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**A STUDY ON THE ACADEMIC PERFORMANCE OF GRADE 8 STUDENTS
BEFORE AND AFTER THE INTRODUCTION OF THE NEW CURRICULUM
THE CASE OF ATSE TEWODROS PUBLIC SCHOOL**

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CHAPTER I

Introduction

1.1 General

Education is essential to progress toward meeting the growing demands of contemporary society. The fact that each succeeding generation of educated youth is expected to face and resolve the challenge of modern society necessitates serious and continued attention to planning curriculum.

Curriculum can be defined in several ways but the most widely used definition of curriculum is that which defines curriculum as “plan for an educational program.” The scope of the term varies from a curriculum for a single subject to a multi year sequence that includes several academic subjects.

The following information regarding curriculum revision is summarized from a hand out written by Dr. Abebe Bekele entitled curriculum.

In our country several curriculum have been designed and implemented since 1947 when the first curriculum was developed. This curriculum was developed by a curriculum committee consisting largely of foreigners of different nations. Accepting suggestion on the first curriculum, the second curriculum was developed in 1948.

The reasons that were raised against the first curriculum were that, in this curriculum, which used a 6-6 structure, i.e. six years elementary and six years secondary classes, the performance of grade 6 completers was not satisfactory particularly from provinces, specially in their command of English.

The other reason for the revision of the first curriculum is that, after world war II many countries have developed to extend duration of elementary education and hence in order to replicate this move in our country the then government has revised the curriculum.

Until 1963 almost all schools except some experimental schools used the second curriculum which used 8-4 structure i.e. 8 years elementary followed by 4 years secondary education.

In 1963 the third curriculum was developed which uses 6-2-4 structure, i.e. 6 years elementary, 2 years junior and 4 years secondary.

Amharic was used as a medium in elementary and English as a medium after wards.

This curriculum has continued until 1974 revolution and was slightly revised, not by structure but by content. Since the country's ideology was declared to be socialism, the curriculum was revised to cop up with this ideology.

The mixed economy implemented in 1990 has brought about a change in the contents of some subjects. For example, the subject political education was discarded and was replaced by civic education. This change made no major work to change the curriculum rather than deleting topics and chapters that advocate the socialist ideology.

The last change in curriculum was done in the current government in 1996. The major reasons given are :

- I) To minimize the sudden decrease in the number of students that join higher education, the screening will be tight in lower classes and hence few students will sit for ESLCE , among which most will join higher education.
- II) To give chances for those who could not be able to pass national examination, which will be given at grade 10, vocational schools and other training institutions will be opened.
- III) To allow students learn in their mother tangué at elementary level.

The structure of this curriculum is 5-3-2-2- i.e. 5 years elementary,3-years junior and 2years secondary. Those who maintain to pass grade 10 national examination will continue to learn for 2 years to make them prepared for higher education.

This curriculum is criticized by some bodies. Among the criticisms the major one is that , in the current situation there are no as such enough vocational training institutions and thus students who fail to pass grade 10 national exam are left even with out completing their secondary education.

This study is conducted on Atse Tewedros public school. Atse Tewedros public school has more than 30 years of history. The school was founded by an individual 30 years ago and was made to be governmental school by the previous government until 1983 E.C. Now

the school is a public school and gives its service to more than 1000 students from the surrounding area and other locations. As in most public school, students pay tuition fees depending on their grades.

1.2 Objective of the study

As stated in the introductory part of this study, one of the main factors that contribute much to a country's development is education.

Education should be planned so that it brings about a significant improvement in the country's socio-economic development. For this purpose there must be a well-designed curriculum. In our country a new curriculum is designed and implemented recently.

The objective of this study is to assess the probable effect of the changed curriculum on students performance in grade 8 and to investigate the correlation between grade 7 and 8 performances in the new curriculum.

1.3 limitations of the study

This study is conducted on a particular school and considered only one grade . Thus it may not be effective enough to judge the changed curriculum and make generalizations about its effects. But it can serve as a basis for undertaking further investigations by considering more schools and grades .

1.4 overview of the study

This study is composed of five chapters. The first chapter is the introductory where the objective and limitations are given. The second chapter deals with methods of data collection and sample selection. The third chapter is concerned with the methods of data analysis, and in chapter four the methods are applied to the data . The last chapter covers conclusions and summary.

CHAPTE II

METHODS OF DATA COLLECTION AND SAMPLE SELECTION

In order to apply statistical methods to Any type of survey it is essential that statistical data be collected as statistical analysis is impossible in the absence of data .

Data can be defined as facts or information used in making decision about a particular problem at hand . Data are in fact, fundamentals of statistics. Therefor an all-important step in statistical work is the collection of facts and figures systematically.

2.1 Basic concepts and definitions

- Population: - is the totality of all units under investigation. It consists of a specified type of persons or objects over a given space and time .
- Sample: - a sample is a subset of the population selected by some method in order to make inference about the characteristics of the population. It will represent the population.
- Elementary units :- are elements or group of elements of the population on which in formation is requested.
- Sampling units:- are non – over lapping collection of units to be selected from the sampling ~~frame~~

- Frame:- is the list of all sampling units.
- Characteristics:- properties of units that are attempted to be measured and recorded for every unit .
- Sampling:- is the scientific procedure of selecting those sampling units which would provide the required estimates with associated margins of uncertainty, arising from examining only a part not the whole.

2.2 Sources and Types of Data

2.2.1 Sources of data

After having determined the objective and scope of survey it becomes necessary to think about sources from which data have to be collected. Broadly speaking, there are two sources of information namely, primary source and secondary source. Primary source is source of data that collect the data it self. Where as secondary source is one that makes data available, which were collected by some other agency. A primary source usually has more detailed information particularly on the procedures followed in collecting and compiling the data.

2.2.2 Types of data

Depending on the source, statistical data are classified under two categories- primary data and secondary data.

Primary data are data which are obtained by a study specifically designed to fulfill the data needs of the problem at hand . Such data are original in nature .

Secondary data on the other hand , are data which are not originally collected but rather obtained from published or unpublished source.

2.3 Methods of data collection

2.3.1 Factors affecting choice of method of collection

It is obvious that the methods of collecting primary and secondary data would not be identical because in one case the data have to be originally collected while in the other case the work is of the nature of composition.

There are various methods of collection of primary and secondary data and the choice of the method depends on a number of factors. Among other factors, the nature, scope and objective of the survey determine the method of data collection to be employed . In addition, the availability of finance and time also contribute to the choice of the method to be used .

2.3.2. Methods of collecting primary data

The following methods of collecting primary data are in common use

- i) Direct personal investigation:- as the name indicates, the investigator has to collect the information personally from the sources.
- ii) Indirect oral investigation:- In this method data are obtained indirectly from persons who are supposed to have knowledge of the problem considered

- iii) By schedules and questionnaires:- In this method data are collected by preparing a list of questions on a paper.
- iv) By local reports: - In this method data are collected by local correspondents or agents.

2.3.3. Methods of collecting secondary data

As mentioned earlier secondary data are those which have already been collected and analyzed by some one else, and as such problems associated with the original collection of data may not be encountered.

The sources of Secondary data can be :-

- Official publications of state and local governments
- Official publications of international bodies like the U.N
- Reports and publications of trade associations, Banks, stock exchanges, universities, schools , researchers etc.

2.4 Sampling procedures

As tried to explain before, sampling is the process by which estimate and inference is made to the whole by examining the sample which is the subset of the population selected by some method.

This procedure is the foundation of all other statistical treatments to follow and hence requires serious attention. In order to carry out this process effectively four main steps can be followed.

- Defining the population.

- Listing the population i.e. construction of frames.
- Selecting a representative sample.
- Obtaining an adequate sample.

2.4.1 Method of Sampling

A sample survey would give dependable conclusion only if the sample is a true representative of the population. In general, there are two methods by which samples can be selected. They are Probability sampling and non – probability sampling.

In probability sampling, the selection of the units is done in such a manner that, the chance of selection of each unit of the population is the same. In other words, the selection of the units depends entirely on chance and one does not know before hand which units will actually constitute the sample.

This method of sampling has many advantages over non-probability sampling.

The most significant merit of this system is that, by theory of probability it is possible to have an idea about the errors of estimation and it is also possible to assign limits within which the true value of a measure of population may lie. Further more, this method is not affected by prejudice or bias of the investigator.

On the other hand, non-probability sampling is based on personal judgment. In this method it is not possible both to estimate sampling variability from the sample and to know about the possible biases involved.

Examples of probability sampling

- Simple random sampling
- Stratified sampling
- Systemic sampling
- Cluster sampling.

Examples of non-probability sampling.

- Haphazard and samples of volunteer subjects
- Expert choice
- Quota sampling.

2.5 Methods of Sampling and Data source used for this Study

The method of sampling used for this study is simple random sampling which is a basic probability sampling. Formally, simple random sampling can be defined as method of selecting n units out of a finite population of size N such that every one of the $\binom{N}{n}$ distinct sample has an equal chance of being drawn.

In practice, a simple random sample is drawn unit by unit. The units of the population are numbered from 1 to N . A series of random numbers between 1 and N are then drawn by means of table of random numbers or by means of a computer program that produces such a table.

For this study the units are drawn by using a computer program given in the appendix of this study.

The data used for this study is a secondary data obtained from the record office of Atse Tewedros Public School. The frame is constructed from the roster list of the students.

The populations considered are collection of students of grade 8 from the same school who have taken grade 8 national examination in the years 1990(old curriculum) and 1991 (new curriculum) E.C.

For these students , grade 8 national exam results on Amharic ,English , Mathematics, geography and science for the old curriculum and Amharic, English, Mathematics ,Biology, Physics and Chemistry for the new curriculum are used for the study . Further more , grade 7 results of the students taken in grade 8 (new curriculum) are used in the study. The two main populations of interest are:

population 1:- students who have taken grade 8 national exam in 1990 E.C (old curriculum).

Population 2:- Students who have taken grade 8 national exam in 1991 E.C (new curriculum).

2.6 Sample Size Determination

No matter how much experienced a researcher may be ,he is always confronted with the problem of determining sample size . This decision is important in that too large a sample implies waste of resources, and too small a sample diminishes the utility of the results obtained.

The following four steps can be of help to get a sample of reasonable size

- i) There must be some statement concerning what is expected of the sample. This statement may be in terms of desired limits of error or in terms of some decision that is to be made or action to be taken when the sample results are known.

- ii) Some equation that connects the sample size n with the desired precision of the sample must be found. The equation will vary with the content of the statement of precision and with the kind of sampling that is contemplated. One of the advantages of probability sampling is that it enables this equation to be constructed.
- iii) This equation will contain, as parameters, certain unknown properties of the population. This must be estimated in order to give specific values .
- iv) Finally, the chosen value of n must be appraised to see whether it is consistent with the resources available to take the sample. This demands an estimation of cost, time and materials required to obtain the proposed size of sample .

Following the above mentioned procedures the sample selection can be done as follows :

Considering that one of the parameters to be estimated in the analysis is the population mean μ we can decide on the permissible margin of error and confidence limits with in which the estimate is to lie.

Deciding that the acceptable risk that μ will lie out side the limits $y \pm d$ is α , where y is the sample mean, we proceed as follows :-

The standard error of y is given to be

$$\sigma_y = \frac{\hat{\sigma}_y}{\sqrt{n}} \sqrt{\frac{N-n}{N-1}}$$

Where $\hat{\sigma}_y$ advance estimate of the population standard deviation.

N - The population size

n- The sample size .

The $(1-\alpha)$ 100% confidence limit of the population mean, μ , is given as

$$\bar{y} \pm z_{\alpha/2} \sigma_y$$

Where $z_{\alpha/2}$ is a value to be obtained from the standard normal distribution.

Setting the permissible margin of error $d = z_{\alpha/2} \sigma_y$ we can calculate n as:

$$n = \frac{(z_{\alpha/2} \sigma_y/d)^2}{1 + \frac{(z_{\alpha/2} \sigma_y/d)^2}{N}}$$

$$\text{Let } n_0 = (z_{\alpha/2} \sigma_y/d)^2$$

Another way of putting the above formula is by considering ϵ , the relative error. d is a absolute error which is some fraction of the mean μ hence we can write d as $\epsilon \mu$. Substituting this value of d in the previous formula ,

$$\text{We get } n_0 = \left(\frac{z_{\alpha/2} \sigma_y}{\epsilon \mu} \right)^2 = \frac{z_{\alpha/2}^2 (\sigma_y^2 / \mu^2)}{\epsilon^2} = \frac{z_{\alpha/2}^2 (\text{C.V}(\mu))^2}{\epsilon^2}$$

where $\text{C.V}(\mu) = \sigma_y/\mu$ is the coefficient of variation which expresses the standard deviations as a percentage of what is being measured at least on the average.

After calculating n_0 as above, if $\frac{n_0}{N}$ is negligible

i.e. $\frac{n_0}{N} \leq 0.05$, n_0 could be taken as required sample size, if not, n is calculated as $n = \frac{n_0}{1 + \frac{n_0}{N}}$

As can be seen in the formula for n_0 , there are unknown parameters σ_y and μ . These parameters can be determined in advance by one of the following methods.

- From results of pilot survey
- By previous sampling of same or similar population.
- By taking samples in tow steps, the first being a simple random sample of size n , from which σ_y can be estimated.
- By guess work about the nature of the population based on some mathematical results.

For this study a confidence limit of a 95% and admissible margin of error, ϵ , = 5% are decided to be taken for both populations

Let N_1 = size of grade 8 students in the old curriculum
 N_2 = size of grade 8 students in the new curriculum.
 n_1 = sample size from old curriculum
 n_2 = sample size from new curriculum
 $\hat{\sigma}_1^2$ = variance estimate for the first population
 $\hat{\sigma}_2^2$ = variance estimate for the second population.

On the basis of the above definition $N_1 = 234$. $N_2 = 167$. Taking preliminary sample $n_1^1 = 15$ and $n_2^1 = 10$ from the old new curriculum respectively, $\hat{\sigma}_1$ and $\hat{\sigma}_2$ are found to be 8.70 and 7.67

These values are obtained from the average results of students in grade 8 national examination.

Sample size determination

Size of the sample to be taken from grade 8 students in the old curriculum.

$$n_{ol} = \frac{(1.96)^2 (0.176)^2}{(0.05)^2} = 47.6 \approx 48$$

$$\text{but } \frac{n_{ol}}{N} = \frac{48}{234} = 0.20 > 0.05$$

$$\text{Therefore } n_1 = \frac{n_{ol}}{1 + \frac{n_{ol}}{N}} = \frac{48}{1 + \frac{48}{234}} = 39.8 \approx 40$$

In the same manner the size of the sample to be taken from grade 8 students in the new curriculum is found to be 23.

Thus 40 students from the old curriculum and 23 students from the new curriculum are taken, and for each student grade 8 national examination result and grade 7 of the same students is used for the study. The raw data is given in the appendix.

CHAPTER III

METHODS OF ANALYSIS

3.1 Basic concepts and definitions

- ◆ parameter:- numerical value of some characteristic of the population.
- ◆ Statistical inference:- is a procedure concerned with attempts to make quantitative statements about properties of population from knowledge of the results given by sample .
- ◆ Point estimate :- is a single number stated as an estimate of some quantitative property of the population .
- ◆ An interval estimate:- is a statement that a population parameter has values lying between two specific values .
- ◆ Confidence interval:- is one type of interval estimate. It has the feature that in repeated sampling a known proportion of intervals computed by this method will include the population.
- ◆ Hypothesis :- is some statement about the population.

3.2 Estimation of Parameters

In sample surveys, one of the major objectives is estimation of the unknown population parameters from the sample. The estimated population parameter could be given either as point estimate or interval estimate. In the process of estimation one has to be curious enough to select the best estimators

An estimator would be called best estimator if it satisfies the following properties:

- ◆ Unbiasdness:- An estimator is unbiased if its expected value equals the parameter value:
- ◆ Consistency: - An estimator is said to be consistent if it tends to the population value as the sample size increases.
- ◆ Minimum variance:- The variance of the estimator should be reasonably small.

3.2.1 Estimation of Means and Variance

1. Point Estimation

Let Y_1, Y_2, \dots, Y_N be N population units .

The population mean denoted by μ is

$$\mu = \frac{\sum_{i=1}^N Y_i}{N}$$

and the variance of the population denoted by σ^2 is

$$\sigma^2 = \frac{\sum_{i=1}^N (Y_i - \mu)^2}{N}$$

If a simple random sample of size n is taken from the population , the corresponding sample mean and variance can be computed as follows:

$$\bar{y} = \frac{\sum_{i=1}^n y_i}{n} \quad \text{is the sample mean}$$

$$S^2 = \frac{\sum_{i=1}^n (y_i - \mu)^2}{n-1} \quad \text{is the sample variance .}$$

If we examine the above estimators on the basis of properties set for good estimators it can be shown that both are unbiased estimators of their corresponding parameters.

The variance of the sample mean is

$$S^2_{\bar{y}} = S^2_{y} \left[\frac{N-n}{N-1} \right]$$

From this the standard error of the mean which is the standard deviation of the sampling distribution of the mean is given by

$$s_{\bar{y}} = \sqrt{\frac{S_{\bar{y}}^2}{n} \frac{N-n}{N-1}}$$

2, Interval estimation:

In point estimation only one value is found through the sample observations. But this value may or may not be good representative of the population parameter. For this reason an interval estimate is used.

In an interval estimation, two limits upper and lower, are found within which any point may be taken as an acceptable value of the parameter with certain confidence probability. The two limits are called lower and upper confidence limits.

Since the central limit theorem says that, for large samples the sample mean is normally distributed with mean μ and variance σ^2/n the upper and lower confidence limits for the population mean are given by

$$LCL = \bar{y} - Z_{\alpha/2} s_{\bar{y}}$$

$$ULL = \bar{y} + Z_{\alpha/2} s_{\bar{y}}$$

But for small samples the above confidence limits can be calculated as

$$LCL = \bar{y} - t_{\alpha/2} s_{\bar{y}}$$

$$ULL = \bar{y} + t_{\alpha/2} s_{\bar{y}}$$

where t is the student's t -statistic taken at $(n-1)$ degrees of freedom and specified α .

3.3 Hypothesis testing

Hypothesis testing is a procedure governed by certain rules, which leads to take decision about the hypothesis for its acceptance or rejection on the basis of sample values.

Hypothesis is classified according to its nature and use as null hypothesis and alternative hypothesis.

A null hypothesis is hypothesis which is to be actually tested for

acceptance or rejection. Alternative hypothesis is a statement about the population parameter or parameters, which gives an alternative to the null hypothesis.

After applying a test, decision is taken about the acceptance or rejection of the null hypothesis but there is always some small probability of committing error in taking decision about the hypotheses. These errors are:

Type I error: Rejecting the null hypothesis (H_0) when it is true.

Type II error : Accepting the null hypothesis (H_0) when it is false .

3.3.1 Steps in Hypothesis Testing

In hypothesis testing the following steps shall be followed in order to arrive at a good decision about the hypothesis to be tested.

- i) State the hypothesis
- ii) Define the test statistic
- iii) Specify the level of significance α
 $\alpha = p[\text{type I error}]$.
- iv) Determine the rejection region: The rejection region is the region over which a decision in favor of the alternative hypothesis is passed i.e. the null hypothesis is rejected. The null hypothesis will be rejected if the test statistic lies within the rejection region.

3.3.2 Comparison of Means

In order to compare means of two population we specify the following hypothesis

$$H_0 : \mu_1 = \mu_2 \text{ against } H_1 : \mu_1 \neq \mu_2$$

which is equivalent to testing

$$H_0 : \mu_1 - \mu_2 = 0 \text{ against } H_1 : \mu_1 - \mu_2 \neq 0$$

To test H_0 we come across either of the two situations

- I) $\sigma_1^2 = \sigma_2^2$
- II) $\sigma_1^2 \neq \sigma_2^2$

In testing H_0 against H_1 in situation (I) the test statistic under H_0 based on two independent samples of size n_1 and n_2 from the two populations respectively is

$$t = \frac{(\bar{Y}_1 - \bar{Y}_2) - (\mu_1 - \mu_2)}{Sp \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

Under H_0 the statistic has t-distribution with (n_1+n_2-2) degrees of freedom.

where Sp^2 is the pooled variance given by

$$Sp^2 = \frac{(n_1-1) S_1^2 + (n_2-1) S_2^2}{(n_1+n_2-2)}$$

where \bar{y}_1 and \bar{y}_2 are sample means

Note: The pooled variance Sp^2 is calculated because the two populations possess the same variability. The expression $Sp \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}$

is an estimate of standard deviation of $(\bar{y}_1 - \bar{y}_2)$.

Decision about acceptance or rejection is taken according to the following rule.

i) Given $H_1 = \mu_1 \neq \mu_2$ and α level of significance, reject H_0

if $t_{cal} > t_{\alpha/2} (n_1 + n_2 - 2)$

or $t_{cal} < -t_{\alpha/2} (n_1 + n_2 - 2)$
otherwise, H_0 is not rejected.

ii) Given $H_1 = \mu_1 < \mu_2$, reject H_0

if $t_{cal} < t_{\alpha} (n_1 + n_2 - 2)$
otherwise, H_0 is not rejected.

iii) Given $H_1 = \mu_1 > \mu_2$, reject H_0

if $t_{cal} > t_{\alpha} (n_1 + n_2 - 2)$
otherwise, H_0 is not rejected

Under situation (II) i.e. when $\sigma_1^2 \neq \sigma_2^2$ the variances can not be pooled and hence the degrees of freedom can not be determined.

The test of difference between means in this case is known as Behrens- Fisher problem. The test statistic given for this situation is

$$t = \frac{(\bar{Y}_1 - \bar{Y}_2)}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}} \quad \text{where } S_1^2 \text{ and } S_2^2 \text{ are sample variances of the two populations respectively}$$

For taking decision about H_0 the calculated value of t is compare with

where
$$t^* = \frac{t_1 S_1^2/n_1 + t_2 S_2^2/n_2}{S_1^2/n_1 + S_2^2/n_2}$$

where t_1 and t_2 are table values of t at n_1-1 and n_2-1 degrees of freedom respectively.

The acceptance or rejection decision is done according to the rules stated for situation (I)

3.3.3 Comparison of Variability

The hypothesis of interest here is

H_0 : the variability in the two populations is the same i.e.

$$H_0 : \sigma_1^2 = \sigma_2^2$$

H_1 : there is difference in the variability of the two populations i.e

$$H_1 : \sigma_1^2 \neq \sigma_2^2$$

The test criterion is $F = S_1^2/S_2^2$

We reject the null hypothesis if $F_{cal} > F_{\alpha/2}(n_1-1, n_2-1)$.

3.4 multivariate analysis

The objective of these sections are to discuss the methods to be used to test the hypothesis of equal mean vectors against the alternative of unequal mean vectors, more over methods of construction of simultaneous confidence interval for the difference of population mean vectors will also be presented.

3.4.1 Multivariate analysis of Means

In multivariate analysis of means of two populations, the hypothesis can be formulated as:

$H_0 : \mu_1 = \mu_2$ i.e. the population mean vector are identical as opposed to the alternative hypotheses if of different mean

vectors. $H_1 : \mu_1 \neq \mu_2$

μ_1 is mean vector of the first population.

μ_2 is mean vector of the second population.

Here it has to be noted that, the two samples used for testing the above hypothesis are independent samples from a P- Variate normal population with mean vector μ_1 and μ_2 and covariance matrix Σ_1 and Σ_2 respectively. We assume that $\Sigma_1 = \Sigma_2 = \Sigma$.

The test statistic is the Hotelling's T^2 statistic given by

$$T^2 = \frac{n_1 n_2}{n_1 + n_2} (y_1 - y_2)' S_p^{-1} (y_1 - y_2)$$

where

$$y_1^1 = [y_{11} \ y_{12} \ \dots \ y_{1p}]$$

$$y_2^1 = [y_{21} \ y_{22} \ \dots \ y_{2p}]$$

are sample mean vectors of the two populations.

S_p is the pooled covariance matrix computed as

$$S_p = \frac{(n_1 - 1) S_1 + (n_2 - 1) S_2}{(n_1 + n_2 - 2)}$$

Where S_1 and S_2 are estimated covariance matrix of population 1 and 2 given by

$$S_1 = \begin{pmatrix} S_{111} & S_{112} & \dots & S_{11p} \\ S_{121} & S_{122} & \dots & S_{12p} \\ \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot \\ S_{1p1} & S_{1p2} & \dots & S_{1pp} \end{pmatrix} \quad S_2 = \begin{pmatrix} S_{211} & S_{212} & \dots & S_{21p} \\ S_{221} & S_{222} & \dots & S_{22p} \\ \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot \\ S_{2p1} & S_{2p2} & \dots & S_{2pp} \end{pmatrix}$$

Where $S_{ijk} = \frac{1}{n_i} \sum (x_{it} - x_{ij})(x_{kt} - x_{ik})$

n_1 = sample size of population 1

n_2 = Sample size of population 2

p = number of variables.

The decision rule about H_0 is done as follows :

The quantity $F = \frac{n_1 + n_2 - P - 1}{(n_1 + n_2 - 2)P} T^2$ has an F- distribution

with p and $n_1 + n_2 - P - 1$ degrees of freedom under the null hypothesis .

The hypothesis of equal mean vectors will be rejected if

$$T^2 \rightarrow \frac{(n_1+n_2-2)P}{(n_1+n_2-p-1)} F_\alpha (P, n_1+n_2-p-1)$$

3.4.2 Simultaneous Confidence Interval

The test for equality of vector means simply indicate that the vector means are equal or not with out clarifying which particular means are the cause for the acceptance or rejection of the null hypothesis, thus the needs for simultaneous confidence interval follows .

The simultaneous confidence intervals can be constructed as follows.

$$\text{let } b^2 = \frac{(n_1+n-2)P}{(n_1+n_2-p-1)} F_\alpha (P, n_1-p-1)$$

Then the $(1-\alpha)$ 100% confidence interval is given by

$$(y_{1i}-y_{2i}) \pm b \sqrt{(1/n_1 + 1/n_2) S_{iip}}$$

where S_{iip} are the elements on the main diagonal of the pooled covariance matrix.

3.5 Analysis of Variance

Analysis of variance is method of testing the equality of three or more population means by analyzing sample variance. The design for obtaining one way classification of data is known as completely Randomized design (CRD).

The hypothesis can be stated as :

$$H_0: \mu_1 = \mu_2 = \dots = \mu$$

$$H_1 : \text{Not } H_0$$

The test statistic is F statistic given by

$$F = \frac{\text{mean square between classes (MBC)}}{\text{mean square with in classes .(MWC)}}$$

$$\text{Where MBC} = \frac{\left[\frac{\sum T_i^2}{n} - \frac{T_{..}^2}{an} \right]}{a-1}$$

$$WBC = \frac{\left(\sum \sum y_{ij}^2 - \frac{T_{i.}^2}{n} \right)}{a(n-1)}$$

a = number of subjects

n = size of the sample

T_i = Total for the i^{th} subject

$T_{...}$ = The grand total

Y_{ij} = result of the j^{th} student on the i^{th} subject

Reject H_0 if $F_{\text{cal}} > F_{\alpha}(a-1, a(n-1))$

3.6 Correlation Analysis

Correlation coefficient is measure of mutual relationship between two variables. The sample Correlation coefficient is a measure of the degree of linear relationship between two variables. It is computed as :

$$r = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^n (x_i - \bar{x})^2 \sum_{i=1}^n (y_i - \bar{y})^2}}$$

where $(X_1, Y_1), (X_2, Y_2), \dots, (X_n, Y_n)$ are the paired observations.

Positive values of r indicate a tendency of X and Y to increase together. When r is negative, large values of X are associated with small values of Y . In the next chapter, this coefficients will be used to measure the degree of association between performances in 7th grade and in 8th grade.

CHAPTER IV

DATA ANALYSIS

This chapter deals with estimating the various unknown population parameters, carrying out hypothesis testing and performing multivariate and correlation analysis

The two populations of prime interest are

Population 1: Grade 8 students who took national examination in 1990(old curriculum)

Population 2: Grade 8 students who took national examination in 1991 (New curriculum).

4.1 ESTIMATION

The average performance of students can be estimated using

$$\bar{y} = \frac{\sum_{i=1}^n y_i}{n}, \quad \text{with standard error } S_{\bar{y}} \text{ which is estimated}$$

$$S_{\bar{y}} = \frac{S_Y}{n} \sqrt{\frac{N-n}{N-1}}$$

Where $S_Y = \frac{\sum (y_i - \bar{y})^2}{n-1}$ is the standard deviation of the Population estimated by the sample.

Thus applying the above formulae the average performance of students on Amharic in the old curriculum is given as:

$$\bar{y} = \frac{\sum_{i=1}^{40} y_i}{40} = 70.62 \text{ and its standard error is}$$
$$\left(\frac{S_Y}{\sqrt{40}} \right) \sqrt{\frac{234 - 40}{234 - 1}} = 1.55$$

This estimate is called a point estimate. The interval estimate Which is given by the 95% confidence interval is given as follows:

$$\text{LCL} : y - t_{\alpha/2} S_{\bar{y}} = 70.62 - 3.58 = 67.0$$

$$\text{UCL} : y + t_{\alpha/2} S_{\bar{y}} = 70.62 + 3.58 = 74.2$$

Therefore, the 95% confidence interval for the population mean score of students on Amharic, in the old curriculum is given (67.9, 74.2)

With the same method the average performances of students on the different subjects, together with their standard errors, are summarized in the following tables :

Table 4.1 Average Performance of Grade 7 Students (New Curriculum)

Subjects	Average	Standard deviation	95% confidence interval
Amharic	61.95	9.97	(57.2,66.6)
English	69.43	12.13	(63.7,77.5)
Mathematics	53.30	15.86	(45.8,60.6)
Biology	57.56	15.04	(50.3,64.2)
Physics	57.56	15.04	(50.5,64.5)
Chemistry	58.60	12.16	(52.6,63.9)
Average	59.60	11.46	(54.2,64.9)

Table 4.2 Average Performance of Grade 8 Students (New Curriculum)

Subjects	Average	Standard deviation	95% confidence interval
Amharic	75.00	10.34	(70.1 ,79.8)
English	47.26	11.95	(41.6 ,52.8)
Mathematics	37.86	11.10	(32.6 ,42.8)
Biology	38.73	10.27	(33.9 ,43.5)
Physics	33.78	12.25	(27.9 ,39.6)
Chemistry	41.21	10.51	(36.3 ,46.1)
Average	45.60	7.61	(42.3, 48.9)

Table 4.3 Average Performance of Grade 8 Students (Old Curriculum)

Subjects	Average	Standard deviation	95% confidence interval
Amharic	70.60	10.84	(67.0,74.2)
English	49.35	13.63	(44.8,53.8)
Mathematics	35.52	10.95	(31.8 ,39.1)
Geography	56.30	11.75	(52.4,60.9)
Science	45.37	12.78	(41.1,49.6)
Average	50.1	8.80	(47.5,52.8)

4. 2 Hypothesis Testing

4.2.1 Comparison of mean score

Let μ_1 and μ_2 be the average score of grade 8 students in the old and new curriculum, respectively. Where μ_1 is the average of 5 subjects, Amharic, English, Mathematics, geography and science and μ_2 is the average of 6 subjects: Amharic, English, Mathematics, Biology, Physics and Chemistry.

The sample means \bar{y}_1 and \bar{y}_2 were found to be 50.1 and 45.6 for the old and new curriculum respectively. Thus this motivates one to test the following hypothesis.

H_0 = There is equal mean score in the two populations

H_1 = The mean score of students in the old curriculum is better.

This hypothesis can be formulated as follows:

$$H_0: \mu_1 - \mu_2 = 0$$

$$H_1: \mu_1 - \mu_2 > 0$$

The test statistic is

$$t = S_p \frac{\bar{y}_1 - \bar{y}_2}{\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \sim t_{(n_1 + n_2 - 2)}$$

where $S_p^2 = \frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2}$ is the pooled variance

taken because of the reason that the variability in the two populations is not significantly different (see section 4.2,2,)

$$\text{Thus } t_{\text{cal}} = 8.4 \frac{50.1-45.6}{\sqrt{\frac{1}{40} + \frac{1}{23}}} = 2.07$$

But $t_{0.05}(61) = 1.996$

Therefore, since $t_{\text{cal}} > t_{\alpha}(n_1+n_2-2)$ we reject the null hypothesis of equality of two population means .

4.2.2 Comparison of Variability

Let σ_1^2 be variability in population 1
 σ_2^2 be variability in population 2

The hypothesis is formulated as

$$H_0 : \sigma_1^2 = \sigma_2^2$$

$$H_1 : \sigma_1^2 \neq \sigma_2^2$$

The test statistic is $F = S_1^2/S_2^2$

where S_1^2 and S_2^2 are Variance of population 1 and 2 respectively estimated by the sample.

$$\text{Hence } F_{\text{cal}} = \frac{77.6}{58.0} = 1.337$$

But $F_{0.025}(39, 22) = 2.23$ Thus since $F_{\text{cal}} < F_{\alpha/2}(n_1-1, n_2-1)$ we don't reject the hypothesis of equality of variances in the two populations.

4.3 Multivariate Analysis

This sections is concerned with testing the hypothesis of equal mean vectors with the alternative of unequal mean vectors.

The mean vectors to be compared are composed of three subjects, Amharic, English and Mathematics. These subjects are selected because of the reason that they are given in grade 8 national examination both in the old and new curriculum and moreover, they are believed to affect overall average performance of students in grade 8 national examination.

The mean vectors are denote as follows:

$$\begin{aligned}\mu_1^1 &= [\mu_{11} \ \mu_{12} \ \mu_{13}] \\ \mu_2^1 &= [\mu_{21} \ \mu_{22} \ \mu_{23}]\end{aligned}$$

where

μ_{11} - Population mean of Amharic in population 1

μ_{12} - Population mean of English in population 1

μ_{13} – Population mean of Mathematics in population 1

μ_{21} - Population mean of Amharic in population 2

μ_{22} - Population mean of English in population 2

μ_{23} -Population mean of Mathematics in population 2

To apply the multivariate analysis the samples values are computed and the following results are obtained.

$$\begin{aligned}\bar{Y}_1^1 &= [70.62 \ 49.35 \ 35.52] \\ \bar{Y}_2^1 &= [75.00 \ 47.26 \ 37.87]\end{aligned}$$

The respective covariance matrix are given below

$$S_1 = \begin{pmatrix} 120.3 & 84.4 & 58.0 \\ 84.4 & 188.2 & 112.1 \\ 58.0 & 112.1 & 122.9 \end{pmatrix} \quad S_2 = \begin{pmatrix} 107.09 & 33.00 & 50.20 \\ 33.00 & 143.02 & 40.50 \\ 50.20 & 40.50 & 123.43 \end{pmatrix}$$

From these matrices the pooled matrix is obtained to be

$$S_{\text{pooled}} = \begin{pmatrix} 116 & 66 & 55 \\ 66 & 172 & 86 \\ 55 & 86 & 123 \end{pmatrix} \quad S_{\text{pooled}}^{-1} = \begin{pmatrix} 0.012 & -0.0029 & -0.0025 \\ -0.0029 & 0.0102 & 0.01065 \\ -0.0025 & -0.0062 & 0.01065 \end{pmatrix}$$

Applying these values and the formula stated in the previous chapter the Hotelling's T^2 value is found to be 5.73 .

To decide whether to accept or reject the stated null hypothesis this value is compared with

$$\frac{(n_1 + n_2 - 2)P F_{\alpha}(p, n_1 + n_2 - p - 1)}{(n_1 + n_2 - p - 1)}$$

This value is calculated and is found to be 0.3610.

Thus since $T^2 = 5.73 > 0.3610$ we reject the null hypothesis of equal mean vectors.

In order to confirm the results of the above test we can further compute the Hotteling's simultaneous confidence interval. The resulted intervals are:

$$\begin{aligned}
 & -6.068 \leq \mu_1 - \mu_2 \leq -2.687 \text{ (for Amharic)} \\
 & 0.04 \leq \mu_1 - \mu_2 \leq 4.14 \text{ (for English)} \\
 & -4.14 \leq \mu_1 - \mu_2 \leq -0.57 \text{ (for Mathematics)}.
 \end{aligned}$$

Since zero is not included in each of the three intervals we conclude at 5% significance level that there is a significant difference in the vector means.

The point that must be carefully noted here is that, although there is overall decrease in the mean performance of students in the new curriculum, students have performed better in some subjects such as Amharic and Mathematics. Thus we can say that the overall mean difference has come not because of these subjects but rather because of the other added subjects, Biology Physics and Chemistry in the new curriculum.

4.4 Analysis of variance

This section is intended to test the hypothesis of equal mean performance of students on each subject versus the alternative hypothesis of different mean performance of students on the stated subjects .

Applying the formulae and methods stated in section 3.3 of chapter 3, the following results are obtained .

- New curriculum

Mean square between subjects = 5212.08

Mean square with in subjects = 123.54

Thus $F_{cal} = \frac{5212.08}{123.54} = 42.18$ which is greater than

$F_{0.05} (5,132)$ hence were reject the null hypothesis of equal mean performance

- Old curriculum

Mean square between subjects = 7572.2

Mean square with in subjects = 689.16

$$F_{cal} = \frac{7572}{689.16} = 10.98$$

Thus since $F_{cal} > F_{0.05} (4,195) = 0.1776$ we reject the null hypothesis of equal mean Performance.

4.5 Analysis of Correlation

Here the correlation coefficient is calculated to measure the degree of linear relationship between students performance in grade 7 and 8 on the subjects Amharic, English, Mathematics, Biology, Chemistry and Physics.

The aim is to investigate how performance in grade 8 are affected by grade 7 performances. The sample Correlation coefficients are calculated for six subjects and for the average, and are summarized in Table 4.4

Table 4.4 : correlation coefficients

Subject	correlation coefficient	P- valve .
Amharic	-0.02	0.92
English	+0.40	0.06
Mathematics	-0.11	0.62
Biology	+0.38	0.06
Physics	-0.27	0.22
Chemistry	+0.14	0.50
Average	+0.20	0.35

Negative correlation coefficients indicate that large grade 7 performances are associated with small grade 8 performances and vice versa. The positive correlation coefficients indicate that grade 7 and 8 performances increase and decrease in the same direction. It is surprising to see that the correlation coefficients for some of the subjects are negative.

CHAPTER V

Summary and Conclusions

As tried to explain in the first chapter, the main objective of this study is to assess the probable effect of the changed curriculum on students' performance in grade 8 national examination. In this chapter conclusions derived from the analysis undertaken and summary of the chapters is presented.

5.1 Summary.

The first chapter of this study has dealt with a brief summary of the curriculum that have been implemented in Ethiopia starting from the first curriculum up to the new curriculum we have now. Furthermore, the objective of the study which mainly focused on the assessment of the probable effect of the newly introduced curriculum on students' performance at grade 8 national examination was discussed.

The second chapter focused on the methods of data collection and sample selection. Data collection methods were treated in two parts as primary and secondary data collection. The sample size was determined by initially computing standard deviations from preliminary samples taken from each population and using the appropriate formula and were made to be 40 and 23 for the old and new curriculum respectively.

The third chapter treated the methods of analysis for the study. Here methods of comparing means using the t-distribution was discussed first, then multivariate analysis of means was discussed followed by the discussion of simultaneous confidence interval formation using the Hotelling's approach.

In addition to these methods, methods of analysis of variance and correlation analysis were discussed.

In chapter four the data were analysed using the methods treated in the third chapter.

The analysis has revealed that there is a significant difference in the overall performance of students in the old and new curriculum. To further clarify the set of subjects that lead to this difference multivariate analysis was conducted.

The Multivariate analysis was followed by analysis of variance which is used to test whether there is difference in students' performance in different subjects and has shown that students have different performances in the subjects considered.

Correlation Analysis were also done to investigate whether there is relationship between students' performance in grade 7 and 8 in the new curriculum. It was found that there is a slight relationship although for some subjects the relationship was found to be negative.

The fifth chapter has dealt with conclusion and recommendations based on the analysis conducted in the fourth chapter.

5.2 Conclusions

5.2.1 Conclusion about Comparison of Means

The test on the overall mean difference has indicated that there is a significant decline in students' results in the new curriculum as compared to the old curriculum.

To further investigate which subjects have contributed to the decrease in students' results, multivariate analysis was carried out to compare vector means. But, since in the new curriculum some new subjects are introduced, the multivariate analysis was done on three subjects, Amharic English and Mathematics.

The multivariate analysis has shown that there is significant difference between the mean vectors. The difference arise, not because, students have performed better in these subjects in the old curriculum, but rather from the reason that students have performed better in these subjects in the new curriculum.

This should not be considered as contradiction to the overall decrease in results in the new curriculum, but indicates that the decline in the overall mean result is not due to these subjects instead from the newly introduced

subjects Biology, Physics and Chemistry which have average values of 38.7, 33.7 and 41.2 respectively.

Despite the improvement of students' performance in some subjects, the overall performance has declined in the new curriculum. The probable reasons that may have lead to this situation, as thought by the researcher are the following:

- The newly introduced subjects are a bit stronger that require reasoning which the students have not developed in the proceeding classes.
- The teachers appointed to teach these new courses are those teachers which used to teach other subjects and hence may not have detailed knowledge of the subject matters.
- The other reason could be scarcity of relevant teaching materials and laboratory equipment's

5.2.2 Conclusion about comparison of variability

The hypothesis of equal variability in the new and old curriculum has been accepted. This indicates that the variability in students' performance in the two cases is the same.

5.2.3 Conclusions about analysis of Variance.

Analysis of variance was done on the two curriculum and has shown that there is a significant difference between the mean performance of students on the six subjects- Amharic, English, Mathematics, Biology, Physics and Chemistry in the new curriculum and between the five subjects- Amharic, English, Mathematics, Geography and Science in the old curriculum.

This result indicates that students performed well in some of the subjects and less in some other.

5.2.4 Conclusion about Correlation

The correlation coefficients suggest that there is a weak linear relationship between grade 7 and 8 performances.

Contrary to what is theoretically expected, in some subjects it is observed that there is a negative relationship

The probable causes could be:

- wrong sequencing of topics in 7th and 8th grades i.e. the subjects given in grade 7 may not be supportive to grade 8 subjects.
- Fairness in marking of grade 7 examination

Apart from these some students view national examination as a difficult one and frustrate during exam time, although have good talents and proved it in their grade 7 performance.

Recommendations

The overall decline in students' result in the new curriculum is mainly due to the poor performance students have shown in the new subjects namely, Biology, Physics and Chemistry. The probable major reason for this are thought to be the scarcity of relevant teaching aids and low qualification of teachers.

Thus to overcome these problems measures should be taken to improve the availability of appropriate teaching materials such as books, laboratory equipment's etc and further more, teachers should be given the opportunity to up grade their qualification so that they can teach their students better.

From the correlation analysis it is observed that there is a negative relationship between students performances in grade 7 and 8 for some subjects, one of the reasons for this is believed to be the unnecessary marks that teachers give to students. Thus, although it is good to encourage students for their participation, teachers should be genuine enough to give the right mark for those who deserve it.

Finally, students should be made ready for any type of exam rather than making them ready for exam types for which they are accustomed to. This can be done by preparing model exams that resemble those given in national examinations.

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APPENDIX

{ The Computer Program Used For Generating Random Numbers }

```
PROGRAM RANDOMN;
uses Crt;
VAR I,J,c:INTEGER; ch:array[1..20] of integer;
    logic:boolean;
BEGIN
  clrscr;
  Randomize;
  FOR I:=1 TO 2 DO
  BEGIN
    FOR J:=1 TO 20 DO
    BEGIN
      ch[j]:=random(234);
      logic:=false;
      for c:=1 to j-1 do
      begin
        if logic=false then
        begin
          if ch[j] <> ch[c] then {repeattion}
          begin
            if (0<ch[j]) and (ch[j] <= 89) then
            begin
              writeln(ch[j] );
              logic:=true;
            end
            else if (89<ch[j]) and (ch[j]<= 176) then
            begin
              writeln(ch[j] );
              logic:=true;
            end
            else if (176<ch[j]) and (ch[j]<= 262) then
            begin
              writeln(ch[j] );
              logic:=true;
            end
            else if (262<ch[j]) and (ch[j]<= 348) then
            begin
              writeln(ch[j] );
              logic:=true;
            end
            else if (348<ch[j]) and (ch[j]<= 436) then
            begin
              writeln(ch[j] );
              logic:=true;
            end
            else if (436<ch[j]) and (ch[j]<= 521) then
            begin
              writeln(ch[j] );
              logic:=true;
            end
            else if (521<ch[j]) and (ch[j]<= 607) then
            begin
              writeln(ch[j]);
              logic:=true;
            end
          end
        end
      end
    end
  end
end
```

```
end
else if (607<ch[j]) and (ch[j]<= 691) then
begin
writeln(ch[j] );
  logic:=true;
end
else if (691<ch[j]) and (ch[j]<= 778) then
begin
writeln(ch[j]);
  logic:=true;
end
else if (778<ch[j]) and (ch[j]<= 864) then
begin
writeln(ch[j] );
  logic:=true;
end
else if (864<ch[j]) and (ch[j]<= 949) then
begin
writeln(ch[j]);
  logic:=true;
end
else if (949<ch[j]) and (ch[j]<= 1031) then
begin
writeln(ch[j] );
  logic:=true;
end
else if (1031<ch[j]) and (ch[j]<= 1111) then
begin
writeln(ch[j] );
  logic:=true;
end
else if (1111<ch[j]) and (ch[j]<= 1194) then
begin
writeln(ch[j] );
  logic:=true;
end
else if (1194<ch[j]) and (ch[j]<= 1277) then
begin
writeln(ch[j] );
  logic:=true;
end
else if (1277<ch[j]) and (ch[j]<= 1361) then
begin
writeln(ch[j]);
  logic:=true;
end
else if (1361<ch[j]) and (ch[j]<= 1445) then
begin
writeln(ch[j]);
  logic:=true;
end
else if (1445<ch[j]) and (ch[j]<= 1527) then
begin
writeln(ch[j] );
  logic:=true;
end
else if (1527<ch[j]) and (ch[j]<= 1614) then
```

```
begin
writeln(ch[j] );
  logic:=true;
end
else if (1614<ch[j]) and (ch[j]<= 1697) then
begin
writeln(ch[j] );
  logic:=true;
end
else if (1697<ch[j]) and (ch[j]<= 1780) then
begin
writeln(ch[j]);
  logic:=true;
end
else if (1780<ch[j]) and (ch[j]<= 1858) then
begin
writeln(ch[j] );
  logic:=true;
end;
end;
end;
end;
END;
READKEY;
END;
END.
```



Grade eight new curriculum

Number	Amharic	English	Maths	Biology	Chemistry	Physics	Average	Code
1	69	56	34	28	28	26	40	1
2	68	55	48	31	37	31	45	1
3	86	70	53	40	59	46	59	1
4	81	60	40	50	55	38	54	1
5	70	30	51	22	42	19	39	1
6	81	50	38	48	61	40	53	1
7	72	33	36	27	32	22	37	1
8	55	40	20	35	27	20	32	1
9	68	55	40	50	43	44	50	1
10	76	41	30	30	42	21	40	1
11	88	66	38	56	36	58	57	1
12	73	22	21	35	56	33	40	1
13	86	46	40	47	35	28	47	1
14	53	41	38	23	34	33	37	1
15	81	45	38	23	45	56	48	1
16	60	50	19	48	36	27	40	1
17	77	61	45	48	54	32	53	1
18	91	56	58	50	45	60	60	1
19	67	49	42	36	40	18	42	1
20	81	33	56	33	40	33	46	1
21	80	48	30	45	41	38	47	1
22	74	45	21	45	41	26	42	1
23	88	35	35	41	19	28	41	1

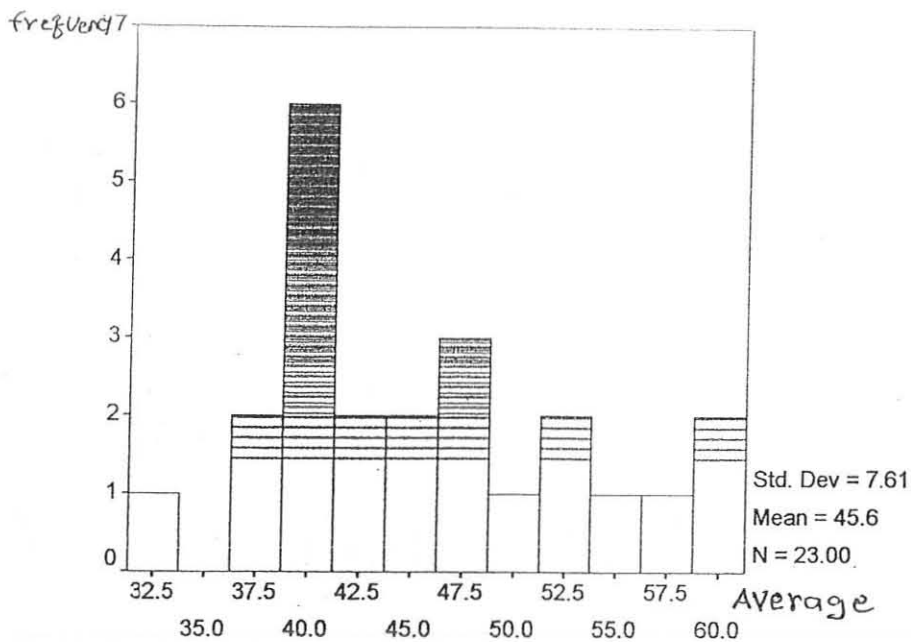
Grade eight old curriculum

Number	Amharic	English	Maths	Science	Geography	Average	Code
1.	77	55	50	41	57	56	0
2.	72	53	47	71	42	57	0
3.	90	75	50	55	60	66	0
4.	77	47	35	26	40	45	0
5.	77	52	49	47	50	55	0
6.	60	45	25	4	40	44	0
7.	72	67	42	857	57	59	0
8.	55	35	30	40	45	41	0
9.	75	37	32	32	32	42	0
10.	57	40	17	42	50	42	0
11.	68	37	15	33	32	37	0
12.	80	65	60	55	70	66	0
13.	70	70	38	47	70	59	0
14.	90	57	42	55	41	55	0
15.	75	37	25	43	40	44	0
16.	95	60	48	52	65	64	0
17.	77	70	45	64	59	63	0
18.	67	32	20	5	45	38	0
19.	57	42	32	22	47	40	0
20.	62	40	35	38	45	44	0
21.	77	45	27	44	37	46	0
22.	72	55	47	54	67	59	0
23.	83	62	42	57	56	60	0
24.	72	60	40	67	32	54	0
25.	55	35	30	38	45	41	0
26.	72	72	50	40	41	55	0
27.	70	62	46	62	65	61	0
28.	50	60	28	67	30	43	0
29.	70	28	28	39	30	39	0
30.	62	60	35	52	51	52	0
31.	72	52	47	44	75	58	0
32.	80	38	30	39	53	48	0
33.	75	33	28	34	30	40	0
34.	67	50	28	50	55	50	0
35.	43	23	35	44	45	40	0
36.	62	42	20	36	45	41	0
37.	80	75	50	37	58	60	0
38.	60	38	28	59	50	47	0
39.	68	43	23	41	50	45	0
40.	82	48	22	48	50	50	0

Grade Seven New curriculum

Number	Amharic	English	Maths	Biology	Chemistry	Physics	Average
1	49	63	47	47	54	56	53
2	61	71	50	59	53	50	57
3	60	56	50	55	55	47	53
4	52	76	43	49	45	44	58
5	58	53	43	44	53	42	52
6	78	86	87	84	81	90	83
7	65	56	51	57	46	44	54
8	55	60	45	47	56	59	53
9	75	61	32	50	45	50	54
10	42	60	49	42	51	55	52
11	62	77	51	45	64	41	56
12	58	56	37	55	44	41	50
13	70	85	76	67	78	80	75
14	57	58	37	47	57	52	51
15	61	69	41	50	50	44	54
16	61	61	45	45	49	55	54
17	69	85	70	81	73	77	74
18	84	92	90	95	83	87	89
19	49	60	40	53	48	49	52
20	75	86	68	80	67	72	74
21	58	64	45	42	54	52	52
22	66	76	61	58	60	71	65
23	60	86	66	66	75	66	68

Graph of Grade 8 New Curriculum



Graph of Grade 8 old Curriculum

