PERFORMANCE OF SENIOR SECONDARY STUDENTS IN BASIC MAPWORK SKILLS

BY

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ABSTRACT

Being components of the overall geographic education, mapwork skills are means to the deep understanding of the other components. As a result, geographic education, whatever the level be, can not be complete without the mastery of at least the basic mapwork skills. Review of literature reveals that this fact is duely recognized by professional geographers, geography educators and curriculum experts including the Social Sciences Panel of the Ethiopian Ministry of Education. However, whether or not students in our schools have really developed such skills was not discovered up to the present. This study was aimed at the investigation of the extent to which students of Addis Ababa developed the basic mapwork skills by the time they complete their secondary education.

A performance test was prepared and administered to 150 sample students of four government and two mission schools. Data relating to the overall academic performance of the students was acquired from the record offices of the concerned schools. The students also filled in questionnaires meant to gather information about the progress and problems of

teaching mapwork skills in their respective schools. Similar questionnaires were prepared to be filled in by geography teachers of the same schools. Besides filling in the questionnaires, Geography Department Heads and two most senior teachers of geography were interviewed.

The data analysis revealed that the performance of students in basic mapwork skills is very low. Most of them were not able to answer correctly even half of the items in the test. The performance of students of mission schools was relatively better than that of students of government schools. The study also suggested that performance in mapwork skills is positively correlated with students' achievement in mathematics, geography and their grand average.

Among the factors that negatively affected achievement in mapwork skills are found to be the chronic scarcity of teaching aids, shortage of time, unfavourable classroom conditions, lack of sufficient knowledge about mapwork skills on the part of the teachers, lack of interest on the part of the students, and poor content structure of the map-reading textbooks being used.

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CHAPTER ONE

INTRODUCTION

1.1. Background of the Study

A map is defined as a representation on a flat surface of all or part of the earth's surface to indicate physical, political or other features, each point on the diagram corresponding to a geographical position according to a definite scale or projection (Rao, 1990: 217). Dale (1959:5) in his part, defined maps very briefly as drawings of part of the earth's surface on a small scale whereas, Farrant (1980: 298) asserts that they are symbolized summaries of the real earth.

Hilton (1967: 1-2) categorized maps as topographical, statistical (or distribution) and atlas maps. Topographical maps show the natural features of a town and a piece of a country. Statistical or distribution maps are maps which show the distribution of rainfall, temperature, crops, minerals and many other things of interest in geographical study. Atlas maps, in their part, can be put into one of these categories but on a much smaller scale, and show the whole country, continent or even the world on a single page.

Kalaluka (1986:1) classified maps into four groups that are essentially similar to the category by Hilton (1967: 1-2). The four groups are physical, political, economic and distribution maps. Physical maps, according to Kalaluka, show only the shape and position of physical features whereas political

maps indicate political divisions of the world, continents and individual countries including, sometimes, capital cities and big towns. Economic maps, as their name shows, give information of economic interest only. The last of this category are distribution maps that are designed to show the distribution of objects and phenomena.

Maps, irrespective of their types, have tremendous importance. The earliest purpose for making a map, as Wareham (1969: 1) stated, was to enable men to show each other how to travel from one place to another. We can still use maps to travel over and explore the world further. The detailed information a map gives us can be a real source of delight, and has a unique capacity to stir our imagination (Hilton, 1967: 1). Having stressed the role maps play in giving accuracy to the ideas and impressions, Hilton forewarded a conclusive remark by saying that: "On it (map) can be set down or summarized most of the facts which a student of geography needs to know, in a form which keeps before him (as a page of text or a column of figure can never do) their position and distribution on the surface of the earth."(P. 1)

Maps are fundamental in the study of geography and their use is almost unlimited (Last, 1960: 48). Without maps, says Last (1960:48), it would be impossible to imagine the nature of parts of the surface of the earth which are distant and which we have never seen. Further explaining this point, Last asserts that "with the aid of maps we can represent the

relief, the climate, the vegetation, the distribution of population, the effect of man's activities: agriculture, industry, roads, railways, settlements; and many other aspects of geographical study (P.47).

The statement of Roselius (1983: 94) also shows the central position maps have in geographic study: "Someone once said that if something can be presented by means of a map, it is part of geography. If it can not, then it is not." Similarily, Grisdale (1965: 31) said, "Geography is maps." Explaining the truth of the statement, Grisdale forcefully argued that without a proper working knowledge of maps a geography student is crippled, he/she can only understand in part; and his/her methods of expression are severly limited.

Briault (1960: 17) seems to attribute someone's determination to pursue geographic study partly to interest in map when he says, "It may be that you are pursuing geography the level at which it forms an essential part of the education of every intellectual citizen, partly because you like maps." (P.17). Another person to acknowledge the role of maps in geography instruction is Kennamer (1963: 150). Kennamer says that maps have distinctive functions in geographic instruction for the very fact that they present certain types of information better than any other medium.

Broek (1980: 4), Ajaegbu (1980: 40) and Pitchard (1986:1) summarized academic and non-academic functions of maps as follows:

1. Eliciting information such as the distribution pattern of phenomena;
2. Discerning spatial relationships between various phenomena;
3. Making statistical and descriptive analysis (on space);
4. Identifying geographical problems for study purposes; and
5. Communicating the results of research in a more summarized form.

To make use of such academic and non-academic benefits obtained from maps, one has to develop the skill to read and interprete them. In relation to this, Kennamer (1963: 156-7) argues that special skills are needed to use maps as sources of information, as tools for developing spatial concepts, as records of experiences, and as materials for making inferences. Continuing his discussion in this line, Kennamer (P.156-7) specifies fourteen types of mapwork skills that determine the degree to which a reader can interprete a map. These are:

1. Reading direction.
2. Reading and using latitude and longitude for locational purposes.
3. Measuring distance by use of scale.
4. Recognizing and expressing relative locations.
5. Recognizing, interpreting and translating map symbols into reality.

6. Orienting the map.
7. Understanding merits and demerits and particualr uses of different map projections.
8. Using and understanding common geographical terms.
9. Correlating patterns that appear on maps, and make inferences concerning the association of people and things in particular areas.
10. Understanding and using correctly a variety of different types of maps.
11. Interpreting and using map legends.
12. Observing landscape phenomena thoughtfully.
13. Reading descriptive facts about the landscape from regional maps and interpret their significance.
14. Relating maps of different scales.

Since many specific skills are involved under the major "mapwork skills", it is necessary to categorize them. Being cognizant of this necessity, Kohn - as quoted by Kennamer (P.157) - identified the following set of six skill categories which are thought to be comprehensive and basic to a program in map reading and interpretation.

1. Ability to orient the map and to note directions.
2. Ability to recognize the scale of map and to compute distance.
3. Ability to locate places on maps and globes by means of grid systems.

4. Ability to express relative locations.

5. Ability to read map symbols.

6. Ability to compare maps and to make inferences.

These six categories of mapwork skills are also recognized by others to be the basic skills that a student should develop by the time he/she completes his/her secondary education (Boardman, 1986; McMaster, 1985; Wareham, 1969; Hutcheson, 1986; Kalaluka, 1986 and Grisdale, 1965). The syllubus for geography in Ethiopian Junior and Senior Secondary Schools (Social Sciences Panel, 1980: 10-20) also pointed out the above six skill categories explicitely (see grade seven third objective; grade eight second and sixth objectives; grade nine fifth objective; grade ten seventh objective; grade eleven sixth objective and grade twelve second objective).

Grisdale (1965: 31) has clearly stated that in the Ethiopoian school system, the Grade 12 student should have a comprehensive knoweldge of simple mapwork which is to result from several years of teaching and of being exposed to many educational experiences. The major theme of this study, therefore, is to explore the extent to which students' skills of mapwork are developed by the time they complete their secondary education.

1.2. Operational Definition of Terms and Concepts

1. Senior Secondary Schools: Refer to schools that have grades nine, ten, eleven and twelve.

2. School - Types: Shool-type in this paper refers to two different types of schools - government and mission.

3. Mastery of Basic Mapwork Skills: Mastery of Basic mapwork skills here refers to students' proficiency in the 50-items test prepared from the eight categories of basic mapwork skills listed below. The student is said to have developed the skill only if he is able to solve the problem or answer the questions related to a given skill category. The basic categories and their sub-categories are given in section 1.9.3.

4. Performance Test - Refers to the 50-item test prepared to measure secondary school art students' proficiency in mapwork skills explained under point 3.

5. Scoring key: Refers to the list of correct responses expected of the candidates. It is used as a guide while marking students' answer sheets.

6. Achievement in Mapwork Skills: Refers to the score earned by a student in the performance test.

7. Performance in Mathematics: Refers to the average score earned by students in mathematics school examinations (grades nine, ten and eleven).

8. Performance in Geography: Refers to the average score earned by students in geography school examinations (grades nine, ten and eleven).

9. Overall Academic Performance: Refers to the grand average (the average of averages) for grades nine, ten and eleven.

10. High Achievers: Refer to students who scored 70 and above in their grand average.

11. Low Achievers: Refer to students who scored 69 and below in their grand average.

12. Map-Reading Textbooks: Refer to the three textbook series entitled "A Concise Map-Reading Course for Ethiopian Schools". They are prepared for grades, nine, ten and eleven.

13. Main-Textbooks: Refer to all geography textbooks prepared for students' use in grades 9-12 other than map-reading textbooks.

14. Extra-Books: Refer to all books (related to mapwork skills) read by the concerned students and teachers other than the main-textbooks and map-reading textbooks. This is indicated by the teachers and students through the questionnaires.

1.3. The Problem

Most people are confronted with maps at some stage in their lives, whether it be as a tourist trying to locate important attractions in a city, in planning leisure, on television or as part of a job (Cracknell, 1976: 156). It is, thus, increasingly desirable for the citizens of a modern

country to be able to understand and use maps (Wareham, 1969: iii). As to the role of mapwork skills in the overall geographic education, Wareham (1969:iii) argues that it is essential to be able to understand maps and know how to use them if we are to be good geographers and understand the world in which we live.

Miller (1965:367), in his part, stresses the same point by saying that "the most important tool of the geographer is a map, and one of the first skills that the beginning student needs to learn is the ability to read maps and interpret the information gained from them." The Social Sciences Panel of Ethiopia has similar stand regarding the importance of mapwork skills (Roselius, 1983: 7). The Panel believes that the ability to read an atlas or a map 'unlocks the door' to locations or distributions of facts over the world. The students' ability to read and understand the locational knowledge needed in everyday life also depends on their mapwork skills according to the Panel.

Despite the attention given to map-reading-and-making skills by professional geographers, curriculum study groups, textbook writers, and others, these aspects of geography are not sufficiently stressed in schools (Cummings, 1966:623 and Report of the Geography Commision, 1967: 110-111). The report by Kohn also points out to this issue. Kohn, as quoted by cummings (P.623), strongly complains that tests

given to freshman entering colleges and universities demonstrate over and over again that map making and map reading skills are not being well developed in most elementary and secondary schools.

This study tries to inquire the degree to which the basic mapwork skills (that are widely considered to be essential not only for geography students but also for every citizen of a nation in his or her day-to-day activity) are mastered or developed by the time the students complete their secondary education.

1.4. Specific Objectives

The following items are stated as more specific objectives for the study.

1. To investigate the status of teaching and learning mapwork skills in the selected senior secondary schools of Addis Ababa.
2. To inquire the level of performance of students in basic mapwork skills by the time they complete their secondary education.
3. To identify the specific areas of difficulty encountered by most of the students while learning mapwork skills.
4. To findout whether or not the materials and/or facilities required for successful mapwork education are available in schools.
5. To explore the factors that influence students' performance in mapwork skills.

1.5. Hypotheses

The hypotheses are:

1. The level of performance of senior secondary students in basic mapwork skills is low (i.e. most of the students correctly answered only less than half of the items in the test).
2. Students of mission schools perform well in mapwork skills when compared to those in government schools.
3. Boys perform better in mapwork skills when compared to girls.
4. There is a significant mean difference in the performance test scores between high and low achievers. (High achievers perform better than low achievers).
5. The higher the students' performance in mathematics, the higher will be their performance in basic mapwork skills.
6. Students' performance in basic mapwork skills is significantly related to their performance in geography as a subject.
7. Achievement in basic mapwork skills is significantly related to students' overall academic performance.

1.6. The Scope of the study

The problem under investigation is delimited both interms of coverage and content. It covers only sample secondary highschools of Addis Ababa Administrative Region. Whatever conclusion is to be made later strictly applies, therfore, to secondary highschools of Addis Ababa. However, this should not hinder from making reasonable generalizations.

Contentwise, the study is limited to only one aspect of geographic education, mapwork skills.

1.7. Limitations of the Study

Mapwork skills are very vast. There are a number of skills under each of the main category. Some of these skills are best demonstrated in the field and others in geography laboratories; and still others using some complex geography teaching aids.

The performance test designed to evaluate students' mastery of the basic mapwork skills has two limitations in this regard. First, it was not possible to include all questions that represent every aspect of the skills for it makes the test extremely bulky and result in boredom on the part of the respondents. Secondly, all aspects of mapwork skill that can be best tested in the field and by the help of complex instruments were avoided by the investigator owing to a shortage or complete absence of the

required materials. The problem of unmanageability to administer the test in the field is also another obstacle.

1.8. Significance of the Study

The significance of this study emanates primarily from the significance given to mapwork skills by the Ministry of Education at Junior and Senior Secondary levels. A number of educational objectives are stated to this effect from grade seven to twelve. A series of separate textbooks entitled 'A concise Map-Reading Course for Ethiopian Schools are also prepared for grades nine, ten and eleven in addition to the standard textbooks. Furthermore, the Social Sciences' Panel made a remarkable statement which justifies the degree of importance given to mapwork skills saying that "The proper understanding of maps and use of them are basic skills that a student of geography should master as early as possible in his or her study of the subject" (Roselius, 1981:1).

There is, however, limited research conducted to investigate whether or not these geographic skills are properly mastered. By suggesting solution for this problem, the present study tries to fill in the gap. This is a general significance of the study.

More specifically, the following institutions or individuals can make use of the out comes of the study directly or indirectly.

1. Curriculum Experts: They can use the findings of the research to evaluate the mapwork textbooks, to reconsider the time alloted for geography subject in general and teaching mapwork skills in particular.
2. Institutes of Higher Education: Institutes that train high school geography teachers will also benefit from the study. They use the result of the study to judge the depth, breadth and level of difficulty of the courses being offered in training highschool geography teachers who are entrusted with the task of developing mapwork skills.
3. Geography Teachers and Students: Teachers and students too will benefit from the study if the result is to be accessible to them. Both parties can sort out where the weaknesses of students lie so as to try their best to improve it. They may also have a clearer and correct picture of what is meant by 'mapwork skills'.

1.9. Research Methodology and Procedures of the Study

1.9.1. Sources of Data

The following are the major sources of data for this study.

1. Senior secondary school art-students of Addis Ababa;
2. Senior secondary school geography teachers of Addis Ababa;

3. Personal documents of senior secondary school art-students of Addis Ababa;

1.9.2. Population and Sampling Procedures Used in the Study

Senior secondary schools run by the government of Ethiopia and the mission schools make up the universe from which the sample is to be drawn. The researcher decided to study six secondary high schools (four government and two mission). The schools selected using a stratified random sampling method were Ethiopia Tikdem No.1, Menelik II, SOS Higher 23, Dejazmach Wondirad, Akaki Adventist and Yehiwot Birhan. The first four were goverment schools while the last two mission schools.

The data from the record offices of the respective schools were used for selecting the students who should participate in the performance test and in responding to the questionnaires. On the basis of their grand average, all art students - now attending in grade twelve were arranged in desending order and then divided into three groups having equal number of students. From each of the three groups eleven students were randomly selected making the number of students selected from each school 33.

In Akaki Adventist and Yehiwot Birhan schools the total number of students attending in grade twelve art stream was much lower than the sample students of the other

schools (14 in Akaki and 25 in Yehiwot Birhan). Thus, all students of the two schools had participated in taking the test and filling in the questionnaires.

1.9.3. Instruments for and Procedures of Data collection

A. Performance Test

Initially a test containing 88 items was prepared for pre-testing (see Appendix 1.) This was done after the investigator studied the geography syllabus for Ethiopian secondary schools, map-reading textbooks prepared for Ethiopian schools and for schools in other African countries. Before having the final test ready for administration, the Performance Test questionnaire was subjected to a critical examination and comment by senior geography teachers.

Grade twelve art-students of Yekatit 12 High School participated in taking the pre-test. Out of the sampled 51 students only 43 appeard for the test.

The test, then was scored assigning 1(one) for those who passed the item and 0(zero) for those who failed. Item analysis was made to select the more reliable ones out of the 88 items using the result of the 43 students.

Item analysis (Ebel, 1979: 258) is meant to indicate which items may be too easy or too difficult and which may fail for other reasons to discriminate clearly between the better and the poorer examinees.

One of the indices that can be calculated from item analysis data is Discrimination Index. This index is often

used to select the best (that is, most highly discriminating) items for inclusion in an improved version of the test. The problem here is that of determining how large the index for a given item should be to be included in the improved version of the test. Table 1.2. depicts the various indices and their corresponding implication.

Table 1.1. Different Indices of Discrimination and their corresponding implications. .lm 00.50"

Index of Discrimination	Item Evaluation
0.40 and up	Very good items
0.30 - 0.39	Reasonably good but possibly subject to improvement
0.20 - 0.29	Marginal items, usually needing and being subject to improvement
Below 0.19	Poor items to be rejected or improved by revision

Source: Ebel, 1979 : 267

From Table 1.2. it can be deduced that all questions that have a discrimination index of 0.30 and above are reasonably good. Out of the 88 items prepared for pretest,

54 have indices above 0.30 (see Appendix 2, column 2). The implication is that these 54 items can form the test to be administered finally.

However, there is one inherent problem attached with discrimination indices as instruments for item selection. This problem (that reduces the reliability of the index to some extent) is that the calculation of the indices involves the results of only the upper and lower 27% of the candidates ignoring the middle 46%. In reality, however, this middle group may bring about a difference. For this reason, another method that takes into consideration the results of the whole group is sought for. One and perhaps the best method that meets this criteria is the calculation of item reliability which is the product of Standard Deviation (si) and the Point Biserial Correlation Coefficient (r_pb_i) (Ferguson, 1985).

Point Biserial Correlation provides a measure of the relation between a continuous variable, such as scores on a test, and a two categoried, or dichotomous variable, such as "pass" or "fail" on a psychological test item (P. 428). The formula for Point Biserial Correlation is:

$$r_pb_i = \frac{\bar{x}_p - \bar{x}}{s_x} \sqrt{pq}$$

Where, $\bar{X}_p$ = the mean score of individuals who pass the item

$\bar{X}$ = the mean of all scores on the continuous variable

P = the proportion of individuals who pass the item

q = the proportion of individuals who fail

s_x = the standard deviation of scores on the continuous variable, or the standard deviation of the test scores.

As a rule the value of r_pb_i neither exceeds positive 1 (+1) nor goes below negative 1 (-1).

The mean value ($\bar{x}$) and the standard deviation (s_x) of the test are calculated and found to be 38.26 and 13.66 respectively. Calculated were also the mean of the students who pass each item ($\bar{X}_p$) and the proportion of students who pass (p) and fail (q) each of the 88 items. Using these information, the r_pb_i for each item is computed (see the seventh column of Appendix 2)

The standard Deviation for each item ($\sqrt{pq}$) is also computed (the sixth column of appendix 2). These two columns, i.e. the Standard Deviation and the Point Biserial Correlation for each item are multiplied to give item reliability index (see column eight on the same Appendix).

Item reliability index = Si x r_pb_i

Where, Si = Standard Deviation for each item

r_pb_i = Point Biserial Correlation for each item.

The writer decided to take 50 of the 88 items because he found out (after administering the first test) that this size is small enough for students to finish in reasonable time and large enough to include items that represent the basic mapwork skills.

The job of selecting the 50 items is, now, fairly simple. It is just taking those items that have the highest item reliability index. Accordingly, the $s_ir_pb_i$ (item reliability) ranges from 0.130 - 0.360. This index, as an instrument of item selection, is the most useful single index for selection of items in common use (Ferguson, 1985 : 431).

The 50-items that make up the final test were selected from the following eight skill categories. The skill categories are further devided into a number of sub-categories.

1. Ability to read map symbols:

    1.1. Identifying familiar signs and symbols used for map reading;

    1.2. Identifying the symbols used for water features;

1.3. Using dots and lines to depict specific physical and cultural phenomena.

2. Ability to orient maps and note directions:

2.1. Identifying cardinal and intermediate directions;

2.2. Orienting a map;

2.3. Using compass in determining cardinal or intermediate directions.

3. Ability to recognize the scale of a map and compute distances:

3.1. Using scale lines, representative fractions and verbal statements of scale;

3.2. Measuring distance on maps and grounds;

3.3. Calculating the approximate area of objects using superimposed grid references on a map.

4. Ability to locate places:

4.1. Locating points by the help of grid references;

4.2. Giving four figure and six figure references on maps;

4.3. Locating points by the help of latitudes and longitudes;

4.4. Identifying the relationship of longitude to time and computing time problems.

5. Ability to analyze relief features on maps:

5.1. Reading heights from contours on a map and estimate heights between contours;

5.2. Identifying common relief features from contour patterns;

5.3. Describing the shape of slopes as steep or gentle, concave or convex, etc;

5.4. Drawing a section accross the contours on a map.

6. Ability to analyze climatic data:

6.1. Analyzing climatic data acquired from various sources such as weather recording stations.

7. Ability to draw statistical graphs and diagrams:

7.1. Drawing bargraphs, linegraphs and piecharts using geographic information.

8. Ability to make simple maps:

8.1 Drawing and anotating sketch maps;

8.2. Enlarging and reducing maps of a given scale.

The correspondance of the selected items (to compose the performance test) with the eight skill categories is depicted in Table 1.1.

Table 1.2. Mapwork skill categories and the serial number of items in the test booklet

Skill Category	Item serial number*
3.1	6, 7, 24, 25, 26, 27, 28, 29
3.2	18, 19, 20, 21, 22, 23, 45
3.3	8, 9, 10, 11
3.4	1, 2, 3, 4, 5, 12, 13, 14, 15, 16, 17
3.5	30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44
3.6	46, 47
3.7	48
3.8	49, 50

*(See the test in Appendix 3).

Estimation of Test Reliability

It is said that only to the degree that test scores are reliable can they be useful for any prupose whatsoever (Ebel, 1979 : 275). How can one estimate test reliability? Ferguson (1985 : 436 - 7) explains about four ways of estimating reliability: Test - retest method, parallel-forms method, split half method and internal consistency methods. The internal consistency methods, which are adopted by this study, are used with tests comprised of a series of items, usually dichotomously scored, a value of one being assigned for a pass and zero for a failure. The methods involve certain test - item statistics.

Such method of obtaining reliability coefficients using test item statistics has been developed by Kuder and Richardson (Ferguson, 1985 : 348). The Kuder Richardson formula 20, which is the most suitable for computing reliability coefficient for tests constructed of dichotomously scored items is given as follows.

$$r_{xx} = \frac{n}{n-1}\left[\frac{S_x^2 - \sum_{i=1}^{n} p_i q_i}{S_x^2}\right]$$

Where, n = number of items

S_x^2 = Variance of scores on test

$p_i q_i$ = Product of proportion of passes and fails for item i.

$\sum_{i=1}^{n} p_i q_i$ = sum of these products

The coefficient r_{xx} computed by this formula will take values ranging from zero to unity. If the items on a test have high inter-correlations with each other and are measures of much same attribute, then the reliability coefficient will be high. If the inter-correlations are low,

either because the items measure different attributes or because of the presence of error, then the reliability coefficient will be low (Ferguson, 1985 : 438).

All the elements involved in the Kuder-Richardson formula 20 are computed for the final test with 50 items. The following results are found:

$n = 50$

$S_x^2 = 93.75$

$\sum_{i=1}^{50} piqi = 10.74$

The calculation of the reliability coefficient using the above figures gives us 0.90. This is sufficiently large a value to make the test reliable for it is suggested that expertly constructed educational achievement tests often yield reliability coefficients of 0.90 or higher (Ebel, 1979: 274).

Administration of the Test

The test having 50 items selected by the item analysis procedure explained above was administered for the sample art students in their respective schools. All the schools were generous enough to give separate rooms for this purpose. Every student was supplied with the test booklet, list of figures from which most of the items are to be answered, empty paper on which they make maps and sketches; and rulers. After brief orientation, the students worked on the test without any time limit, for the essence of the study is not to find out how effectively and efficiently they workout in a given span of time.

Out of the 175 students selected from the sample schools 155 (88.67%) appeared and took the performance test.

Scoring of the Test

All the test papers were scored using a scoring key. The scoring was done just by giving a value of one point for correct answer and zero for incorrect responses. To facilitate comparison of the test scores with the other scores earned by a given student previously, the test score was multiplied by two and, thus, changed to percent.

B. Quetionnaires and Interviews

The second types of instruments used for gathering information for this study were questionnaires and interviews. Questionnaires to be filled in by students who took the test and geography teachers of the sample schools were prepared. The aim was to gather information regarding the state of teaching and learning mapwork skills and factors that affect performance in those skills. The questionnaires for teachers had 30 items whereas those prepared for students had only 22. The questions were composed of open-ended, close-ended, yes/no items and others designed to elicit personal information such as year of experience and educational status of teachers (see the questionnaires in appendices 5 and 6).

The students filled in the questionnaires immidiately after taking the performance test whereas teachers filled in these forms at a time parallel to the administration of the performance test.

Besides filling in the questionnaires prepared for teachers, the Geography Department Heads and two other senior teachers of geography from each school were interviewed. The interviews were aimed at securing supplementary information relating to the overall progress and problems of teaching and learning mapwork skills (the specific questions prepared for the interview are attached in the Appendix - see Appendix 7).

During the interview, special emphasis was given to the advantages and limitations of the map-reading textbooks prepared, state of fieldwork in their schools, methods of evaluation used to assess mapwork skills, and matters related to the preparation and utilization of teaching materials. The oral interviews were all conducted by the researcher himself.

C. Investigation of Documents

Information about the overall academic performance of the sample students was collected from their personal documents. Such information included their achievement in Geography and Mathematics from grade 9-11 and the average score each student earned at the end of grades nine, ten and eleven.

1.9.4. Methods of Data Analysis

Coefficient of correlation (r) between achievement in the performance test and the variables, achievement in mathematics, geography and grand average was computed for the total sample, high achievers, low achievers, girls, boys, for students of government and those of mission schools. The aim here was to examine the magnitude of the relationship between achievement in mapwork skills and that in mathematics, geography and the grand average.

Analysis of Variance (ANOVA) was used to investigate whether there is significant difference in the means of scores in mathematics, geography, grand average and the performance test between government and mission schools, male and female students and high and low achievers.

Chi-Square (X^2) test was used to determine whether or not the difference between the observed number of students (number of students who actually passed the performance test)

and the expected number of students (number of students who should pass the test) is significant.

All the statistical tests were carried out at 0.05 level of significance or less.

1.10. Organization of the Study

The thesis has five chapters including this introductory one. Earlier findings in relation to students' performance in mapwork skills are reviewed in chpater two which is followed by a chapter that deals with the analysis and interpretation of the findings of the present study. Chapter four is devoted to the presentation and discussion of the factors that were found to influence students' performance in mapwork skills. The last chapter is concerned with the conclusion of the study and recommendations put foreward on the basis of the findings.

CHAPTER TWO

REVIEW OF LITERATURE

Rushdoony (1963) conducted an experimental study to investigate; among other things, the relationships between achievement in map-reading and related factors. For this end he selected and used different standardized tests that made use of findings in map-reading research (P. 71). One of these tests was the map test of the 'Iowa Tests of Basic skills'. The test was reported to be reliable and it investigates the ability of students to use map-reading skills without previous knowledge of a given place as a factor. The reading and arithmetic test of the 'Stanford Achievement Test' were also utilized. In order to ascertain the intelligence of the boys, the girls and the total group, Rushdoony administered the 'California Test of Mental Maturity, 1957 Edition, Primary Level, S-Form' (P.71-72).

The item analysis of the map-reading test revealed that about 50-75 percent of the examinees passed items related to determining directions from map orientation, comparing exact distances interms of miles on road maps, and locating certain places by using map symbols on street and road maps. On the other hand, the students were reported to have greatest difficulty on items related to determining distance from a

scale, tracing travel routes, determining distances in relation to time, and comparing facts on distribution maps (P.73).

Schneider (1976) administered map and globe skill tests to six grade students. The analysis of student responses revealed that 70% of six graders had difficulty in answering questions in 11 major categories of map-and globe-related skills (P. 329-330). These categories of skills were 1) selecting appropriate synonyms for the terms globe, latitude, and longitude; 2) identifying lines of latitude and longitude; 3) discriminating between world maps and globes for determining shape, size, distance and direction; 4) using a vertical scale to determine exact elevations; 5) identify- ing the mouth and source of a river; 6) differentiating between upstream and downstream and determining river flow using contour map; 7) identifying revolution and the earth's tilt as the cause of seasonal changes; 8) computing time differences by using longitude; 9) identifying and using a map legend to determine the meanings of symbols; 10) comparing climates of selected cities on the basis of differences in latitude and elevation; and 11) forming conclusions and making predictions of geographic significance on the basis of distributional map data.

Schneider also reported that on only four items were 90 percent or more of the sixth graders able to respond correctly. They could identify the name of their own country,

appropriately label a picture of the globe, select the best model for a globe, and name and orient the cardinal directions -- north and south (but they had more difficulty with east and west). On only 26 of the 69 questions could as many as 70-Percent of the students respond correctly (P. 329).

To compare the map-reading abilities of college freshman students with those of nine graders, Miller (1965) used the Map-Reading Skills portion of the 'Iowa Test of Basic Skills', a test used by Rushdoony (1963) to measure mapwork skills of elementary students. Having administered the test to 435 students entering freshman at Western Washington State College and to 329 ninth-grade students, Miller arrived at the following conclusions on the basis of the analysis of the test scores (P.372).

1. There are significant differences in map-reading ability of ninth-grade and college freshman students, although the differences are not as great as the grade levels would indicate.
2. There seems to be no relationship between map-reading ability and amount of travel or number of localities in which a student has lived during his school years.
3. Map-reading ability is gained mostly through formal teaching during actual class work.

Giannangelo and Frazee (1977) also used the same section of the 'Iowa Tests of Basic skills' to investigate

the map-reading proficiency of elementary educators (390 in number) from the mid-south area of the United States. Explaining why they were interested to study map-reading proficiency of educators, the researchers argue by saying that "if educators possess ineffective skills in map-reading, then they can not be expected to provide adequate instruction for children in this important area of social studies" (P.63). Similarly, administrators and supervisors were included in the study since one of their responsibilities as instructional leaders was to help classroom teachers improve their performance. The assumption was that they cannot adequately carry out this function unless the administrators and supervisors have some map reading skills.

No time limit was, however, imposed (during the examination) to eleminate speed as a factor in the final evaluation of the test results. The specific map skills tested by Giannangelo and Frazee are listed below (P.64).

Table 2. Map skills used by Giannangelo and Frazee (1977)

Skill Number	Skill Evaluated
1a	The ability to determine direction from parallels and meridians
1b	The ability to determine direction of river flow or slope of land
2a	The ability to locate and/or describe places on maps and globes through the use of standard symbols
2b	The ability to locate and/or describe places on maps and globes through the use of a key
2c	The ability to locate and/or describe places on maps and globes through the use of distance and/or direction
2d	The ability to locate and/or describe places on maps and globes through the use of latitude and longitude
3a	The ability to determine distances on a road map

Skill Number	Skill Evaluated
3b	The ability to determine distances using a scale of miles
3c	The ability to determine distances on a globe
3d	The ability to compare distances
4	The ability to determine routes of travel
5	The ability to understand seasonal variations, sun patterns and time differences
6	The ability to read and compare facts from one or more pattern maps
7	The ability to visualize landscape features
8a	The ability to infer man's activities or way of living from outline maps
8b	The ability to infer man's activities or way of living from pattern map.

An analysis of categories of skills tested by the examination indicates that the group exhibited the greatest competency in skills involving the ability to visualize landscape features (Skill 7), the ability to locate or describe places on maps and globes through the use of a key (skill 2b), and the ability to determine routes of travel

(skill 4). The study participants appeared to encounter considerable difficulty with skills involving the ability to determine distances on road maps (skill 3a) and to determine distances on a globe (skill 3c) (P. 63-64).

Giannangelo and Frazee concluded that the results of their study tend to substantiate criticism of elementary educators' proficiencies in map-reading (P.65).

A number of research findings in geography and other disciplines ascertained that students' performance in certain skills is positively influenced by their performance in some other but related areas. In the study aimed at determining the influence of highschool mathematics and science courses on students' mathematics and science knowledge and skills, Lyle and others (1986: 197-8) discovered a strong relationship between senior-year mathematics achievement test score and the number of highschool mathematics courses taken at the level of Algebra I-and-above. But, the same study revealed the existence of weaker relationship between senior-year science test score and the number of highschool science courses taken (P.197-8).

Prouse and Turner (1969: 439-40), in their part, made a systematic investigation to determine the significance of certain highschool and college data in predicting success in calculus II at Mankato State College. Having analyzed, with correlation techniques, a number of variables which are related to success in college Freshman mathematics courses, they found that those highschool variables contributing to

success in calculus II in order of significance were High School Plane Geometry (0.34), Trigonometry (0.29), Algebra II (0.29), Rank in graduating class (0.25), Algebra I (0.18) and Act Mathematics Standard Score (0.16) (P.440). The researchers also made it clear that those college variables contributing to success in calculus II in order of significance are Calculus I (0.67), College Algebra (0.51) and Trigonometry (0.51).

Similar studies have also been conducted in geography. Rushdoony (1963) found out high, positive, linear relationships between map-reading achievement and intelligence, reading achievement, and arithmetic achievement. The map reading correlation coefficients for the total sample were found to be 0.753 for intelligence, 0.849 for reading and 0.855 for arithmetic. Rushdoony further ascertains that his findings of the relationship between map-reading and intelligence and between map-reading and reading generally concurred with the findings of earlier research. No coeficients of correlation, however, had been found previously between map-reading and arithmetic (P.73).

In his study entitled, "Map Reading Abilities of College Freshman compared with those of Ninth Graders", Miller (1965: 372) similarily found that there is a high degree of correlation between map reading and most of the measurements of achievement (Intelligence Quotient, California Achievement

Test in Reading and the Differential Aptitude Tests in Verbal and Space Relations).

Whether or not there is a gender difference in achievement of mapwork skills is another area of interest in studies related to this issue. Matthews (1984: 328) conducted a study to examine whether gender influences a childs' awareness of place and ability to represent space. He found out that from about the age of eight onwards, clear differences were apparent between the sexes interms of their images of place. Regarding map accuracy, which demands considerable visual-spatial effort, Matthews found that older boys frequently managed to provide an integrated map, revealing a good grasp of the relational qualities of a wide array of environmental elements. Girls, on the other hand, rarely achieved this ability by the age of 11 (P.335).

Matthews further argued that the evidence of his study broadly paralleled the findings of those studies which have focused on the acquisition of spatial abilities of young children. In this regard he mentions the findings of Macoby and Jacklin (1974). Macoby and Jacklin pointed out that sex differences are rarely found until the age of eight. Prior to this age girls do as well as boys. Thus, males do not demonstrate a clear superiority in spatial skill until adolesence (Matthews, P.335).

Stein and others (1971), as quoted by Matthews, attribute the inferiority of girls in environmental

competence to a belief (on the part of girls) that the activities and skills involved in environmental studies are essentially masculine. Hart (1978), in his part, noted that girls were not encouraged to see environmental competence as appropriate to their sex (P.335).

Based on his own and related research findings, Matthews forwarded a valuable suggestion to curriculum experts and geography teachers. He seriously notes that, particularily in the initial part of the curriculum, it is necessary to make the subject rich in environmental experiences in order to compensate for the discriminatory influence of early gender expectations. Geography teachers are also advised to encourage the pupils to make purposeful observations of the environment around the school and to arrange project works with their pupils so that children's mental spatial skills can be developed (P. 335).

The relationship between students' performance and school-type has also drawn the attention of researchers. Olatunji (1990) investigated the academic performance of students in private and public primary schools of Nigeria. Among the instruments of data collection he used were English and Mathematics achievement tests. These tests were prepared by the researcher in consultation with class teachers both in the private and public schools (P.140). Olatunji also reported that he made reference to the syllabus, teachers' lesson plans,´pupils' texts and excercise books together with

the past test papers inorder to ensure the content validity of the tests. A tentative forms of the tests were drawn up and pilot-tested in schools not selected for the study. The final test, that was improved on the basis of information secured in the ways described, was administered in the schools (private and public) (P.140-2).

Having undertaken regorous computations on the basis of the test results, Olatunji found out that significant difference exists between the performance of private and public school pupils (in both intelligence and achievement) in all primaries, irrespective of the factors of preschool education (P.149)

Flip and others (as quoted by Olatunji, P.154) arrived at similar conclusions. In their analysis of pupils' performance in primary level, Filp and others found that there was a consistent relationship between the socio-economic level of the school that the child attended and learning out- comes at the end of a given grade. Even after controlling the effect of the child's home background, Filp and his colleagues still found that the trends in learning outcomes were related to the type of primary school attended. From this, the researchers concluded that the type of primary school attended had a decisive impact on pupils achievement.

Olatunji tries to attribute the poor scores obtained by public school pupils (when compared to their private school

counterparts) to deficiencies in the academic and experimental background of Public school pupils on the one hand, and the much more favourable teaching and learning conditions of the private schools on the other. As an illustration he mentions the lower teacher-pupil ratio, better qualified teachers, pleasantly decorated and well-furnished classrooms and libraries as factors that combine to produce the higher achievement levels which distinguish the private school pupils (P.155-6).

Describing the condition in Nigeria, he stresses that the large pupil-teacher ratio, overcrowded classrooms, the lack of classroom equipment, teaching aids and textbooks and the sterile teaching methods which are prevalent in many public primary schools all combine to depress the achievement of pupils in public schools (P.154).

In an article entitled "Some Problems of Teaching Geography in Zambian Bush", Wilkinson (1971:312) complains about similar problems to those of Nigerian schools. He says, "...unfortunately, many of the books used at Sefula (is a secondary school in western province of Zambia) and, I suspect, at other Zambian schools, are far from adequate either with respect to text, or especially, photographs. "Wilkinson added that wall-maps, charts and large pictures are in extremely short supply. Regarding the scarcity of materials, Wilkinson posed very sensitive but unanswered questions by saying, "How can one or two post-card views be used satisfactorily in a class of over fourty

students?" "How can excercises on maps be carried out with may be one or two maps for the class to use?"

Regarding scarcity of geography teaching aids similar problems were observed in Ethiopian secondary highschools. In his study that deals with the availability of geography teaching aids in selected senior secondary schools of Addis Ababa, Aklilu (1991) found out that the sample schools (seven secondary high schools of Addis Ababa) were very poor in geography teaching materials. There were virtually no optimum equipment (such as slides, projectors, altimetres, etc) in all the schools observed (P.24). Even the minimum equipment existing were found to be not only incomparable to the student population but also poorly handled.

In the same study, Aklilu reported the suggestion given by an experienced (taught for 16 years) geography teacher named Askalech Yimer* about the availability of teaching aids in two of the highschools in Addis Ababa she taught in the past and still teaching. To preserve the originality of what she said, a direct quotation was made (P.25).

> There are only two maps in Wondirad Secondary School, one world map and one map of Africa. These maps are needed by history teachers, political education teachers and sometimes by

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* Askalech was a final year extension student in the Department of Geography at that period. The suggestion was taken from a term paper she produced for a course Educ.311 (Subject Area Methodology-Teaching Geography.)

> others. At times the whereabouts of the maps can not be traced. If one wants to use one of these maps the next day, he has to hide it somewhere so that it is within his own reach when he wants to use it. In short, let alone using these maps, seeing them in somebody's hand is a rare chance. Surprising enough, there is no globe in the school. There is no even a graduated ruler.

Askalech was teaching in Ayer Tena Secondary High School of Addis Ababa before she was transferred to Wondirad High School. Concerning geography teaching aids in Ayer Tena she commented, "There were three maps: one world, one African and another map of Ethiopia. I have not seen any other teaching aids in Ayer Tena." (P.25).

Bezuayen (1970), in a study conducted on the situation of geography teaching in some of the Junior Secondary Schools of Addis Ababa, identified and reported serious shortage of materials required to teach mapwork skills. The teachers interviewed, according to Bezuayen, reported that they use old, tornout and sometimes out-dated maps. Worse than this, all of the respondents were said to witness complete absence of wall charts. It was also found out in the same study that almost all the schools visited (about 12 Junior High-schools) have no provincial maps. From his overall investigation, the researcher concluded that teaching materials found in Addis Ababa Junior High Schools were not adequate both in quantity and quality (P.55).

Mclaughlin (1965) also noted similar problem in Ethiopian schools. Mclaughlin, a geography teacher in the former Bademariam Laboratory School, noted that the lack of visual teaching aids was a serious problem both in the teaching of Physical and Regional Geography (P.39).

Another aspect of the problem that affects students' development of mapwork skills, is teachers' reluctance to use the available materials like maps and globes that are considered to be the basis for the development of mapwork skill. Having inquired teachers about the frequency with which they used maps in connection with geography-teaching, Cracknell (1976:152) found that eleven percent of the teachers in the sample made no use of any maps. From his analysis of the overall findings, Cracknell concluded that in most schools little is being done to develop mapwork skills through regular contact with the appropriate maps, despite the availability of the maps (P.153).

Survey study conducted in three selected senior secondary schools of Addis Ababa also indicated the problem of under-utilization of the existing teaching materials (Aklilu, 1990). After making a thorough enumeration of the available geography teaching aids and assessing the state of their utilization in the three highschools (Addis Ketema, Nifas Silk and Yekatit 12), Aklilu arrived at the following conclusions (P.31-32)

1. Geography teaching materials are available to a certain extent in all the schools. Thus, the popular complaint that there is a complete absence of any teaching aids is proved to be groundless. Infact, the existing collection of materials, if it were to be fully utilized, is by no means sufficient to equip students with basic geographical knowledge and skills expected of them at that stage.

2. The existence of pedagogical centres in the high schools enhanced the collection of specimens, production of models and preparation of maps. But, nothing stored there was being effectively used by the students.

3. The existing teaching aids, in general, are not fully utilized due to several factors - lack of interest on the part of the teachers, extremely large number of students, unfavourable classroom environment, low skill of the teachers to use the materials, etc.

4. The negative influences of the undersizedness of geography rooms which also served as stores in Addis Ketema and Yekatit 12 schools can not be over emphasized. It forced to pile one material upon another or roll up them and put under the shelves as if they are documents for special reference. The lack

of storage facilities discouraged both the utilization of the existing ones and preparation of others.

The problem of appropriate space not only to keep the materials but also teach the mapwork skills was observed also by Bezuayen (1970: 49) in the Junior Highschools he investigated. Bezuayen argues that due to lack of space for geography rooms, teachers have difficulty in carrying maps, globes and other materials from one class to another. Explaining the multiplier effects of the same problem, he continues by saying, "Students have to do some mapwork, consult books, work on pictures, if any, and hence there is a need for movement. There must also be enough space for putting specimens, hanging maps, pictures and for students' seats." For financial and physical reasons, none of the schools has this kind of facility (P.49).

Still another side of the problem (that is, problem concerning materials used for mapwork instruction) is related to the manner in which the available maps are utilized. Cracknell (1976) reported that most teachers responding seemed to use the maps simply to locate geographical features. This situation, he argues, is identical to that of the period 1862-1900 when students were expected to have knowledge of locational details but not that of spatial distribution and aerial interaction which makes the core of present day geographic education (P.152).

On the basis of research findings reviewed so far, it is reasonable to assume that the mentioned problems highly affect the development of mapwork skills. However, no research outcomes are reported that show the level of performance of senior secondary students of Ethiopia. Neither do we have findings that reveal the factors that influence the development of mapwork skills both positively and negatively.

This study attempts to investigate not only the degree to which students perform in mapwork skills but also tries to find some explanations to student performance in mapwork skills.

CHAPTER THREE

ANALYSIS AND INTERPRETATION OF STUDENTS' PERFORMANCE TEST RESULTS

This chapter is concerned with the analysis of the performance test results and interpretation of the findings. Firstly, the results of item analysis are presented and described. Secondly, the difference between mean scores of the test (for various groups) is analysed and interpreted. Finally the relationship trends between mapwork skill test scores and other variables are shown.

3.1. Item Analysis

The item analysis made by the writer on the pre-test resulted in sorting out a few items or questions that have been too difficult for all students in the sample study. For instance, the item related to calculation of gradient was correctly answered by only one student out of the 43. In addition, the following items were found to be too difficult for all the subjects: 1) identification of different types of settlements (linear, star-shaped, scattered and clustered) on maps (answered by six students); 2) provision of bearing for different towns of Ethiopia - taking Addis Ababa as a reference point (by one student); 3) indicating the position of a

watershed on a map (answered by only four); 4) and drawing a pie chart using a given geographic information (answered by nine students). On the other hand, 1) items related to matching certain features (such as water bodies, relief features and vegetation) with the conventional symbols and 2) the identification of important points and parallels (the Poles, the Equator and the Tropics) were correctly answered by more than 70% of the students.

The item analysis of the final test (that had 50-items and administered to 150 students of the six selected schools) revealed that students had difficulty in answering items related to 1) calculation of an area of a given object using grid system (only 8 out of the 150 students answered it correctly); 2) drawing a section of landform (13 students); and 3) identification of direction after orienting the map using the Northing (no student was able to answer it correctly). In the last case, the problem was not that of simply denoting the direction of a place, but rather of orienting the map because the students performed well in questions related to simple identification of the directions without orienting the map. For instance, items 18 and 19 which inquire students' ability of simply indicating directions were correctly answered by 66% and 63% of the students respectively. Other areas of difficulty include finding the time for a town on the basis of a given information; providing the location of places using latitudes and longitudes; identifying the features that can be

represented by certain symbols; calculation of the scale of a map given the relevant information; and converting compass directions into measurements in degrees. All the items related to these specific skills were correctly answered by less than 30% of the students.

Items that were found to be easier (correctly answered by more than 70% of the students) include analysis of climatic data (and computing stations that have the highest and lowest annual ranges of temperature), and showing the location of the Antarctic and Arctic Circles.

Detailed information as to which item is answered correctly by what proportion of students in each school is given in Appendix 4.

The comparison of students who scored above 50 (out of 100) with those who scored below it revealed a noticeable gap. Only 37 (24.7%) of the students were able to score above 50 (see Table 3.1.)

Table 3.1. Proportion of students who have correctly answered more than half of the items.

Schools	Total No. of candidates	No of candidates who scored above 50	(%) age of candidates who scored above 50
Ethiopia Tikdem No.1	27	6	22
Menelik II	32	6	19
SOS Higher 23	27	1	4
Wondirad	27	9	33
Akaki Adventist	14	6	43
Yehiwot Birhan	23	9	39

Though the proportion of students who correctly answered half of the items is invariably low in all the schools, between-school variations are also evident in the table.

The school, SOS Higher 23 is the lowest. Only one student passed the test out of 27 candidates. The position of the two mission schools (Akaki Adventist and Yehiwot Birhan) is better. Fourty-three percent and 39% of their students scored above 50 respectively. From the category of the government schools, students of Wondirad school exhibited greater performance (33% scored above 50).

Chi-Square (X^2) test was employed to investigate whether the observed number of students who passed the test (scored

above 50) is lower than the expected number of students who should pass the test in each of the six schools. The expectation here is that, at least, half of the candidates from each school should score 50 out of 100.

Table 3.2. depicts results of the Chi-square test analysis.

Table 3.2. Comaparison of the observed and expected frequency of students who passed the performance test.

Schools	Observed Frequency (O)	Expected Frequency (E)	$(O-E)^2$	$\frac{(O-E)^2}{E}$
Ethiopia Tikdem No.1	6	14	64	4.6
Menelik II	6	16	100	6.3
SOS Higher 23	1	14	169	12.1
Wondirad	9	14	25	1.8
Akaki Adventist	6	7	1	0.1
Yehiwot Birhan	9	12	9	0.8

$$X^2 = \frac{(O-E)^2}{E} = 25.7$$

df= degree of freedom = 6-1= 5

With five degrees of freedom, the critical value of Chi-square is 22.46 at 0.001 level of significance (Hammond, 1978: 333). The calculated value of X^2 in this case is 25.7. As this calculated value is greater than the tabulated value

(22.46) at 0.001 level of significance, it is safe to confirm the substantive hypothesis. Thus, the first hypothesis of this study is confirmed. That is, the level of performance of senior secondary students in basic mapwork skills is low.

3.2. Variations in Results of the Performance Test

Analysis of Variance (ANOVA) was used to examine whether there existed a significant difference in the mean scores of the performance test for the various groups such as 1) government and mission schools; 2) male and female students and; 3) high and low achievers. The level of significance at which the mean difference was confirmed was also specified for each of the cases.

The average score earned by students of mission schools was found to be 47.14 while that of government schools was 36.55 inturn resulting in a mean difference of 10.59. To examine whether this mean difference is significant or not, the analysis of variance was further carried out (see Table 3.3.).

Table 3.3. Comparison between mean scores of students in government and mission schools(n=150).

School Type	No. of Students	Mean Score	Variance	Std. Dev.	level of signf.
Mission	37	47.14	316.565	17.792	
Government	113	36.55	318.803	17.855	0.003
Difference		10.59			

ANOVA

Variation	SS	df	MS	F-Statistics
Between	3123.853	1	3123.853	
Within	47102.307	148	318.259	9.815
Total	50226.160	149		

The table substantiates that mean difference between the students of mission and government schools is significantly large. At 0.003 level of significance, one can safely conclude that mission school students performed better in map skills test than those in government schools.

The variation in test scores of the two types of schools could perhaps be explained by the observed difference in the teacher-pupil ratio. The teacher-pupil ratio was very low for mission schools (for instance the ratio for grade 12 was 1:14 in Akaki Adventist and 1:25 in Yehiwot Birhan school). This ratio was alarmingly high for governement schools (the writer

observed 120 students agglomerated in one room in Ethiopia Tikdem No.1 school). In the other government schools too, the number of students in a classroom was above 60. In this condition teachers' follow-up and effective student-teacher communication are unthinkable. Mission schools, on the other-hand, could have no problem of this kind.

The availability of teaching aids and facilities is observed as being relatively better in mission schools. The Geography Department Head of Yehiwot Birhan school (one of the mission schools) expressed that scarcity of materials and facilities has never been their problem to teach mapwork skills. Contrary to this, such facilities as school pedagogical centre, geography laboratories, school workshop and geography club are totally absent in SOS Higher 23 and Wondirad; and poorly developed in the other government schools. This may also be another factor that could explain the variation in mission and government school students achievements.

The mean scores of male and female students were also compared (Table 3.4). The comparison here excluded students of Yehiwot Birhan school because there were no male students in the school. It was found out that male students had higher mean score (41.25) compared to female students (28.95). The analysis of variance in this case indicates that the mean score earned by male students is significantly larger than that by female students at 0.001 level of significance.

Table 3.4. Comparison between mean scores of male and female students (n=127)

Sex	No. of students	Mean Score	Variance	Std.Dev.	level of signf.
F	42	28.95	216.046	14.699	
M	85	41.25	364.664	19.096	0.001
Difference		-12.30			

ANOVA

Variation	SS	df	MS	F-Statistics
Between	4249.118	1	4249.118	
Within	39489.717	125	315.918	13.450
Total	43738.835	126		

A number of studies (Matthews, 1984; Jacklin, 1974; Stein and others, 1971 and Hart, 1978) also discovered the existence of gender difference in such skills as mapwork. The researchers tried to attribute the inferiority of girls to the belief that the activities and skills involved in environmental studies are essentially musculine. There is, however, no ground to explain the remarkable gap between male and female students of Addis Ababa schools in their mapwork skills interms of such attitude. Since the achievement of girls is lower also in mathematics, geography and grand average, their inferiority in the performance test could only be considered, in this study, as part and parcel of the general academic weakness of girls (the

detailed verification of which may require a number of independent studies).

Those students who were good in their schools grand average (having scores of 70 and above) were also found to be good in the performance test scores. They earned an average score of 50.85. Low achievers (students who scored 69 and below in their schools grand average) were also known to be poor in their performance in the mapwork skills test (32.58). The difference between the mean scores of these two groups of students in the performance test was computed to be significant at a 0.0001 level (Table 3.5).

Table 3.5. Comparison between mean scores of high and low achievers (n=150).

Category	No.of students	Mean Score	Variance	Std. Dev.	level of sign.
High achievers	54	50.85	326.28	18.06	
Low achievers	96	32.58	225.25	15.01	0.0001
Difference		18.27			

ANOVA

Variation	SS	df	MS	F-Statistics
Between	11534.012	1	11534.012	
Within	38692. 148	148	261.433	44.118
Total	50226.160	149		

Mastery of mapwork skills is beyond proficiency in drawing sketches and making diagrams. It involves ability to associate the physical and cultural environments with the abridged forms of the same environments as represented on pieces of paper. Such an association, inturn, requires knowledge in many other subjects, one of which being geography. That seems why students who are good in their overall academic performance are also better in the mapwork skill test.

The results of the analysis of mean difference in the performance test can be summarized as follows:

1. There is a significant difference between the mean scores of students of government and mission schools in the mapwork skills test. Students of mission schools performed better than those of government.
2. There is gender difference in the achievement of students in the mapwork-skill test. Boys performed better than girls.
3. Students who were good in their overall academic performance were also found to be better in the mapwork- skill test.

The three relationships are true at 0.003, 0.001, and 0.0001 levels of significance respectively. As a result, the second, third and fourth hypotheses of this study, which were stated in terms of superiority of students of mission schools to those of government schools; of male students to female students; and of high achivers to low achivers in their performance in the mapwork skills test, are confirmed.

3.3. Relationship Between Performance Test Scores and Other Variables

Correlation coefficients between performance test (PT) scores and such variables as average scores in mathematics (MATH), geography (GEOG) and grand average (AVER) were calculated for 1) the whole sample; 2) students of mission schools and 3) for students of government schools. In addition to the calculation of correlation coefficients (r), the 95%* confidence interval was computed for r.

The results for the whole sample showed positive correlation with all the three variables. The figure was 0.51 for mathematics, 0.43 for geography and 0.52 for grand average. Table 3.6 shows this. The relationship in all the cases is significant at 0.05 level.

Table 3.6. Correlation coefficients for the whole sample.

Between	r	95% C.I. for r
PT and MATH	0.51	0.38<r<0.62
PT and GEOG	0.43	0.29<r<0.55
PT and AVER	0.52	0.39<r<0.63

*The "95% confidence interval for r" means that if 100 such studies are conducted on different samples (but the same population and similar sample size), there is 95% probability for r to be within that interval.

The relationship between students' overall academic performance and their mapwork skills is relatively stronger followed by that between mathematics achievement and performance in mapwork skills. The relationship between achievement in geography and performance in the mapwork skills is less strong when compared to the other two variables.

The strength of the relationship between achievement in mathematics and that in mapwork skills when compared to the relationship between achievement in geography and that in mapwork skills might be attributed to the fact that map-reading and interpretation involve mathematical computations. Such mapwork skills as calculation of distance and area, manipulation of scales, analysis of climatic data, etc. involve quantitative skills. The knowledge of geographic objects and phenomena is necessary for mastery of mapwork skills. If this knowledge is supplemented by interest and ability in mathematics, it would be much more useful. The relationaships observed seem to support this point.

A similar trend (similar to that for the whole group) of relationship is observed in students of government schools (see Table 3.7.). The highest correlation was found with achievement in mathemathics (0.53) followed by that with grand average (0.46) and geography (0.40). For students of mission schools there was no significant relationship between mapwork skills and achievement in mathematics at 0.05 level of significance. The correlation with geography and grand

average is significant for students of mission schools too.

Table 3.7. Correlation coefficients for students in government and mission schools.

	Government Schools		Mission Schools	
Between	r	95% C.I. for r	r	95% C.I. for r
PT and MATH	0.53	0.39<r<0.65	0.23	-0.10<r<0.52
PT and GEOG	0.40	0.23<r<0.54	0.39	0.08<r<0.64
PT and AVER	0.46	0.30<r<0.59	0.55	0.27<r<0.74

In mission schools, however, the availability of materials and facilities on the one hand and teachers' close assistance on the other seem to be more important factors for success in the mapwork skills test than students' interest in mathematics. A relatively weaker correlation between performance test scores and achivement in mathematics is observed which suggests other explanations than achievement in mathematics. The strongest correlation for students of mission schools is between performance test scores and their overall academic performance.

In summary, the analysis of correlation coefficients between performance test results and the variables, achievment in mathematics, geography and grand average for the whole smaple showed that:

1) there is strong relationship between students' achievement in mathematics and their performance in the mapwork skills test.

2) the higher the achievement of students in geography the higher will be their achievement in mapwork skills.

3) performance in mapwork skills test is highly related to students' overall academic achievement.

4) the relationship between performance test scores and grand average results is the strongest followed by that with achievement in mathematics.

These findings confirm the fifth, sixth and seventh hypotheses of this study which state significant positive relationship between performance in mapwork skills and students' achievement in such variables as mathematics, geography and grand average.

CHAPTER FOUR

FACTORS THAT AFFECT STUDENTS' PERFORMANCE IN BASIC MAPWORK SKILLS

The analysis of students' performance in the mapwork skills test clearly indicated that more than 50 percent of the students of all the schools failed to answer at least half of the items. It was also found out that the range between the highest and the lowest scores for the schools is very high (86). Besides these common features, it was possible to observe between-school variations in the performance of students. For instance, Akaki Adventist, Wondirad, and Yehiwot Birhan schools were found to be better both in terms of the proportion of students who correctly answered half of the items and the average score earned by the students. The reverse is true for SOS Higher 23 school. Sex difference was also noted in the mean scores of the test.

The findings presented in the preceding chapter also revealed the existence of a strong positive correlation between achievement in mapwork skills and the variables, mathematics (0.51); geography (0.43) and grand average

(0.52), when the whole sample was considered. There are specific cases that disturb this general relationships, however. For instance, there is no correlation at 0.05 level of significance between performance test scores and achievement in mathematics, geography and grand average for female students and students of SOS Higher 23 school.

The aim of this chapter is to find out the possible reasons that explain, first of all, the generally low performance of students in the mapwork skill test. To this end, the responses of all teachers and students secured through the questionnaires will often be used along with the information acquired by interviewing senior teachers and department heads of geography.

For the sake of convinience, all the factors that were found (through the questionnaires and interviews) to affect students performance in mapwork skills are grouped into four major categories. These are: 1) curriculum-related factors, 2) teacher-related factors, 3) students-related factors, and 4) the effects of ESLCE questions--related to mapwork skills.

4.1. Curriculum-Related Factors

This category of factors includes the limiting of mapwork skill education to senior secondary level, shortage of time for teaching mapwork skills, scarcity of teaching

aids for teaching mapwork skills, lack of opportunity to conduct field works, and poor content organization and structure of the existing mapwork text books.

4.1.1. Lack of Knowledge at the Grassroot Level

Success in basic mapwork skills at the senior secondary level highly depends on the quality and quantity of instruction given to students at the lower grades (Blaut, 1971). Research findings substantiate both the possibility and necessity of teaching these basic skills at the grassroot level. Catling (1979:290) for instance, found out that six years old children are able to comprehend and use large scale, simplified maps of a place in which they are living, and vertical aerial photographs of a familiar place, as two dimentional representations. Started at the lower or elementary grades, these skills should be tackled progressively. Regarding this Grisdale (1965: 31) said that the essence of mapwork is that it should be a gradual progression of difficulty, with constant practice over a long period of time. It should be a result of several years of teaching but not a crash programme of mapwork in grade 12, as it is so frequently the case.

Students of the sample study were asked whether or not they have learned any kind of mapwork skills in their elementary and junior secondary levels. Out of the 150 students, 93 (62%) said that they did not learn anything

related to mapwork skills at those levels. Only 25 (17%) students responded that they have learned. The other 21% failed to respond to the question.

The problem is not only the absence of purposeful and detailed instruction of these skills at the lower grade levels, but also that of either treating the skills at the end of grades nine, ten and eleven or limiting it totally to grade 12. In this situation, it is difficult to think of systematic and progressive development of the skills. Thus, the low performance of most of the students in mapwork skills can be partly attributed (among other things) to this lack of basic knoweldge at lower grades and systematic and progressive way of handling the skills at the senior secondary level.

4.1.2. Incompatibility of Content to be Covered and Time Alloted to Teach It

Geography as a school subject has two separate textbooks in grades nine, ten and eleven (one main textbook and another map reading textbook for each grade). The length of time alloted by the "Institute for Curriculum Development and Research" to cover the two books is two periods in grade nine and ten, and three in grade 11. Teachers and students consider this as complete discordance between the content to be taught and time given for it. This shortage of time

(though there is no objective measure to balance content and time) is felt by both teachers and students to have been highly affecting the frequency of teaching and learning of mapwork skills.

Table 4.1. Frequency of teaching and learning mapwork skills as indicated by teachers (n=23) and students (n=150).

Frequency	Grades					
	9		10		11	
	T	S	T	S	T	S
Twice a week	1	-	1	-	1	-
once a week	9	82	7	77	5	84
Once in two weeks	3	15	3	12	1	12
Once in four weeks	1	9	2	8	-	12
Not at all	-	18	1	20	-	20

T = Teachers

S = Students

Table 4.1. shows that teachers and students did not agree in their responses to the same question eventhough they are the participants of the same process. One teacher reproted that map-reading was taught twice a week but no student confirmed it. A good number of students responded

that they have never been taught mapwork skills in grades nine, ten and eleven but no teacher reported the same for grades nine and eleven. This anomaly might be due to students' usual inclination to blame the school and teachers; and teachers' inclination to redress their weaknesses. Anyhow, the state of the matter has one clear indication, absence of clear and explicitly scheduled time for teaching mapwork skills in all the schools studied. Some of the schools teach it once a week (despite the existence of differences for different grades) while others teach once in two or four weeks. There were also teachers and students who reported that the concerned skills have been taught only at the end of each grade.

Teachers and students were also asked the question, "to which of the textbooks do you give more emphasis?" About 87% of the teachers and 85% of the students indicated that they give more emphasis to the "main textbooks". Only one teacher and 12 students said that they give more emphasis to the mapwork textbooks. Explaining why they give more emphasis to the main texts, 74% of the students and 44% of the teachers responded that the texts are more valuable and easily understandable when compared to the map-reading textbooks. However, when asked why they do not give due consideration to the mapwork textbooks, both the teachers and students did not present difficulty and importance of the content but shortage of time for teaching of the map-reading part (61% of the students and 78% of the teachers) and scarcity of

supplementary materials. This shows that even if map-reading part is relatively difficult to deal with and requires more planning and preparation, the teachers and students have the interest to teach and learn it if they are provided with appropriate instructional time and materials. Up to the present, adequate time is not assigned by the curriculum experts. Thus, the general weakness of students in these skills could also be partly explained by shortage of time to complete the content.

4.1.3. Supply of Teaching Aids and Other Facilities

In the absence of at least the basic teaching materials and some necessary facilities, the mastery of mapwork skills will be handicaped. The Social Sciences Panel (1980:1), however, admitted that one of the main problems facing a teacher of geography in Ethiopia, is lack of large scale maps of most parts of the country and other teaching aids. To prove whether this statement of the Panel holds true for senior secondary schools of Addis Ababa, teachers and students were asked to indicate which of the necessary teaching aids are available in their schools from the given list of materials. The list contains about 15 different geography teaching aids (see table 4.2.). The respondents were also given an opportunity to list other (if any) materials which are not incorporated in the list.

Table 4.2. reveals that the most available teaching aids are maps (excluding the 1:250,000 maps of Ethiopia), globes,

Table 4.2. Teaching aids available in the sample schools as indicated by teachers and students.

	Teachers (n=23)		Students (n=150)	
Teaching Aids	No.	%	No.	%
Maps of the world	23	100	144	96
Maps of Africa	23	100	141	94
1:250,000 map of Ethiopia	9	39	90	60
Other maps of Ethiopia	15	65	108	72
Globes	12	52	84	56
Pictures	8	35	79	53
Graphs	5	22	41	27
Diagrams	9	39	*	*
Models	5	22	*	*
Specimens	4	17	26	17
Locally prepared maps	13	57	75	50
Mathematical instruments	12	52	49	33
Mapographs	5	22	10	7
Atlas of Mefin Wolde Mariam	11	48	40	27
Other atlases	13	57	60	40

*They are not included in the questionnaire for students.

locally prepared maps and atlases other than that of Mesfin Wolde Mariam. Other teaching materials are also reported to be available, but, by small proportion of the teachers and students (see table 4.2.).

Besides approving their existence, teachers were also required to indicate the exact or approximate quantity of each of the materials said to be available. However, no teacher gave this information. Thus, it is difficult to take forgranted that the materials that were reported to be existing match the progressively exploding number of students. Asked to enumerate the major factors that are presently affecting the teaching and learning of mapwork skills, both teachers and students rated scarcity of teaching aids as the second major factor preceeded only by shortage of time.

Maps are not only available in all the sample schools but also reported to be the most frequently utilized teaching aids. When asked why they prefer maps most, 10 (43%) of the teachers responded by saying that maps are the most appropriate to teach the concerned skills. Some others complained that they were forced to stick to maps because they are the only materials that are available in enough quantity. The former is somewhat impalatable justification for there is no specific and clearly defined material appropriate for the development of all kinds of skills.

It is clearly indicated in the Concise Map-Reading Textbooks for grades nine and eleven that the 1:250,000 maps of Ethiopia and the Atlas of Mesfin Wolde Mariam are basic references for teaching and learning the map reading contents for grades nine and eleven respectively. Several quotations are also made from the latter in the Map-Reading textbook for grade eleven. For instance, such statments as "The maps No.7 to 10 in Mesfin's Atlas are good examples of this type of maps and should be referred to when you are studying about these types of maps" (P.81), are abundant. The response of teachers and students, however, shows that one or both of these materials is (are) not found in some of the schools. It is obvious that giving assignments for students and teachers on the basis of the materials that are not available in the schools will not only be shocking but also indicates how the Panel lacks information (or did not want to consider it) regarding what is going on in the schools.

Such facilities as geography laboratory, school pedagogical centre, school workshop and geography clubs are poorly developed. Only 4(17%) of the teachers reported the existence of geography laboratories whereas 7(30%), 6(26%) and 10(43%) of the respondents said that they had school pedagogical centre, school workshop and geography club respectively. Geography teachers of Wondirad and SOS Higher 23 schools reported that they have none of the facilities.

It is, therefore, reasonable to ascribe the weakness of students in basic mapwork skills also to the shortage and maldistribution of teaching aids and poor development of necessary facilities.

4.1.4. Opportunity to Conduct Field Work

Younger pupils should always have an opportunity to practice map skills in the local neighbourhood whilst older ones should make full use of maps when carrying out field work in more distant areas (Boardman, 1986:138). In relation to this the Social Sciences Panel (1980:1) asserted that map reading is not, at least on the secondary level, an academic exercise to be carried out in the classroom only. Where - and whenever possible, the Panel declares, excercises should be carried out in the field with whatever maps happen to be available over the area where the school is located (P.1). The Panel even goes to the extent of saying that in the study of landforms, field activities are a must (1983:43).

Teachers were asked whether or not they have ever conducted a field work. Only 2 (9%) said yes. Giving a brief account of one of the fieldworks conducted, the teachers reported that geography teachers and selected students of Menelik II school went to the Rift - and the Awash-valleys before three years to study the physical features. The other field study was conducted in Kefetegna 12 Kebele 12 by selected students of Ethiopia Tikdem No.1. When compared to

the need and necessity of field study in the development of mapwork skills, these two instances are not remarkable.

Mapwork teaching, in Ethiopian schools, is limited to classrooms and taught using the lecture as a method of instruction. Only few teachers and students mentioned the use of different methods (for instance, demonstration, and giving exercises) to teach mapwork skills. Such a limitation of the activities to the classroom is considered by Boardman (1986:123) as making mapreading an end by itself.

The emphasis given to field studies by the Social Sciences Panel is apparently sensible. In reality, however, all the assertions are good on paper but difficult to apply under the existing shortage of teaching aids and extremely large size of students in a classroom (there are, for example, about 120 students in one classroom in Ethiopia Tikdem No.1 school). The difficulty of practicing the theoretical consideration in the field, is another factor that is highly affecting student development in mapwork skills.

4.1.5. Content Organization and Structure of the Mapwork Textbooks

The three map-reading textbooks have one common and externally observable limitation. This is that they give more emphasis to the theoretical explanation of ideas and

concepts (in some cases the ideas and concepts are well explained in the main text too). By doing so the texts deviate from their basic aim: enabling students excercise the theoretical knowledge they acquired. There are almost no excercises that encourage students' independent activity and personal effort. In contrast, the textbooks are dominated by vey general (in some cases even vague) statements such as the following: "An interesting map exercise can be carried out on any map sheet of the topographic map to find out how many such 'gebeyas' are mentioned and which week days are covered." (Grade 11. p.72). Greater importance, however, should not be given to the indication of the possibility of carrying an exercise; but to (practically) setting the exercise and showing the steps and procedures.

Teachers were asked to list down the weaknesses of the textbooks if they think that the texts have weaknesses. Table 4.3. shows the responses. About 57% of the teachers reported that the content of the textbooks is very vast whereas 48% consider the content as difficult for under-standing. The textbooks are also believed (by 30% of the teachers) to be prepared without any consideration as to the availability of teaching aids.

Table 4.3. Teachers' responses regarding the Weaknesses of Mapwork textbooks

Teachers' Responses	No.	%
The content is very vast	13	57
The content is difficult for understanding	11	48
They are not prepared by considering the avilability of teaching aids	7	30
Not sufficient examples and exercises are incorporated	4	17
Some irrelevant contents are included (Coastal Landforms-Grade 10).	4	17
No logical arrangement of the content	3	13

In schools where students do not have an opportunity to read extra reference books, only 24(16%) of the students reported that they referred to other mapwork textbooks, the standard textbooks should be prepared with maximum care so that students can independently exercise the activities at home. This could have also compromised the shortage of time to discuss all the problems in the classroom.

Another curriculum related factor other than the ones listed above is the absence of a conducive classroom environment for conducting mapwork exercises. Seventeen teachers (74%) and 77(51%) of the students reported that large size of students per classroom, inconvenient sitting arrangement of the students, and similar classroom environments are affecting the development of mapwork skills.

4.2. Teacher-Related Factors

The condition of training and qualification of teachers in mapwork skills and the interest they had in teaching it seem to have a direct effect on students' performance in the skills. Out of the 23 teachers who filled in the questionnaire, 18(78%) were found to have BA Degrees while the others had diploma (12+2). More than 91% of these teachers were known to be graduates of Addis Ababa University. Only one (4.3%) was a graduate of Cotebe Teachers College. One teacher did not tell the college from which he graduated. All teachers had experiences that range from 5 to more than 20 years as depicted in Table 4.4.

Table 4.4. Experience of teachers (in Years)

Experience	No. of teachers	%
Less than five	5	22
5 - 10	6	26
11 - 15	6	26
16 - 20	2	9
More than 20	3	13
No response	1	4
TOTAL	23	100.0

Teachers were asked to evaluate the courses offered in the higher institutions they attended in relation to mapwork skills. The responses are tabulated in Table 4.5.

Table 4.5. Evaluation of courses related to mapwork skills .

Reponses	No.	%
Insufficient	5	21.7
Sufficient but inappropriate for junior and senior secondary levels	9	39.1
Neither sufficient nor appropriate	1	4.3
Sufficient and appropriate	7	30.4
No response	1	4.3
TOTAL	23	100.0

Table 4.5. shows that about 65% of the teachers were not satisfied with the courses offered to them in the university and college related to mapwork skills. This might mean that the teachers did not have the necessary knowledge and skills that enable them to perform the job successfully.

Students were asked to rate the ability and interest of their teachers in mapwork skills. About 46% and 49% of the students rated their teachers as highly and moderately competent. Only 7% of the students think that their teachers are incompetent. The majority of the students (71%) reported taht their teachers had either moderate (45%) or less (26%) interest to teach mapwork skills while 33% of them believed that the interest of their teachers is very high.

The dissatisfaction of the teachers with the courses offered in the higher institutions on the one hand and that of students with their teachers on the other could also partly explain the poor performance of students in basic mapwork skills. The deficiency in the training of teachers was highly stressed by the teachers during the interview not only to minimise their interest to teach but also create a lack of confidence in themselves while teaching the skills.

4.3. Students - Related Factors

Teachers rated the interest of their students to learn mapwork skills as medium and low. More than 65% of the teachers believe that their students are moderately interested in learning mapwork skills whereas 35% of the teachers believe that their students have low interest. Those teachers who rated students' interest to be low were asked for further explanation. They expressed that students of art stream in general do not have job opportunity after completing grade 12 when compared to those trained in other streams. This made the students develop a strong disinterest for the art subjects in general and mapwork skills in particular.

Teachers have also mentioned lack of basic and background knowledge, shortage of time and absence of opportunity for independent activities as factors that contribute to the

deterioration of students' interest to learn mapwork skills and the resultant poor performance in the map work skill test.

4.4. The Effects of ESLCE Questions

The primary aim of teaching and learning a given content should not be passing examinations. If the content is learned effectively, passing examination (related to it) will be the natural consequence. This fact did not seem to have been appreciated by teachers and students of Addis Ababa Senior Secondary Schools. They consider passing the ESLCE the major goal of teaching and learning mapwork skills.

More than 91% of the teachers said that they often consult mapwork skill questions that appear in the ESLCE. What is more interesting is the reason they give for consulting previous ESLCE question papers (see Table 4.6.).

Table 4.6. Reasons for consulting mapwork skill questions of the ESLCE as reported by teachers

Teachers' Responses	No.	%
To shape my instruction in line with the questions	12	52
To evaluate the items and make critical comments	5	22
To inform students where to emphasize while studying	17	74

Table 4.6. shows that teachers mostly refer to the ESLCE questions to shape their instruction in line with those questions and inform students what to study.

The reason put foreward by the students is not different from that given by the teachers. More than 50% of the students reported that they consult the questions in order to prepare themselves in accordance with the questions that appear in the ESLCE of preceeding years.

The described condition has one inherent danger, i.e. narrowing the scope of mapwork skills. Every year 10 to 15 questions appear in the ESLCE that are related to mapwork skills. These items are often repeated. As a result, it is very easy to predict what questions could appear next by consulting question of the past four or five years. If the aim of teaching and learning is considered to be passing that examination, the shortest route is to give more emphasis to the types of skills that appear in the exam as it is being done by the teachers and students. Since the coverage of these questions is too narrow, the ESLCE is highly distorting the true picture of what we call mapwork skills (reducing them to the skills that appear in the exam); and is attracting the attention of teachers and students by repeating items year after year.

One of the reasons for giving less weight to the Map-Reading textbooks is also related to quantity of map-reading questions included in ESLCE. Both teachers and students openly expressed that they did not give equal respect to

these group of textbooks because less proportion of the items in the ESLCE is taken from mapwork textbooks.

Another aspect of the effect of the ESLCE questions is the form of the items. Questions of the ESLCE are always presented in multiple choice form. The mapwork skills, however, involve some computations and drawings which can best be shown by problem solving method or giving students an opportunity to show their sketches and drawings. Being cognizant of the types of questions that appear in the ESLCE, students purposefully avoid any effort to master the latter, which, infact, is the corner stone of developing such skills.

Ademe and Gebre (1991:44) conducted a research on the impact of objective type tests on the learning process of high school mathematics. They found out that although students had scored significantly higher average grade in the objective test, they had failed to workout most of the problems when these had been framed in a subjective format. The low scores in the subjective test, the researchers argue, indicate that the mental faculties of students to workout or solve mathematical problems is poorly developed.

The way the ESLCE items are selected and structured could, therefore, be claimed as acting as a negative stimulant to the learning of mapwork skills.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1. Conclusion

This study was primarily aimed at investigating the performance of senior secondary students of Addis Ababa in basic mapwork skills. Identification of the specific areas of difficulty encountered by students and exploring the major factors that influence students' performance in basic mapwork skills were among the more specific objectives.

A performance test was prepared and administered to sample students from government and mission schools. The test was intended to examine students' ability in mapwork skills. The other instrument for data collection was a questionnaire. All teachers of geography in the sample schools and students who participated in taking the performance test filled in the questionnaires prepared to enquire the general status of teaching and learning mapwork skills and to explore the problems encountered in the process. Students' documents were also investigated inorder to gather information about the overall academic performance and their achievement in mathematics and geography. Interviews were also conducted with geography department heads and two other teachers of all sample schools.

Different methods of data analysis were used. The degree to which an item was difficult or easy to students was

investigated by item analysis. Analysis of Variance was used to examine whether or not there is a difference between mean scores of the performance test for different groups. The relationship pattern between the performance test scores and the variables, achievement in mathematics, geography and grand average were analysed using simple correlation coefficients. Such statistical tests as F-test and the Chi-Square test were used to prove or disprove the hypotheses at the specified level of significance (0.05).

The analysis of test results show low level of performance in the mapwork skills. Only 37 out of 150 students (24.7%) were able to answer correctly more than half of the items. The majority (about two-third) of the students failed to answer even half of the questions. The position of mission schools was found to be better (in this regard) than that of government schools.

A computation of the mean difference made it clear that mean scores earned by different groups in the mapwork skills test were significantly different at 0.05 level. Students of mission schools performed better than their counterparts in the government schools. This finding is similar to the one by Olatunji (1990) who concluded that the performance of primary level students of Nigerian public schools was poorer than that of private school students of the same level.

A comparison of mean scores for male and female students substantiated the superiority of boys in mapwork skills.

Matthews (1984) had also reported that from about the age of eight onwards, clear differences were apparent between the sexes in terms of their images of place. Regarding map accuracy (which demands considerable visual effort) older boys frequently managed to provide an integrated map, revealing a good grasp of relational qualities of a wide array of environmental elements (Matthews, 1984:328). Girls of Addis Ababa highschools were also found to be inferior in their achievement in mathematics, geography and grand average. Students who had high scores in their grand average (scored 70 and above) were also better in their performance in the mapwork skills test compared to low achievers.

Correlation analysis of performance test with the variables, achievement in mathematics, geography and grand average suggested the existence of a significant relationship. The findings in this line concurred with those of Rushdoony (1963). Rushdoony found out high positive relationships between map-reading achievement and itelligence, reading achievement and arithmetic achievements (p.73).

The foregoing conclusions were made on the basis of the analysis of students' performance test results. The examination of 1)map-reading textbooks prepared by the Social Sciences Panel of the MOE, 2) questionnaires filled in by the teachers and students, 3) interviews conducted with teachers; and 4) the analysis of ESLCE questions related to mapwork skills, enabled the researcher to make the succeeding conclusions.

1. The place given to mapwork skills by the Social Sciences Panel of the Ethiopian Ministry of Education is apparently encouraging. The preparation of a series of textbooks and stating a number of objectives in terms of those skills may lead one to generalize that due respect is given to the skills. In practice, however, this is negated by the extremely short time (two or three periods per week) alloted for covering the textbooks. The insignificant effort made by the Ministry of Education (MOE) to alleviate the chronic shortage of materials and facilities (that are not only necessary but also mandatory for true education of mapwork skills) is another testimony to the argument that the "Ministry" is worried more about the statement of the objectives in the syllabus but less to the actualization or materialization of these objectives.

2. Mapwork skills are taught in all sampled schools but from grade nine onwards. The latter has resulted in two bad outcomes. First, students are deprived of basic background knowledge that can act as a spring board for the complex skills that are encountered in the later grades. Secondly, it is practically impossible to cover even the basic mapwork skills in that short period of time. Any attempt to do so inevitably results in shallow treatment of the skills as it is the case in the schools investigated.

3. The existing map-reading textbooks are good in terms of coverage but poor in quality. No effort is exerted to make the textbooks instruments for independent activities of students. Illustrations and examples included in the textbooks are far from being sufficient and the exercises are mostly general and in some cases even confusing.

4. The two textbooks prepared for the same grade (nine or ten or eleven) do not have much relations content wise. Such a separation of textbooks for map-reading and for other aspects of geographic education is very artificial one and can have a serious effect on both students and teachers. The practice may mislead one to conclude that the development of mapwork skills is an end by itself. Moreover, it contradicts Boardman's (1986) assertion that intellectual and physical skills are closely interdependent. Intellectual skills require the possession of knowledge and understanding of ideas, and physical skills demand mastery and practice if pupils are to reach high levels of achievement. In order to read and interpret a topographical map, for example, pupils need some prior knowledge of land-forms and drainage patterns, and they also have to be able to identify features shown by means of contour patterns and other conventional forms of representation (P.15).

5. Conducting a field study is the most appropriate method for teaching and learning mapwork skills. The realization of

some of the objectives related to mapwork skills is unthinkable without taking the students out to the actual environment. Despite all its merits, a field work has become totally impossible in the surveyed schools due to different problems -- the major ones being financial, logistics and social.

6. Institutions of Higher Education (particularily the Geography Department of Addis Ababa University) are blamed by teachers for their failure to offer courses that are relevant to the teaching of mapwork skills at junior and senior secondary levels. The teachers reported that the courses being given are not only insufficient but also inappropriate (having less relationship to what they are expected to do in schools). The absence of intensive training in those skills is known to act as a limiting factor to teachers' self- confidence and interest in teaching mapwork skills.

7. The mapwork skill items that appear in the ESLCE are found to have dangerous effects on the learning of the skills. They tempted both teachers and students to define mapwork skills in terms of the questions that appear in the ESLCE. The year after year repetition of the same questions also forced students to refrain from practicing the other aspects of mapwork skills that are not being included in the ESLCE.

5.2. Recommendations

Curriculum experts, geography teachers and students seem to be knowledgeable of the key position mapwork skills have in Geography Education. However, the skills are not handled properly in the schools surveyed. This mismanagement of the skills, in turn, resulted in poor performance of senior secondary students by the time they complete grade 12. Since geography without the mastery of mapwork skills is incomplete, the present state must be improved soon. Recommendations are, therefore, made on the basis of the findings.

1. The Ministry of Education should arrange workshops and short term trainings for teachers so that they can update their existing skills in mapwork and gain new knowledge.

2. As far as possible materials and facilities required for teaching and learning mapwork skills should be available in the schools. In order to involve teachers in the preparation of some of the teaching aids locally, the MOE in cooperation with the school administration should devise a strong mechanism of checking the contribution of each teacher individually or in group.

3. Mapwork skills should be encountered progressively (starting from lower grades of the elementary level they should continue systematically by increasing the level of

difficulty and complexity). The Social Sciences Panel should, therfore, consider this fact while preparing Social Studies and Geography textbooks for Elemantary, Junior Secondary and Senior Secondary levels.

4. The existing map-reading textbooks should be either integrated in the main textbooks or thoroughly revised (if they are to remain independent). The revised version should incorporate as many examples and illustrations as possible. Maximum effort should also be exerted to make the textbooks assume a form of workbooks (or worksheets) so that students can attempt the problems at home once they are introduced to the major principles in the classroom. This may also minimize the problem of time to some extent. Along with the revised textbooks, teachers' guides should be prepared to narrow the between-teachers gap in ability.

5. All the institutions that train highschool geography teachers must give sufficient courses to equip the prospective teachers with knowledge and skills of mapwork. The courses should be designed taking into consideration the academic backgrounds of high school students and the material conditions of the majority of the schools.

6. All the schools should design strong programme of collecting specimens of all kinds and keep them for demonstration. This may compromise the absence of field studies to a certain extent.

7. Some of the basic references on mapwork skills must be made available at least for teachers. In addition to this, the teachers themselves should be encouraged to be members of such libraries as "The British Council Library" and the Library of the Institution for Curriculum Development and Research where they can find a number of books which are very relevant to the teaching of mapwork skills. The latter requires mere interest on the part of the teachers.

8. Mapwork skill questions that appear in the ESLCE should cover atleast the basic skills. Furthermore, the Examination Board of the ESLCE (especially those responsible for the preparation of geography questions) should avoid giving students and teachers a direct clue by repeating items year after year. They need to diversify questions to make them representative of the syllabus.

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APPENDICES

APPENDIX I: PERFORMANCE TEST PREPARED FOR SENIOR SECONDARY ART STUDENT OF ADDIS ABABA - **FIRST VERSION**

GENERAL DIRECTION: Try all the map work questions in this booklet and write your answers in the space provided. Most of the questions will be answered by referring to the list of figures given separately.

* . By using Fig.1 show the following important points and parallels.

1. North pole
2. South pole
3. Equator
4. Arctic Circle
5. Tropic of Cancer
6. Tropic of Capricorn
7. Antarctic Circle

* . If the time in town X which is 75^0W is 1:00 pm, what would be the time in:

8. Town Y which is 90^0W? _____
9. Town Z which is 45^0E? _____
10. Town G which is 0^0? _____

* . Use Fig.2 and identify the symbols represented by letters A through F.

11. A represents _____
12. B represents _____
13. C represents _____
14. D represents _____
15. E represents _____
16. F represents _____

* . Match the following features with the conventional colours that represent them on a coloured map.

Features	Conventional Colours
____ 17. Water bodies	A. Brown
____ 18. Relief features	B. Green
____ 19. Communication features	C. Blue
____ 20. Vegetation	D. Pinc and Black
____ 21. Settlement	E. Black or Red

*. Arrange the following five scales in descending order (start with the larger and go to smaller scale).

22. I cm to 1 km	1. _____
23. 1:25, 000	2. _____
24. 4 cm to 0.5 km	3. _____
25. 1 cm to 2.5 km	4. _____
26. 1: 1,000,000	5. _____

27 The straight line distance of AB on a map with RF: 1:40,000 is 4cm. What would be the ground distance of AB? _____?

28 What distance on a 1:50,000 map can be represented by a ground distance of 3.5 km? _____.

29 The field distance (FD) of AB on Fig. 11 is found to be 60 km. Calculate the scale of the map._____

30 Calculate the area of Ethiopia using the 1 cm grid system provided on Fig.3._____

*. Using Fig.4 give the latitude and longitude of points A,D and W in degrees, minutes and seconds.

31. Point A _____
32. Point D _____
33. Point W _____

*. Supply a six-figure grid reference for points P,Q and R on Fig.5.

34. Point P _____
35. Point Q _____
36. Point R _____

*. Which points of the compass are opposite in direction to each of the following?

37. E _____
38. NE _____
39. SSW _____
40. ESE _____

*. Convert the following compass directions into measurements in degrees.

41. WSW _____
42. NW _____
43. N _____
44. ENE _____

*. What is the map bearing of the following towns from Addis Ababa?

45. Nekemte _____
46. Asmara _____
47. Moyale _____

*. The different methods used to show relief are given below. Match them with their respective symbols provided on Fig.6

_____ 48. Contour lines
_____ 49. Layer tinting
_____ 50. Hachures

_____ 51. Hill shading
_____ 52. Spot heights
_____ 53. Trigonometrical points
_____ 54. Bench marks

*. Match the different types of the slopes with the sketches that represent them. The sketches are given on Fig.7

_____ 55. Even slope
_____ 56. Convex slope
_____ 57. Concave slope
_____ 58. Stepped slope
_____ 59. Cliffs
_____ 60. Overhanging cliff

*. Match the following landforms with their simple sketches given on Fig.8.

_____ 61. Spur
_____ 62. Mountain ridge
_____ 63. Valley
_____ 64. Plateau

*. Pair together the letters and numbers that represent the same relief features as shown by contours and sketches on Fig.9. Example: 1 is represented by C.

65. 2 by _____
66. 3 by _____
67. 4 by _____
68. 5 by _____
69. 6 by _____

70 Insert the major watersheds dividing the river systems given on Fig. 10.

*. Refer to Fig. 11 and answer the following questions.

71. What is the vertical interval (VI)? _____

72. Draw a section of landform through a line connecting points A and B. Show your drawings on the attached sheet of paper.

73. Are points A and B intervisible? _____

74. Claculate the average gradient of the road that connects C and Z. (give your answer in degree or percent) _____

75. Calculate the approximate height of points A and C:
A _____ C _____

76. What is the direction of: B from C _____, A from C, _____ B from Z, _____

*. Identify the types of settlement represented by S_1, S_2, S_3 and S_4 on Fig. 2.

77. S_1 _____
78. S_2 _____
79. S_3 _____
80. S_4 _____

*. Use Table 1 to answer the following questions.

Table 1.

Sta.	J	F	M	A	M	J	J	A	S	O	N	D
A	24.4	24.9	24.3	24.5	22.5	21.8	20	24.5	21.5	22.5	22	23.3
B	13.7	13.5	13.4	14	13	12.2	12.5	12.5	12.6	13.3	13.3	14
C	29	27.5	28	25	20	19.7	16.5	19	17.7	23	27	26
D	22.1	24	21	23	28	29	27.3	24.8	24	20	19.8	23

81. What is the mean annual temperature for station A _____.

82. Which station has the highest annual range of temperature? _____.

83. Which station has the lowest? _____.

84. Make a linegraph showing the distribution of temperature in station C on the attached sheet of paper.

85. Table 2 shows the pattern of land utilization in Region X in year 1988. Using the information given on the table, make a pie chart on the attached sheet of paper.

Table 2

Pattern of land Utilization	Area in Hectares
Arable	250
Pastoral	250
Others	500
TOTAL	1000

86. Enlarge the map of Ethiopia on Fig.3 by two and give the new scale. Use attached sheet of paper.

* . Draw a sketch map of Ethiopia on the attached sheet of paper and:

87. Show the regional boundaries and name the 14 regions

88. Indicate the location of Addis Ababa, Asmara, Asseb and Moyale by putting a dot and writing their names nearby.

LIST OF FIGURES

Fig. 2

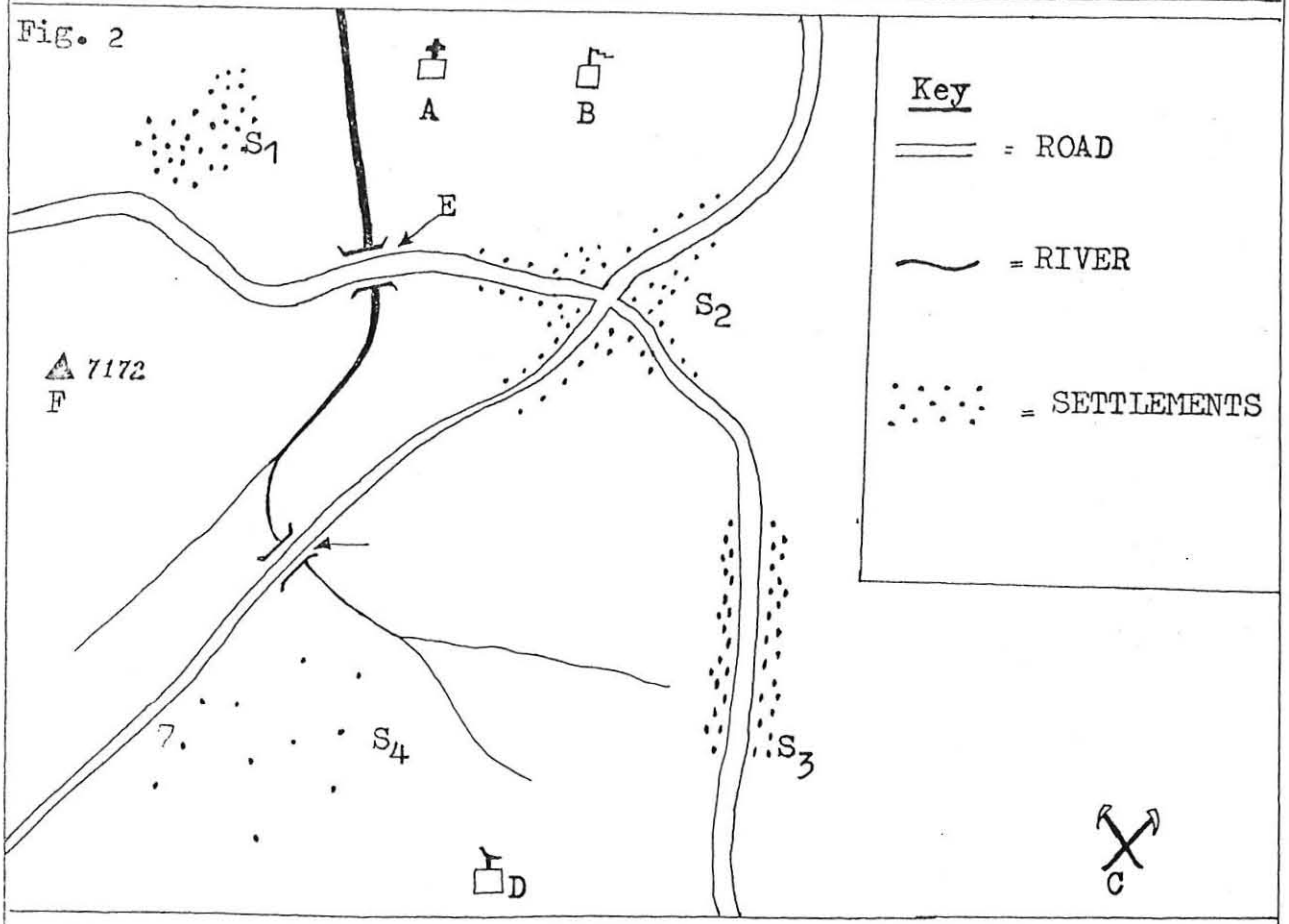
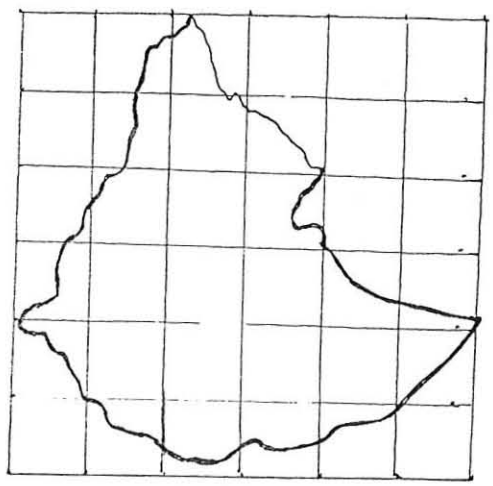


Fig.3



Scale: 1:27,500,000

Fig. 4

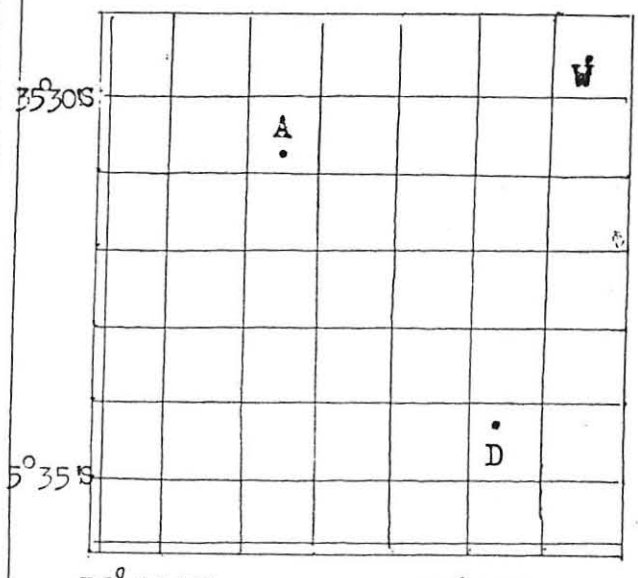
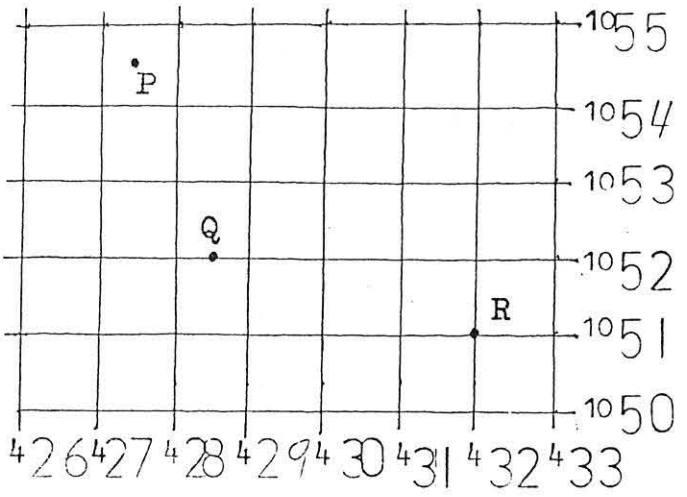


Fig. 5



Gig. 6

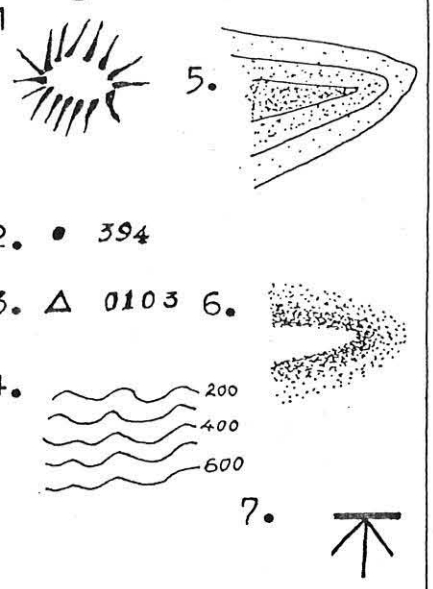


Fig. 7

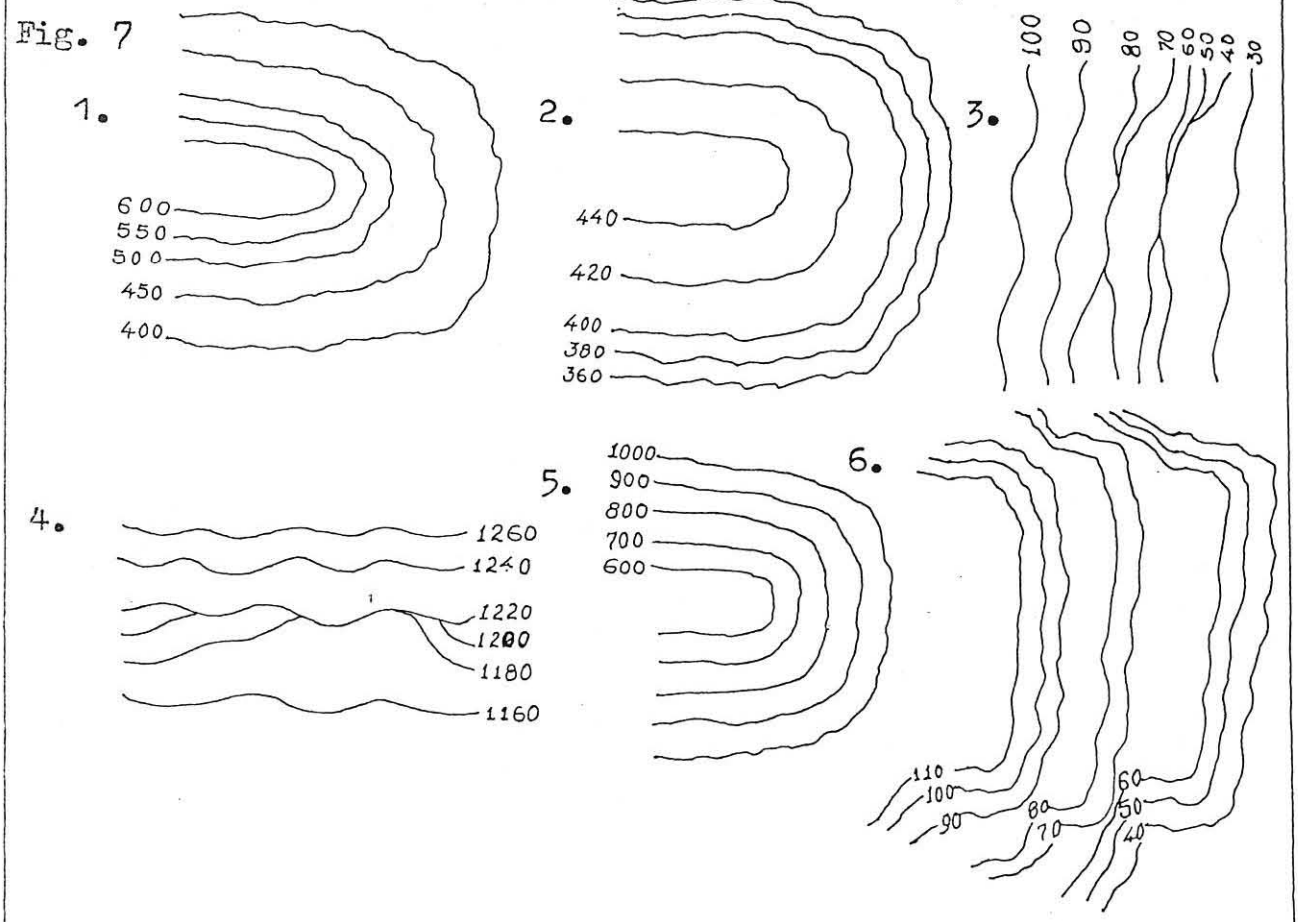


Fig. 8

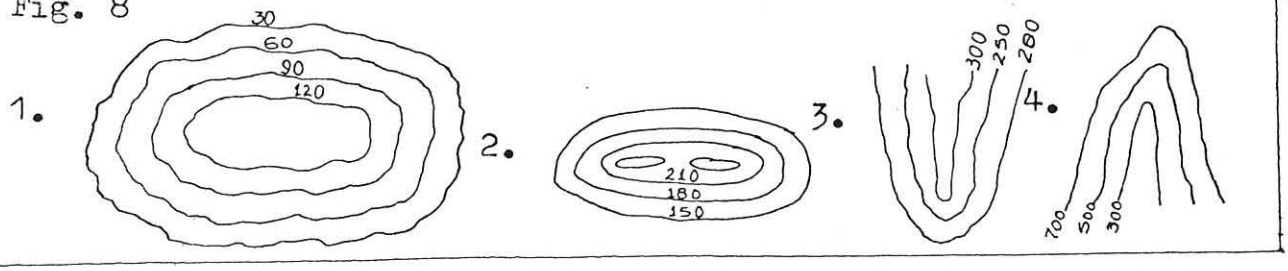


Fig. 9

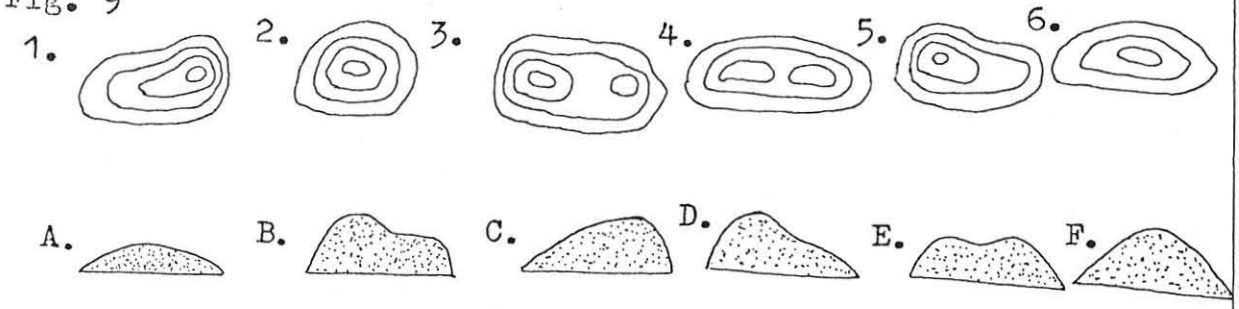


Fig. 10

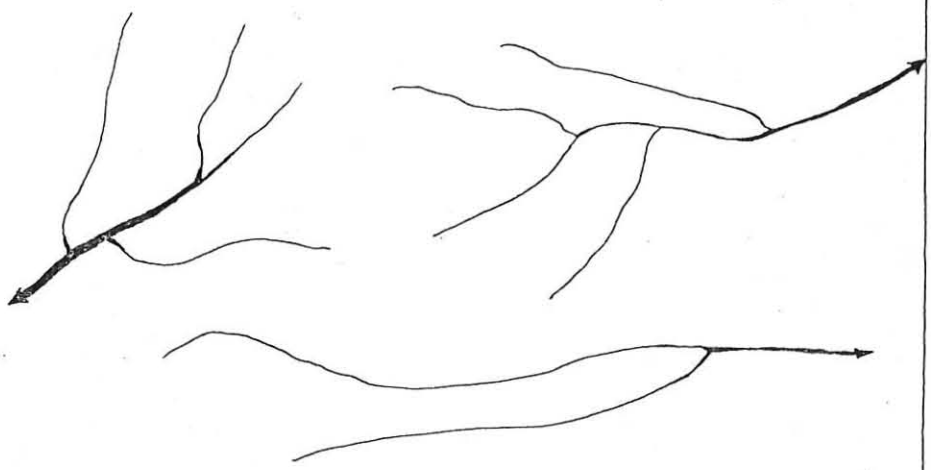
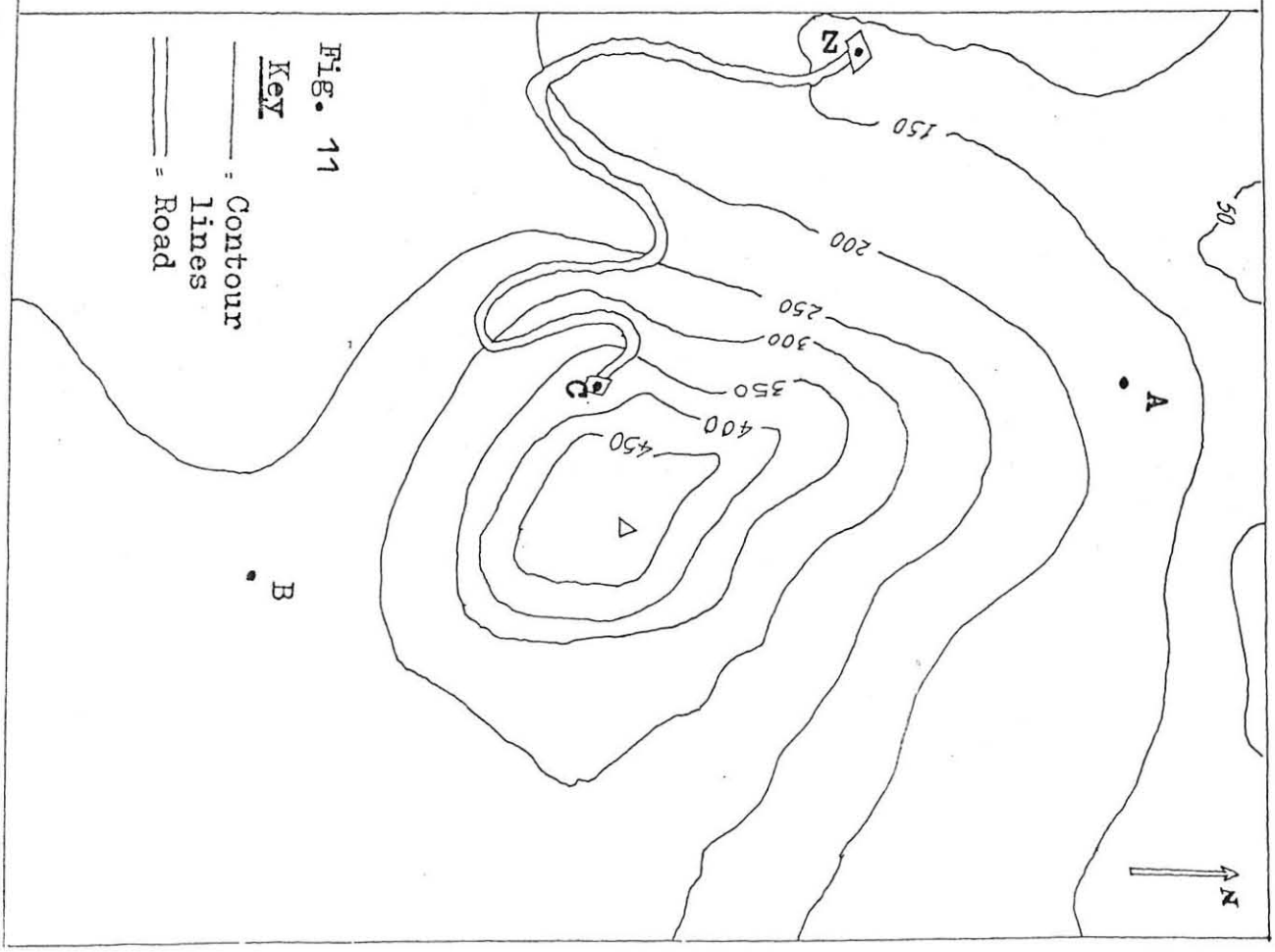


Fig. 11



APPENDIX II: Index of Discrimination, Point Biserial Correlation and Item Reliability Index for the first test.

Item No.s	Index Dis.	P	q	Si^2 (Pq)	$\sqrt{Pq}$ Si	r_{pbi}	$r_{pbi\ si}$	Selected Items
1	0.17	0.95	0.05	0.05	0.22	0.21	0.046	
2.	0.17	0.95	0.05	0.05	0.22	0.21	0.046	
3.	0.08	0.98	0.02	0.02	0.14	0.22	0.031	
4.	0.42	0.84	0.16	0.14	0.37	0.47	0.174	✓
5.	0.08	0.93	0.07	0.06	0.24	0.21	0.050	
6.	0.08	0.93	0.07	0.06	0.24	0.21	0.050	
7.	0.33	0.86	0.14	0.12	0.35	0.39	0.137	✓
8.	0.25	0.33	0.67	0.22	0.47	0.32	0.150	✓
9.	0.42	0.33	0.67	0.22	0.47	0.37	0.174	✓
10.	0.42	0.30	0.70	0.21	0.46	0.29	0.133	✓
11.	0.25	0.88	0.12	0.10	0.32	0.35	0.112	
12.	0.25	0.88	0.12	0.10	0.32	0.19	0.061	
13.	0.25	0.14	0.86	0.12	0.35	0.25	0.086	
14.	0.42	0.60	0.40	0.24	0.49	0.35	0.172	✓
15.	0.25	0.42	0.58	0.24	0.49	0.21	0.103	
16.	0.42	0.60	0.40	0.24	0.49	0.35	0.172	✓
17.	0.08	0.81	0.19	0.15	0.39	-0.13	-0.051	
18.	0.08	0.70	0.30	0.21	0.46	0.14	0.064	
19.	0.17	0.42	0.58	0.24	0.49	0.15	0.074	
20.	0.08	0.98	0.02	0.02	0.14	0.15	0.021	
21.	0.08	0.40	0.60	0.24	0.49	-0.09	-0.044	
22.	0.08	0.19	0.81	0.15	0.39	-0.13	-0.051	
23.	0	0.07	0.93	0.07	0.26	0.00	0	
24.	0.17	0.35	0.65	0.23	0.48	0.13	0.062	
25.	0.33	0.16	0.84	0.13	0.36	0.31	0.112	
26.	0.42	0.30	0.70	0.21	0.46	0.32	0.147	✓
27.	0.50	0.70	0.30	0.21	0.46	0.71	0.327	✓
28.	0.92	0.42	0.58	0.24	0.49	0.73	0.358	✓
29.	0.67	0.51	0.49	0.25	0.5	0.50	0.250	✓
30.	0.33	0.21	0.79	0.17	0.41	0.28	0.115	

Item No.s	Index of Dis.	P	q	Si^2 (Pq)	$\frac{Si}{\sqrt{Pq}}$	r_{pbi}	r_{pbi} Si	Selected Items
31.	0.67	0.26	0.74	0.19	0.44	0.63	0.277	✓
32.	0.58	0.16	0.84	0.13	0.36	0.58	0.209	✓
33.	0.67	0.23	0.77	0.18	0.42	0.61	0.256	✓
34.	0.92	0.30	0.70	0.21	0.46	0.74	0.340	✓
35.	0.83	0.35	0.65	0.23	0.48	0.75	0.360	✓
36.	0.67	0.30	0.70	0.21	0.46	0.66	0.304	✓
37.	0.33	0.79	0.21	0.17	0.41	0.28	0.115	
38.	0.50	0.74	0.26	0.19	0.44	0.43	0.189	✓
39.	0.50	0.74	0.26	0.19	0.44	0.40	0.176	✓
40.	0.33	0.74	0.26	0.19	0.44	0.27	0.119	
41.	0.67	0.26	0.74	0.19	0.44	0.62	0.273	✓
42.	0.58	0.30	0.70	0.21	0.46	0.55	0.253	✓
43.	0.50	0.33	0.67	0.22	0.47	0.47	0.221	✓
44.	0.58	0.16	0.84	0.13	0.36	0.62	0.223	✓
45.	0	0	0	0	0	0	0	
46.	0.08	0.02	0.98	0.02	0.14	0.32	0.045	
47.	0	0	0	0	0	0	0	
48.	0.08	0.86	0.14	0.12	0.35	0.15	0.053	
49.	0.33	0.35	0.65	0.23	0.48	0.27	0.130	✓
50.	0.50	0.63	0.37	0.23	0.48	0.41	0.197	✓
51.	0.33	0.37	0.63	0.23	0.48	0.31	0.149	✓
52.	0.67	0.60	0.40	0.24	0.49	0.43	0.211	✓
53.	0.58	0.63	0.37	0.23	0.48	0.40	0.192	✓
54.	0.67	0.60	0.40	0.24	0.49	0.49	0.240	✓
55.	0.33	0.26	0.74	0.19	0.44	0.30	0.132	✓
56.	0.67	0.28	0.72	0.20	0.45	0.63	0.284	✓
57.	0.58	0.33	0.67	0.22	0.47	0.55	0.259	✓
58.	0.25	0.14	0.86	0.12	0.35	0.24	0.084	
59.	0.33	0.19	0.81	0.15	0.39	0.26	0.101	
60.	0.08	0.14	0.86	0.12	0.35	-0.06	-0.021	

Item No.s	Index of Dis.	P	q	Si^2 (pq)	Si $\sqrt{pq}$	r_{pbi}	r_{pbi} Si	Selected Items
61	0.92	0.37	0.63	0.23	0.48	0.64	0.307	✓
62	0.67	0.33	0.67	0.22	0.47	0.53	0.249	✓
63	0.92	0.40	0.60	0.24	0.49	0.71	0.348	✓
64	0.58	0.51	0.49	0.25	0.5	0.44	0.220	✓
65.	0.42	0.77	0.23	0.18	0.42	0.37	0.155	✓
66	0.50	0.51	0.49	0.25	0.5	0.45	0.225	✓
67.	0.67	0.47	0.53	0.25	0.5	0.49	0.245	✓
68.	0.42	0.67	0.33	0.22	0.47	0.41	0.193	✓
69.	0.50	0.60	0.40	0.24	0.49	0.34	0.167	✓
70.	0.17	0.09	0.91	0.08	0.28	0.21	0.059	
71.	0.92	0.58	0.42	0.24	0.49	0.68	0.033	
72.	0.67	0.33	0.67	0.23	0.48	0.53	0.254	✓
73.	0.75	0.44	0.56	0.25	0.5	0.54	0.270	✓
74.	0.08	0.02	0.98	0.02	0.14	0.32	0.045	
75.	0.83	0.33	0.67	0.23	0.48	0.75	0.360	✓
76.	0.58	0.30	0.70	0.21	0.46	0.46	0.212	✓
77.	0.17	0.07	0.93	0.06	0.24	0.25	0.060	
78.	0	0	0	0	0	0	0	
79	0	0.02	0.98	0.02	0.14	0.05	0.007	
80	0.17	0.14	0.86	0.12	0.35	0.09	0.032	
81.	0.25	0.21	0.79	0.17	0.41	0.16	0.066	
82.	0.08	0.40	0.60	0.24	0.49	0.73	0.358	✓
83	0.42	0.65	0.35	0.23	0.48	0.28	0.135	✓
84	0.58	0.40	0.60	0.24	0.49	0.49	0.240	✓
85.	0.17	0.21	0.79	0.17	0.41	0.13	0.053	
86	0.58	0.26	0.74	0.19	0.44	0.56	0.246	✓
87	0.50	0.47	0.53	0.25	0.5	0.44	0.220	✓
88	0.25	0.51	0.49	0.25	0.5	0.21	0.105	

APPENDIX III: PERFORMANCE TEST PREPARED FOR SENIOR SECONDARY ART STUDENTS OF ADDIS ABABA -AFTER ITEM ANALYSIS

Name _____

School _____

GENERAL DIRECTION: Try all the map work questions in this booklet and write your answers in the space provided. Most of the questions will be answered by referring to the list of figures given separately.

* . Show the following parallels on Fig. 1.

1. Arctic Circle
2. Antarctic Circle

* . If the time in town X which is 75^0 W is 1:00 pm, what would be the time in:

3. Town Y which is 90^0 W?_____
4. Town G which is 0^0? _____
5. Town Z which is 45^0 E? _____

* . Use Fig. 8 and identify the symbols represented by letters D and W.

6. D represents _____
7. W represents _____

8. The straight line distance of AB on a map with RF: 1:40,000 is 4 cm. What would be the ground distance of AB? _____.

9. What distance on a 1:50,000 map can be represented by a ground distance of 3.5 km? _____.

10. The field distance (FD) of AB on Fig. 8 is found to be 60 km. Calculate the scale of the map. _____

11. Calculate the area of Ethiopia using the 1cm grid system provided on Fig. 2. _____

* . Using Fig. 3 give the latitude and longitude of points A, D and W in degrees, minutes and seconds.

12. Point A _____
13. Point D _____
14. Point W _____

* . Supply a six-figure grid reference for points P,Q and R on Fig. 3.

15. point P _____
16. point Q _____
17. point R _____

* . Which points of the compass are opposite in direction to each of the following?

18. NE _____
19. SSW _____

* . Convert the following compass directions into measurements in degrees.

20. WSW _____
21. N _____
22. NW _____
23. ENE _____

* . The different methods used to show relief are given below. Match them with their respective symbols provided on Fig. 4.

_____ 24. Layer tinting
_____ 25. Hachures
_____ 26. Hill shading
_____ 27. Spot height
_____ 28. Trigonometrical point
_____ 29. Bench mark

* . Match the different types of slopes with the sketches that represent them. The sketches are given on Fig. 5

_____ 30. Even slope
_____ 31. Convex slope
_____ 32. Concave slope

* . Match the following landforms with their simple sketches given on Fig. 6.

_____ 33. Spur
_____ 34. Mountain ridge
_____ 35. Valley
_____ 36. Plateau

* . Pair together the letters and numbers that represent the same relief features as shown by contours and sketches on Fig. 7. Example: 1 is represented by C.

37. 2 by _____
38. 3 by _____
39. 4 by _____
40. 5 by _____
41. 6 by _____

* . Refer to Fig. 8 and answer the following questions.

42. Draw a section of land form through a line connecting points A and B. Show your drawings on the attached sheet of paper.

43. Are points A and B intervisible? _____

44. Calculate the approximate height of points A and C:
A _____ C _____.

45. What is the direction of B from C _____.

* . Use Table 1 to answer questions below.

Table 1.

Sta.	J	F	M	A	M	J	J	A	S	O	N	D
A	24.4	24.9	24.3	24.5	22.5	21.8	20	24.5	21.5	22.5	22	23.3
B	13.7	13.5	13.4	14	13	12.2	12.5	12.5	12.6	13.3	13.3	14
C	29	27.5	28	25	20	19.7	16.5	19	17.7	23	27	26
D	22.1	24	21	23	28	29	27.3	24.8	24	20	19.8	23

46. Which station has the highest annual range of temperature?_____

47. Which station has the lowest? _____

48. Make a linegraph showing the distribution of temperature in station C on the attached sheet of paper.

49. Enlarge the map of Ethiopia on Fig. 2 by two and give the new scale. Use attached sheet of paper.

50. Draw a sketch map of Ethiopia on the attached sheet of paper and show the regional boundaries and name the 14 regions.

LIST OF FIGURES

Fig. 1

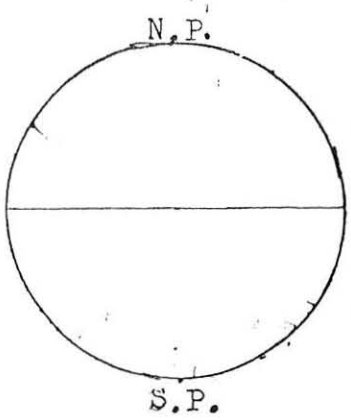


Fig.2

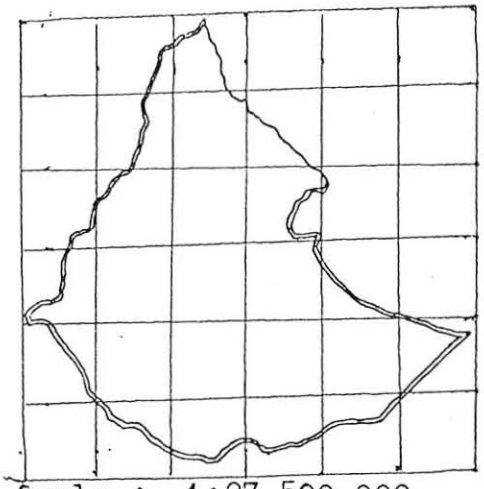
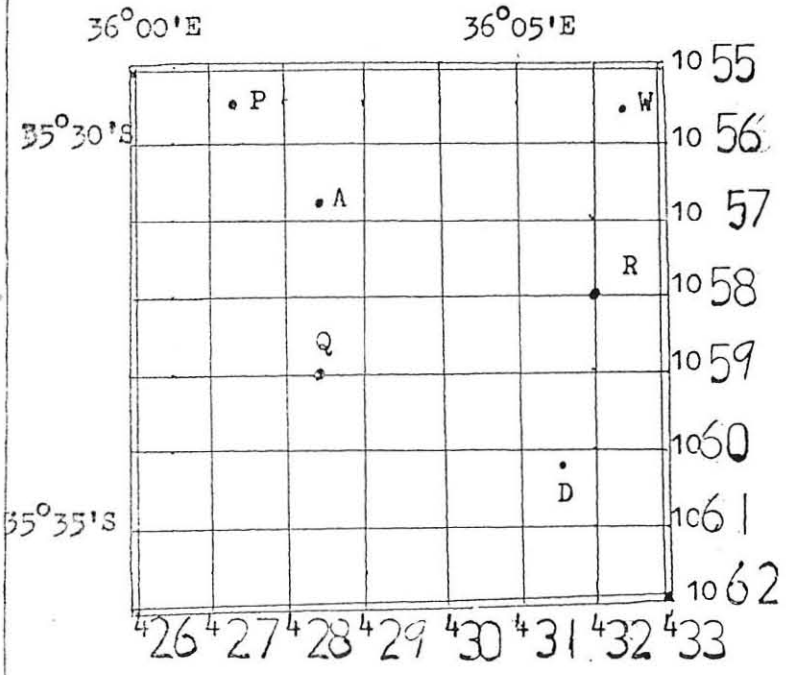
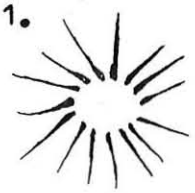


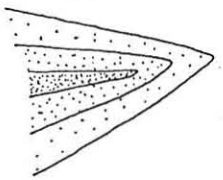
Fig.3



4.

1.





2. • 349

5.

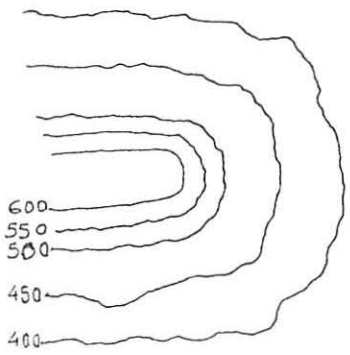
3. △ 7768

6.

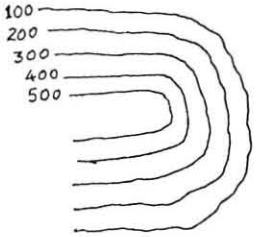
Fig.4

Fig.5

1.



2.



3.

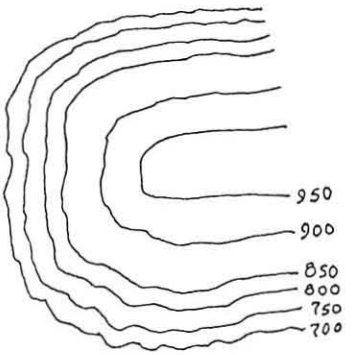


Fig. 6

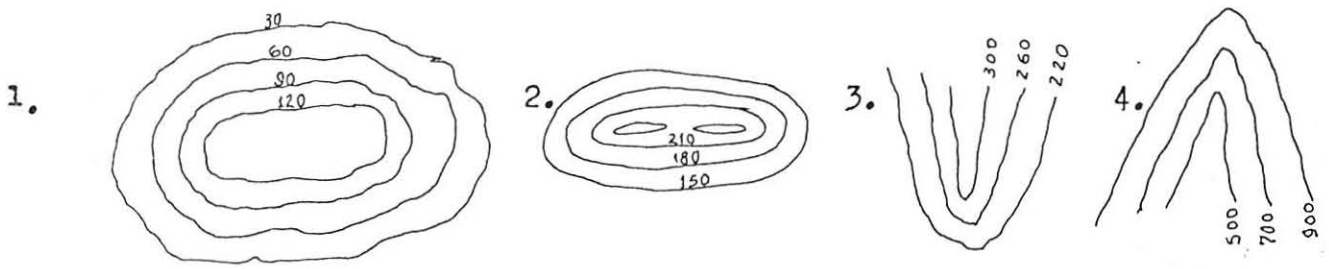


Fig.7

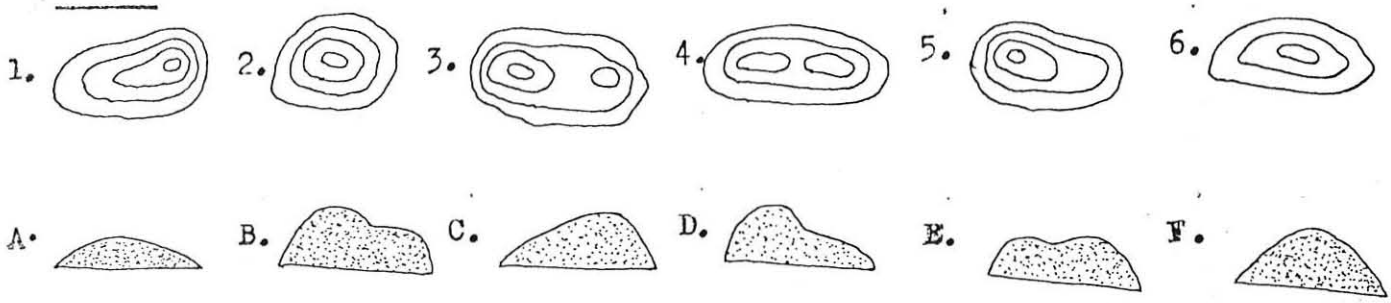
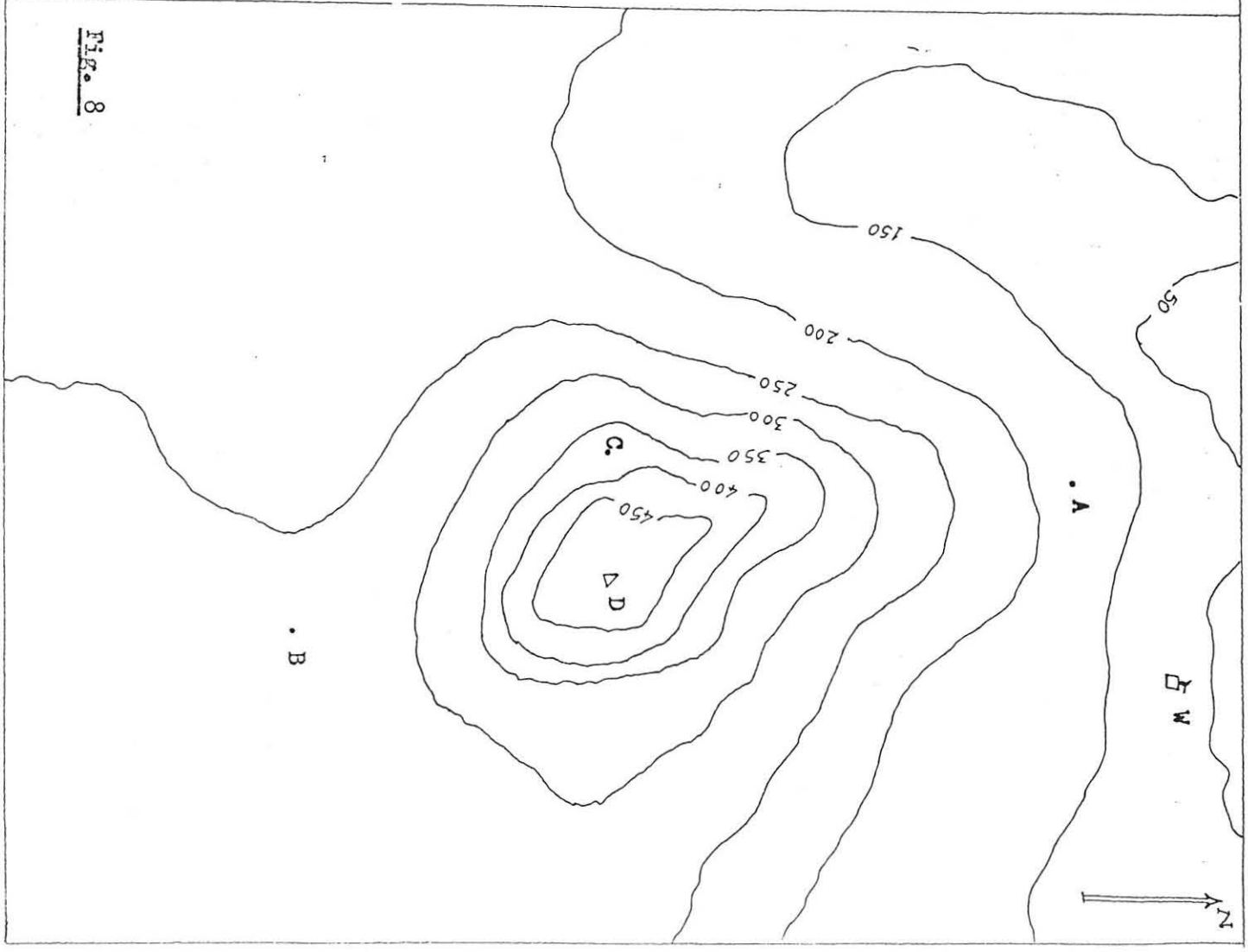


Fig. 8



APPENDIX IV: Number and Percentage of students who correctly answered each of the 50 = items.

Item No.s	NAME OF SAMPLE SCHOOLS												Total	
	Ethiopia Tikdem No. 1		Menelik II		SOS Higher 23		Wondirad		Akaki Adventist		Yehiwot Birhan			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1	17	63	26	81	22	81	18	67	11	79	21	91	115	77
2	17	63	26	81	22	81	18	67	12	86	21	91	116	77
3	10	37	7	22	0	0	3	11	2	14	0	0	22	15
4	10	37	4	13	3	11	4	15	2	14	0	0	23	15
5	13	48	4	13	3	11	3	11	2	14	0	0	25	17
6	16	59	3	9	2	7	14	52	4	29	1	4	40	27
7	9	33	5	16	6	22	3	11	4	29	11	48	38	25
8	11	41	9	28	10	37	6	22	9	64	10	43	55	37
9	8	30	8	25	6	22	6	22	6	43	13	57	47	31
10	6	22	4	13	1	4	7	26	6	43	11	48	35	23
11	1	4	3	9	1	4	2	7	1	7	0	0	8	5
12	3	11	4	13	0	0	9	33	3	21	3	13	22	15
13	2	7	4	13	3	11	10	37	7	50	3	13	29	19
14	2	7	3	9	0	0	6	22	5	36	0	0	16	11
15	0	0	2	6	0	0	2	7	3	21	1	4	8	5
16	4	15	16	50	12	44	7	26	5	36	14	61	58	39
17	4	15	18	56	16	59	8	30	5	36	20	87	71	47
18	19	70	23	72	10	37	16	59	9	64	22	96	99	66
19	22	81	21	66	9	33	17	63	8	57	18	78	95	63
20	7	26	5	16	2	7	10	37	3	21	4	17	31	21
21	15	56	14	44	8	30	18	67	6	43	9	39	70	47
22	6	22	9	28	3	11	11	41	5	36	4	17	38	25
23	9	33	6	19	2	7	9	33	4	29	4	17	34	23
24	5	19	11	34	9	33	9	33	7	50	19	83	60	40
25	8	30	12	38	10	37	11	41	10	71	19	83	70	47
26	13	48	7	22	16	59	11	41	7	50	19	83	73	49
27	16	59	8	25	12	44	14	52	7	50	12	52	69	48
28	15	56	11	34	8	30	20	74	9	64	14	61	77	51

Item No.s	NAME OF SAMPLE SCHOOLS												Total	
	Ethiopia Tikdem No. 1		Menelik II		SOS Higher 23		Wondirad		Akaki Adventist		Yehiwot Birhan			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
29	17	63	17	53	2	7	13	48	9	64	21	91	79	53
30	20	74	24	75	13	48	15	56	12	86	23	100	107	71
31.	11	41	14	44	7	26	10	37	6	43	11	48	59	39
32	9	33	15	47	11	41	11	41	7	50	11	48	64	43
33	14	52	10	31	7	26	15	56	4	29	7	30	57	38
34	8	30	6	19	4	15	14	52	3	21	18	78	53	35
35	9	33	6	19	7	26	14	52	4	29	5	22	45	30
36	13	48	12	38	16	59	17	63	5	36	22	96	85	57
37	6	22	20	63	24	89	23	85	6	43	19	83	98	65
38	13	48	11	34	12	44	16	59	6	43	12	52	70	47
39	11	41	13	41	14	52	17	63	7	50	13	57	75	50
40	16	59	17	53	17	63	14	52	10	71	13	57	87	58
41	4	15	17	53	15	56	17	63	4	29	18	78	75	50
42	2	7	2	6	0	0	5	19	3	21	1	4	13	9
43	17	63	11	34	8	30	11	41	4	29	11	48	62	41
44	13	48	12	38	9	33	12	44	7	50	13	57	66	44
45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
46	13	48	25	78	15	56	16	59	6	43	18	78	93	62
47	20	74	29	91	16	59	25	93	10	71	22	96	122	81
48	13	48	10	31	2	7	10	37	6	43	13	57	54	36
49	11	41	11	34	1	4	5	19	7	50	11	48	46	31
50	16	59	17	53	5	19	16	59	8	57	21	91	83	55

APPENDIX V: QUESTIONNAIRE TO BE FILLED IN BY SENIOR SECONDARY GEOGRAPHY TEACHERS ONLY

Dear Respondent,

The aim of administering these questionnaires is to get relevant data regarding the state of teaching and learning "Mapwork Skills" in selected Senior Secondary Schools of Addis Ababa. You are, therefore, kindly requested to supply information about this issue in your school. The researcher appreciates your cooperation in advance.

Note: 1. Where there are alternatives, please show your choice by putting "X" mark.

2. Where you are required to write your opinion, please make it as clear and concise as possible.

3. You do not need to write your name.

1. Name of the school you teach at present _____

2. Your qualification: BA Degree ___ Diploma ____ Others____

3. College or University you graduated from _____

4. Years of experience in teaching geography: total _____
   in grade 9 _____ 10 _____ 11 _____ 12 _____

5. How often do you teach mapwork skills?

Frequency	Grade level			
	9	10	11	12
once in a week				
Once in two weeks				
Once in four weeks				
Not at all				

6. In what ways do you teach mapwork skills? Please give brief description of the method (s) you use. (You can use the other side of this page too).

_____
_____
_____
_____

7. Do you believe that the method(s) you employed is/are the most appropriate for teaching mapwork skills?

Yes _____ No _____

8. If not, what forced you to adhere to the method(s) you think is/are not appropriate for that purpose?

_____
_____
_____

9. Which of the following materials are available in your school? Please indicate an exact or approximate number of each material available in the space provided.

1. Maps of the world _____
2. Maps of Africa _____
3. 1:250, 000 map of Ethiopia ____
4. Other maps of Ethiopia _____
5. Globes _____
6. Pictures _____
7. Graphs _____
8. Diagrams _____
9. Models _____
10. Specimens _____
11. Locally prepared maps
12. Mathematical instruments: rulers, dividers, protractors _____
13. Mapographs_____
14. Atlas of Mesfin W. Mariam _____
15. Other Atlases _____

10. If there are other materials in your school, list them below

1. _____ 2. _____
3. _____ 4. _____
5. _____ 6. _____

11. Which of the materials listed under 10 and 11 are more preferred by you while teaching mapwork skills?

1. _____ 2. _____ 3. _____

12. Why do you prefer these materials most?

_____

_____

13. Which of the following facilities are available in your school?

A. Geography laboratory _____ B. School pedagogical centre
C. School workshop _____ D. Geography club _____

14. To which of the textbooks do you give greater emphasis? "main texts" _____ or Map-reading textbooks _____

15. If you put a greater emphasis on the "main texts", why is that?

A. because this is required by the Ministry of Education ____
B. because they contain the most important content _____
C. because they are easily understandable for me and the students as well _____
D. Any other reason _____

_____

16. Why is that "Map-Reading" part did not get due consideration in your school?

A. because greater share of the time available is assigned for the "main texts" _____
B. when compared to the "main texts", map-reading texts contain content of less importance _____
C. there are no enough supplementary materials to teach this part _____
D. this part requires more planning and preparation _____
E. Any other reason _____

_____

17. Please list the major weaknesses of "Map-Reading" textbooksgrades 9-11.

1. _____
2. _____
3. _____
4. _____
5. _____

18. Have you ever referred to other books related to basic mapwork skills?

Yes _____ No _____

19. If yes, please write their author and title below.

1. _____
2. _____
3. _____
4. _____
5. _____

20. Do you often consult mapwork questions that appear in the ESLCE?

Yes _____ No _____

21. If yes, why?

A. to shape my instruction in line with the questions _____
B. to evaluate them and make comments _____
C. to inform students where to emphasize while studying ____
D. Any other reason _____
_____

22. Have you ever conducted a field work? Yes ____ No _____

23. If your answer is yes, please give brief account of your field work including the time, site and related matters (you can use the other side of this page too).

_____
_____
_____
_____

24. How do you rate the interest of your students in learning "map work skills"?

A. High _____ B. Moderate _____ C. Low _____

25. If it is low, please give reasons for that.

_____
_____

26. How do you evaluate the courses offered in higher institutions that are related to basic mapwork skills?

A. they are insufficient _____
B. they are sufficient but inappropriate for junior and senior schools _____
C. they are neither sufficient nor appropriate _____
D. they are sufficient and appropriate _____

27. Do you believe that "mapwork" is as important as other contents of geographic education?

Yes _____ No _____

28. If yes, mention some of the uses of mapwork skills for students.

1. _____
2. _____
3. _____
4. _____
5. _____

29. What are the major factors affecting the teaching and learning of mapwork skills? If you take more than one, put them in rank order.

A. Lack of comprehensive knowledge in this area during my training _____
B. Lack of necessary equipment in my school _____
C. Shortage of time to teach basic mapwork skills _____
D. Absence of appropriate classroom environment for practicing skills _____
E. Any other reason _____
_____
_____

30. What should the Ministry of Education and/or your school do in order to improve the existing condition of teaching "mapwork"? (you can use the other side of this page).

_____
_____
_____
_____
_____
_____
_____
_____

APPENDIX VIA: QUESTIONNAIRE TO BE FILLED IN BY GRADE 12 GEOGRAPHY STUDENTS ONLY

Dear Respondent,

The aim of administering these questionnaires is to get relevant data regarding the state of teaching and learning "Mapwork skills" in selected Senior Secondary Schools of Addis Ababa. You are, therefore, kindly requested to supply information about this issue in your school. The researcher appreciates your cooperation in advance.

Note: 1. Where there are alternatives, please show your choice by putting 'x' mark.
2. Where you are required to write your openion, please make it as clear and concise as possible.

1. Your Name _____
2. Name of your school _____
3. How often have you learned mapwork skills?

	Grade Level		
Frequency	9	10	11
Once in a week			
Once in two weeks			
Once in four weeks			
Not at all			

4. In what ways did you learn the mapwork skills? (Please explain the methods of teaching and learning used).

_____
_____
_____
_____

5. Which of the following materials are available in your school?

1. Maps of the world _____
2. Maps of Africa _____
3. 1:250,000 map of Ethiopia ____
4. Other maps of Ethiopia
5. Globes _____
6. Pictures _____
7. Graphs _____
8. Specimens _____

9. Locally prepared maps _____
10. Mathematical Instruments: rulers, dividers, Proteractors ___
11. Mapographs _____
12. Atlases of Mesfin W.M
13. Other Atlases _____

6. If there are other materials in your school, list them below.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

7. Which of the materials listed under 5 and 6 are more utilized? Please put them in rank order.

1. _____ 2 _____ 3. _____

8. To which of the text books do you give greater emphasis? 'main-texts' _____ or Map-reading textbooks _____

9. If you put a greater emphasis on the 'main-texts', why is that?

A. because my teacher advised me to do so _____
B. because they contain the most important content _____
C. because they are easily understandable _____
D. any other reason _____
_____

10. Why is that 'map-reading' part did not get due consideration in your school?

A. because the greater share of the time available is assigned for the 'main-texts' _____
B. when compared to the 'main-texts', they contain content of less importance _____
C. there are no supplementary materials to teach them _____
D. any other reason _____

11. Have you ever referred to other books related to mapwork skills? Yes _____ No _____

12. If yes, please write their authors and titles below.

1. _____
2. _____
3. _____
4. _____

13. Do you often consult mapwork questions that appear in the ESLCE? Yes _____ No _____

14. If yes, please give the reason for that _____
_____
_____

15. How do you rate the interest of your teachers to teach mapwork skills?

A. High _____ B. Moderate _____ C. Low _____

16. How do you rate the ability of your teachers to teach mapwork skills?

A. very competent _____ B. Moderately competent ___
C. incompetent _____

17. Do you think that it is important to teach mapwork skills in high schools? Yes _____ No _____

18. If yes, mention some of the uses of mapwork skills for you.

1. _____
2. _____
3. _____
4. _____
5. _____

19. Have you learned any of the mapwork skills in elementary or junior secondary levels? Yes _____ No _____

20. If yes, do you think that it helped you at the senior secondary level? Yes _____ No _____

21. What are the major factors affecting the teaching and learning of mapwork skills? If you take more than one, put them in rank order.

A. Lack of competent teachers _____
B. Lack of necessary equipment _____
C. Shortage of time to teach 'mapwork skills' _____
D. Absence of appropriate classroom environment for practicing skills _____
E. Any other reason _____
_____

22. What do you suggest that your school or the Ministry of Education should do to improve the state of teaching and learning mapwork.

_____
_____
_____
_____
_____
_____
_____

APPENDIX VIB

በ12ኛ ክፍል ፎሺአግራፊ ተማሪ ዎች የሚሞላ ቃለመጠይቅ

ውድ ተማሪ:

የዚህ ቃለመጠይቅ ዓላማ በተወሰኑ የአዲስ አበባ ከፍተኛ ሁለተኛ ደረጃ ትምህርት ቤቶች የማኘ ሪድንግ ትምህርት መማርና ማስተማር ሁኔታዎችን ለመገምገም ነው:: ስለዚህ አንተም በዚህ ጉዳይ ላይ መረጃ እንድትሰጥ በትህትና እየጠየቅሁህ ለተብብርህ በቅደሚያ አመሰግናለሁ ::

ማሳሰቢያ: 1. አማራጪች በቀረቡህ ቦታ ሁሉ ምርጫህን 'x' ምልክት በመፃፍ አመልክት ::

2. በፅሑፍ መልስ በሚያስፈልግበት ፅሑፍህ አጠር ያለና ግልጽ ቢሆን መልካም ነው ::

1. ስም _____

2. የትምህርት ቤትህ ስም _____

3. በት/ቤታቸሁ ማኘ ሪድንግ ስንት ጊዜ ይሰጣል ?

ጊዜ	የክፍል ደረጃ		
	9ኛ	10ኛ	11ኛ
በሳምንት አንዴ			
በሁለት ሳምንት አንዴ			
በአራት ሳምንት አንዴ			
በጭራሽ አልተሰጠም			

4. በእናንተ ትምህርት ቤት ማኘ ሪድንግ የምትማሪት በምን ሁኔታ ነው:? ዘዴዎችን ዘርዘር አድርገህ ፃፍ::

_____

_____

_____

_____

5. ከዚህ በታች ከተዘረዘረት የሚስገራፊ ትምህርት መርጃ መሣሪያዎች በአናንተ ትምህርት ቤት ያሉትን ብቻ ምልክት በማደረግ አሳይ ::

ሀ. የዓለም ካርታዎች _____

ለ. የአፍሪካ ካርታዎች _____

ሐ. የኢት//ካርታዎች/ መስፍርት: 1 : 250,000/ _____

መ. ሌሎች የኢት ዩጵያ ካርታዎች _____

ሠ. ሉሳ _____

ረ. ስዕሎች _____

ሰ. በትምህርት ቤት ውስጥ የተሠረ ካርታዎች _____

ሸ. ሠንጠረዦች _____

ቀ. የተለያዩ ድንጋዮች ፣ ጥራጥሬዎችና ቅመማቅመሞች ክምችት _____

በ. የሒሳብ መሥሪያ መሣሪያዎች፣ ማስመሪያ፣ ሲሻይደር፣ ፕሮተራክተር፣ወዘተ_____

ተ. የካርታ መሥሪያ ማኅተም /ማያግራፍ/ _____

ቸ. የመስፍን ወ/ማርያም አትላስ _____

ነ. ሌሎች አትላሶች _____

6. አሳይ ከተጠቀሱት መርጃ መሣሪያዎች ሌላ ካሉ ከዚህ በታች ፃፍ

1. _____ 2. _____

3. _____ 4. _____

7. በተራ ቁጥር አምስትና ስደሳት ከተጠቀሱት መሣሪያዎች ዘወትር የምትጠቀሙት የትኞቹን ነው?:: በደረጃ አስቀምጣቸው ::

1. _____ 2. _____ 3. _____

8. የበለጠ ትኩረት የምትሰጠው ከዚህ በታች ካሉት መጽሐፍት ለ የትኞቹ ነው?

ለማኘ ሪድንግ _____ ለ ዋና መፅሕፍት _____

9. ለ ዋና መፃሕፍት የበለጠ ትኩረት የምትሰጥ ከሆነ ለምንድነው?

ሀ. አስተማሪዎቹ ይህንን እንዳደርግ ምክር ስለሚሰጡኝ_____

ለ. ዋናዎቹ መፃሕፍት ከማኘሪድንግ የበለጠ ጠቃሚ ይዘት ስላላቸው _____

ሐ. ዋናዎቹ መፃሕፍት ለመረዳት አስቸጋሪ ስላልሆኑ _____

መ. ሌላ ምክንያት ካለ _____

_____

10. የማኘ ሪድንግ መፀሕፍት ተገቢውን ትኩረት ያላገኙት ለምን ይመስለሃል?

ሀ. አብዛኛው ጊዜ ዋናዎቹን በመማር ስለሚያልቅ _____

ለ. ከዋናዎቹ መፀሕፍት ጋር ሲወዳደር ይዘታቸው አምብዛም ጠቃሚ ስላልሆነ_____

ሐ. አስፈላጊ የትምህርት መርኻ መሣሪያዎች በበቂ ስለሌሉ _____

መ. ሌላ ምክንያት ካለ _____

_____

11. ከዋናዎቹና ማኘ ሪድንግ መጻሕፍት ሌላ ተዛማጅ መፀሕፍት አንብባህ ታውቃለህ?

አዎን _____ አላውቅም _____

12. አንብበህ ከሆነ የደራሲዎቹን ስምና የመፀሕፉን ርዕሶች ከዚህ በታች ፃፍ::

1. _____
2. _____
3. _____
4. _____
5. _____

13. በማትሪክ ላይ የሚወጡ የማኘሪድንግ ጥያቄዎችን ዘወትር ታነባቸዋለህ?

አዎን _____ አላነባቸውም _____

14. የምታነብ ከሆነ ምክንያቱ ምን እንደሆነ ግለጽ _____

_____

_____

15. አስተማሪዎችህ የማኘ ሪድንግ ትምህርት ለማስተማር ያላቸውን ችሎታ እንዴት ታያለህ?

ሀ. ከፍተኛ ብቃት አላቸው _____ ለ. አማካይ ችሎታ አላቸው ____

ሐ. ብቃት የላቸውም _____

16. አስተማሪዎችህ የማኘ ሪድንግ ትምህርት ለማስተማር ያላቸውን ፍቀር እንዴት ታያለህ ?

ሀ. በጣም ከፍተኛ ነው _____ ለ. መጠነኛ ነው _____

ሐ. ዝቅተኛ ነው _____

17. በሁለተኛ ደረጃ የማኘ ሪድንግ ትምህርት መሰጠት ጠቃሚ ነው ብለህ ታምናለህ?

አዎን _____ አላምንም _____

18. የምታምን ከሆነ ማኘ ሪድንግ በመማር ከምታገኛቸው ጥቅሞች ጥቂቶቹን ጻፍ ::

1. _____
2. _____
3. _____
4. _____
5. _____

19. በ1ኛና መለስተኛ ሁለተኛ ደረጃዎች ከማኘሪድንግ ጋር የተዛመደ ትምህርት ተምረሃል ?

አዎን _____ አለተማርኩም _____

20. ለ19ኛው ጥያቄ ምላሽህ ' አዎን' ከሆነ በዚያን ጊዜ የተማርከው አሁን እየረዳህ እንደሆነ ታምናለህ?

አዎን _____ አላምንም _____

21. በማኘ ሪድንግ መማርና ማስተማር ላይ ተጽዕኖ ያደርጋሉ የምትላቸውን ነገሮች አመልክት :: ከአንድ በላይ ይሆናሉ ካሰብክ / 1ኛ, 2ኛ, 3ኛ/ በማለት ደረጃ ስጥ::

ሀ. ብቃት ያላቸውን አስተማሪዎች ያለማግኘት _____

ለ. በቂ የትምህርት መርጃ መሣሪያዎች ዕጦት _____

ሐ. የማኘ ሪድንግ ለማስተማር የጊዜ ጥበት _____

መ. በክፍል ውስጥ ለመለማመድ የሆኔታዎች ያለመመቻቸት _____

ሠ. ሌላ ካለ _____

_____

22. ከላይ የተጠቀሱትን ወይም ሌሎች ችግሮች ለመቀነስ ት/ቤታችሁ ወይም የትምህርት ሚኒስቴር ምን ማደረግ ይጠበቅባቸዋል ::

_____

_____

_____

_____

_____

_____

APPENDIX VII:

Interview Questions Prepared for Geography Teachers and Department Heads

Date _____

Your Name _____

Your school's Name _____

Your position: Teacher _____ Department Head _____

1. Please give a general comment on the place given to "mapwork skills" in the overall geographic education.

2. Have you observed any limitations in the map-reading textbooks being used? If yes, what are the main ones?

3. Have you ever conducted fieldwork in your school? Do you think that there are possibilities to attain objectives related to mapwork skills without conducting a field work? Explain in some detail.

4. What instruments of evaluation do you often use to assess students' peformance in mapwork skills?

5. Do you think that the existing facilities and teaching aids are sufficient for effective teaching and learning of mapwork skills? If no, what are you doing or planning to do in order to solve the problem related to the scarcity of facilities or materials?

6. Do you (and your colleagues) have interest in teaching mapwork skills? (please be as frank and free from any suspicion as possible).

DECLARATION

I the undersigned declare that the thesis is my original work, has not been presented for a degree in any other university and that all sources of material used for the thesis have been duely acknowledged.

Name Akiilu Dalelo Wamisho

Signature 

Place and Date of Submission School of Graduate Studies, Addis Ababa University, June 8, 1992.