥ ከየትኛው ጋር ችግራችሁን ገልፃችሁ ግንኙነት አድርጋችኋል? /ከአንድ በላይ መልስ መስጠት ይቻላል/
ሀ. መንግሥታዊ ካልሆኑ ድርጅቶች ሐ. ከግለሰቦች
ለ. ከአካባቢው ሕብረተሰብ መ. ሌላ ካለ ይገለጽ _____
15. ት/ቤቱ የት/መርጃ መሣሪያዎችን ለማሟላት ላደረገው ጥረት ምላሹ እንዴት ነው?
ሀ. ጥሩ ነው ለ. መካከለኛ ነው ሐ. ዝቅተኛ ነው
16. የዞኑን/ የወረዳውን ጽ/ቤት ለት/ማበልፀጊያ ማዕከሉ የሚሠጡትን ድጋፍ እንዴት ያዩታል?
ሀ. ከፍተኛ ነው ለ. መካከለኛ ነው ሐ. ዝቅተኛ ነው መ.የለም
17. መንግሥታዊ ያልሆኑ ድርጅቶች (NGO's) ለት/ማ/ማዕከሉ የሚሠጡትን ድጋፍ እንዴት ያዩታል?
ሀ. ከፍተኛ ነው ለ. መካከለኛ ነው ሐ. ዝቅተኛ ነው መ.የለም
18. ሕብረተሰቡና የአካባቢው የእጅ ባለሙያዎች ለት/ማ/ማዕከሉ የሚሠጡትን ድጋፍ እንዴት ያዩታል?
ሀ. ከፍተኛ ነው ለ. መካከለኛ ነው ሐ. ዝቅተኛ ነው መ.የለም
19. የትም/ቤቱ አስተዳዳር ለት/ማ/ማዕከሉ የሚሰጡትን ድጋፍ እንዴት ያዩታል?
ሀ. ከፍተኛ ነው ለ. መካከለኛ ነው ሐ. ዝቅተኛ ነው መ.የለም
20. የሂሣብ መምህራን የት/መ/መሣሪያዎችን በተመለከተ ለእርስዎ ችግራቸውን አመልክተው ያውቃሉ?
ሀ. ቃውቃሉ ለ. አያውቁም
21. አመልክተው ከሆነ የእርስዎ ምላሽ ችግራቸውን ምን ያህል ፈቷል ብለው ያምናሉ?
ሀ. በተሟላ ሁኔታ ለ. በመጠኑ ሐ. በጣም በጥቂቱ መ.አልተፈታም
22. መምህራኑ ካመለከቷቸው ችግሮች ውስጥ የተወሰኑትን ይፃፉ::
_____ _____
23. በት/ቤቱ ውስጥ የሚከሰተውን የት/መርጃ መሣሪያዎች እጥረት ለመቅረፍ እርስዎ የሚከተሉት የትኛውን አካሄድ ነው? /ከአንድ በላይ መመለስ ይቻላል/
ሀ. ለመንግሥት ማመልከት ለ. በግሌ መፍትሔ መፈለግ
ሐ. እስታፉን በማሳተፍ መ. ተማሪዎችን በማሳተፍ
ሠ. ወላጆችን በማሳተፍ ረ. ሌላ ካለ ይገለጽ _____
24. የት/መርጃ መሣሪያዎችን አዘውትረው ለሚያዘጋጁና በክፍል ውስጥ ለሚጠቀሙ መምህራን የሚሠጥ ማበረታቻ አለ?
ሀ. አለ ለ. የለም
25. በመምህራን ግምገማ ወቅት ተማሪዎች የሂሣብ መምህራኖቻቸው የት/መርጃ መሣሪያዎችን በክፍል ውስጥ መጠቀማቸውን ለሚጠይቀው ጥያቄ/ዎች/ የሚሠጡት ውጤት በአብዛኛው እንዴት ነው?
ሀ. ከአራት በላይ ለ. ሦስት ሐ. ከሁለት በታች
26. በት/ቤቱ የሂሣብ ትምህርት የተማሪው መማሪያ መጽሐፍ ለተማሪዎች የሚሠራጨው እንዴት ነው?
ሀ. በቅናሽ ይሸጥላቸዋል ለ. በት/ቤቱ መጠነኛ ኪራይ
ሐ. በመንግሥት ወጭ በነጻ ይታደላቸዋል መ. ሌላ ካለ ይገለጽ _____
27. የ7ኛ እና የ8ኛ ክፍል የሂሣብ መጽሐፍት አንድ መጽሐፍ ለስንት ተማሪ ተዳርሷል?
የ7ኛ አንድ መጽሐፍ ለ _____ተማሪ/ዎች/
የ8ኛ አንድ መጽሐፍ ለ _____ተማሪ/ዎች/
28. ት/ቤትዎ የት/መርጃ መሣሪያዎችን በተገቢውና በተሻለ መንገድ ለመጠቀም ትኩረት ሰጥቷል ብለው የሚያምኑ ከሆነ ከዚህ በታች ከተዘረዘሩት ለየትኛው በይበልጥ ክብደት ሰጥቷል?
ሀ. ለቤተ መጽሐፍት ለ. ለት/ማበልጸጊያ ማዕከል ሐ. ለቤተሙከራ
መ. ለሥልጠና /ወርክሾፕ/ ሴሚናር/ ሠ. ሌላ ካለ ይገለጽ_____
29. የት/ቤት ኃላፊዎች ሁሉ ከመምሕራን የሚጠበቀውን የሥራ ውጤት የተሟላና ውጤታማ ለማድረግ ለት/ቤታቸው የት/ማበልፀጊያ የማዕከላትንና ቤተ መጽሐፍትን ማደራጀትና ማጠናከር ይጠበቅባቸዋል:: እርስዎ ይህንን ኃላፊነት እንዴት ተወጥቼዋለሁ ይላሉ?
ሀ. በከፍተኛ ደረጃ ለ. በመካከለኛ ደረጃ ሐ. በዝቅተኛ ደረጃ

APPENDIX-G

OBSERVATION FORM: SPC & Library

Form 3-03

Wereda _____ Name of the School _____

1. SPC room(s) size _____ X _____.
2. Arrangement of IMs in SPC is by:
   Subject ( ) Grade & subject ( )
   Department ( ) Mixed ( ) No arrangement at all ( )
3. The available IMs in SPC which could be used for mathematics Instruction are:
   Produced by teachers ( ) Purchases ( )
   Produced by SPC coordinators ( ) Borrowed ( )
   Produced by students ( ) Donated ( )
4. Row materials (such as graph papers, different color markers, different color inks, materials to construct models, etc) for production of IMs for mathematics instructions are:
   Available ( ) Not available ( )
5. Availability of mathematics curricular materials in SPC:

Curricular Materials	Grade	Available	Not Available
Syllabuses	7		
	8		
Teacher Guides	7		
	8		
Student Textbook	7		
	8		

6. Availability of different facilities in SPC:

Facility	Available	Not Available	Remark
Room for production of IMs Room for storage of IMs Room for coordinators office Display shelves Workbench Hand tools			

7. Record of frequency of teachers' IMs utilization in SPC (borrowing List).
   Available ( ) Not Available ( )
8. List of IMs (catalogue) found in SPC.
   Available ( ) Not Available ( )
9. Availability of the following IMs in the school:

IMs	Available	Not Available	Quantity
Bulletin board Graph board Television set Film projector Video Computer			

10. Library working hour. Full time ( ) half time ( )
11. Library size _____X _____.
12. Capacity of library _____ seats.
13. The availability of the following materials in the library:

Materials	Available	Not Available	Remark
Book shelves Reading tables Math's reference book Subject catalogue			

APPENDIX-F

Classroom Observation Instrument

A. General Information

1. Wereda _____ Name of School _____.
2. Grade and Section Observed _____ Date _____.
3. Class Size _____ Length of Observation time _____.
4. Teacher Qualification _____ Teaching Experience _____.
5. Roll number of Students having Math's textbook _____
   _____.
6. Number of students having math's textbook during observation _____.
7. List of IMS Presented in the Classroom _____
   _____.
8. The source(s) of IMS Used _____
   _____
   _____

Classroom Observation Results (Check List)

	Classroom Environment Variables	Check	
		Yes	No
1	All students have adequate seat in the classroom (no more than 3 students sit on a desk).		
2	There are instructional displays in the classroom.		
3	The sitting arrangement permits easy teacher movement.		
4	The blackboard is readily viewed from all positions in the classroom.		
	Teacher's use of IMs		
1	Give class/homework from the textbook.		
2	Let students to do class/homework on the blackboard.		
3	Non-textbook IMs listed in the lesson plan are presented.		
4	IMs suggested in the curricular materials for the topic are presented.		
5	Let students to use and do exercises from the text by themselves.		
6	Draw the needed diagrams/sketches on the blackboard.		
7	Repeatedly use the diagrams to clarify the content.		
8	Writing on the blackboard is legible.		
9	Resources of the environment are used to provide practical applications of the IMs.		
10	When the teacher use the IM(s) focuses on meaning and promoting student understanding.		
11	Involve learners by using controlled practice (e.g.: - invite and answer questions, discussions, dialogue).		
12	Check students' performance or demonstration of skills expected tobe learned from experience (e.g.: - drawing graphs construct models, solve problems, defining, proving, etc).		

14. Library services given to teachers:
    Reference room ( ) Information about arrivals ( )
    Borrowing ( ) Others services _____.
15. Library services given to students.
    Reference room ( ) Guidance for use
    Borrowing ( ) Others _____.

OBSERVATION CHECKLIST: SPC (inventory form)

Wereda _____ Name of school _____

Assessment of the availability of IMs suggested in the syllabus/ Teachers Guide of Grade 7 &8

Directions: If the suggested IMs available in the SPC write the available quantity in the column. Indicate the source from where it comes (e.g.: - Teacher made, student made, borrowed, purchased, donated, etc.).

Unit	Suggested IMs in the Syllabus/ T.G. (Grade 7)	Available quantity	Source
1	• Graphs on coordinate system • Square with 100 equal unit subdivision • Pictures of parts of whole • Table of proportions • Charts showing algorithms for solving problems of percent • Survey of line, bar, and circle graphs		
2	• Picture of number ray • Slide rule for addition of rational numbers • Survey of rules for add, mult, dividing with rational numbers		
3	• Balance • Survey of rules transformation • Picture of number line		
4	• Ruler • Compasses • Model of circles • Survey of theorems on circles • Protractor • Summary table of the unit		
5	• Numerical table • Models of right prisms • Models of right cylinders • Models cube • Models of rectangular right prisms • Models of triangular right prisms • Summary table of units		

Assessment of the availability and use of IMs suggested in the syllabus/ Teachers Guide of grade 8

Unit	Suggested IMs in the Syllabus/ T.G. (Grade 8)	Available quantity	Source
1	• Charts showing properties of operations with rational nos • Charts showing the rule for multiplying two binomials • Charts showing the rules for converting products into sums		
2	• Tables and venn diagrams showing representations of relations • Graphs of simple relations • Ruler • Charts showing sequences • Charts showing the four quadrants of coordinate plane • Spuared paper • Flash cards containing rule of transformation • Chats containing the rules for removing brackets • Charts showing the steps for solving word problems		
3	• Numerical table &Table of values • Chart showing the relationship between squaring and extracting square roots • Charts which shows the steps how the point which corresponds to $\sqrt{2}$ is obtained by construction		
4	• Figures representing a path, closed path, simple closed path • Models showing different plane figures		
5	• Set square, Ruler, colored chalk, compass • Charts with similar triangles • Charts containing steps for construction similar triangles using similarly theorems		
6	• Protractor, set square, ruler		
7	• Flash cards containing the similarity theorems • Models of cylinders and prisms • Models of different pyramids • Models of circular cones • Models of spheres		

APPENDIX-H

OBSERVATION OF DOCUMENTS

Form 3-04

1. Observation of SPC Borrowing List. School Name _____

Grade	Teacher code	Types of IMs borrowed from SPC by Mathematics Teachers of grades 7&8 in 1½ year	Frequency per semester

2. Observation of grade 7&8 Mathematics Teachers Lesson plans

Teacher Code	IMs listed in the lesson plan (in the 1993 E.C.)	