STATISTICAL ANALYSIS OF THE ENGLISH EXAMINATION RESULTS

A Thesis Submitted to the Department of English Education

in Partial Fulfilment for the Master's Degree in Education

Submitted by

Kshitise Subba

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Tribhuvan University, Kirtipur

Kathmandu, Nepal

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DECLARATION

I hereby declare to the best of my knowledge that this thesis is original; no part of it was earlier submitted for the candidature of research degree to any university.

Date: 2065/10/21 **Kshitise Subba**

RECOMMENDATION FOR ACCEPTANCE

This is to certify that **Mr. Kshitise Subba** has prepared this thesis entitled "**Statistical Analysis of the English Examination Results"** under my guidance and supervision.

I recommend the thesis for acceptance.

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DEDICATION

Dedicated

To My Parents and Teachers

whose teachings have always inspired me

that work is worship

too much of analysis is bad

road to improvement is never-ending

do one good deed everyday

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ABSTRACT

The present thesis entitled "**Statistical Analysis of the English Examination Results**" aimed at analyzing the English exam results statistically. For this purpose, the SLC Examination 2004 was taken to be analyzed. The researcher selected five public and five private schools of Kathmandu district purposively. The researcher sampled twenty students' scores randomly from each of these schools. The main focus was given to the marks obtained in the English subject. Further, the marks obtained in English were compared with other two compulsory subjects, i.e. Mathematics and Science. The researcher used only the secondary data and the data were collected from the sampled schools, and OCE Sanothimi, Bhaktapur. The researcher analyzed the English examination in terms of central value, dispersion, relationship, relative position and hypothesis testing. For testing hypothesis major tests such as Z-test, ANOVA and chi–square tests were used. The study shows that the English achievement scores are better than Math and Science achievement scores. Even if the English scores are more scattered, the mean score is satisfactory. The study also exerts that the achievement score in English of private school is better than that of public schools.

The study is divided into four main chapters. Chapter one deals with general background, SLC examination system in Nepal, curriculum of secondary level and statistical methods of analyzing data. This chapter also includes the review of the related literature, objectives of the study, and significance of the study. The second chapter includes methodology, i.e. how the research was carried out. It encompasses sources of data, sample population, process of data collection and limitations of the study. Similarly, the third chapter deals with analysis and interpretation of the collected data. The analysis and interpretation were carried out in three sections. In first section, the English exam result was

analyzed and in second the English exam result was compared with scores of Math and Science, and at last section the English scores between public and private schools were compared. Chapter four incorporates findings and recommendations. On the basis of analyzed data, the findings have been extracted and in turn, on the basis of these findings recommendations have been made. Eventually, references and appendices are also attached. The appendix part includes statistical calculations and other information.

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ABBREVIATIONS AND SYMBOLS

A. D.	:	Anno Domini
ANOVA	:	Analysis of Variance
B. S.	:	Bikram Sambat
CDC	:	Curriculum Development Centre
CERID	:	Educational Research and Innovation Development Centre
COE	:	Controller of Examination
CV	:	Coefficient of Variation
et al.	:	and others
etc.	:	etcetera
Exam	:	Examination
F-test	:	Variance Ratio test
H_0	:	Null Hypothesis
H_1	:	Alternative Hypothesis
i.e.	:	that is to say
ibid	:	from the same book
N	:	Number
NNEPC	:	Nepal National Educational Planning Commission
PR	:	Percentile Rank
R	:	Multiple Correlation
r	:	Simple Correlation
SAARC	:	South Asian Association Regional for Co-operation
SD	:	Standard Deviation

SEC	:	Secondary Education Curriculum
SLC	:	School Leaving Certificate
SLE	:	School Level Education
SSC	:	Sum of Square between the Sanples
TSS	:	Total Sum of Square
TU.	:	Tribhuvan University
σ	:	Sigma
υ	:	Degree of Freedom
χ^2	:	Chi-square

CHAPTER - ONE

INTRODUCTION

1.1 General Background

Examination is a formal test of somebody's knowledge or ability in a particular subject, especially by means of written questions or practical exercises (Hornby, 1996). It exerts an influential role especially in the education system. It is administrated in order to serve certain purposes. The primary purpose of a final examination is to assess the current knowledge, achievement and skills of candidates, that is to say an important function of a final examination is to discover the extent to which a course's objectives are being achieved.

Tyler (1969) and Findley (1963) as cited in Khaniya (2005, p.44) state that the functions of examination are "to guide or select students for further education, monitor the educational program of school system, and aid the work of teaching and learning." The examination provides students with a sense of achievement, feedback, permission to go on to further education, teachers with feedback about the effectiveness of their teaching and employers with a guarantee of competence in those examined to perform the tasks demanded of them by the jobs or professions they take up. Looking at the nature of the purposes and functions of an examination discussed above, Wiseman (1961) states that examination can be seen as being used for two purposes: backward looking purpose and forward looking purposes.

Heaton (1998, p.5) says, “a large number of examinations in the past have encouraged a tendency to separate testing from teaching.” But examinations at present reveal the fact that both teaching and testing are so closely interrelated that it is impossible to work in either field without being constantly concerned with the other. According to Miyazaki (1963),

examination is usually attributed to China for its origin and clinical use where it was employed in the selection of public officials. It was not employed in the schools at that time. Schools were meant for educating students but there was not any kind of examination prescribed to evaluate the effectiveness of the teaching learning process. It reveals that the examination system was used in other areas before it was used in education. Most of the known early instances of testing involved oral examination in the ancient and medieval times.

“Boston School Committee in England used printed examination only in 1845 A.D. for the first time” (Encyclopedia Americana, 1991, pp.715-16).

Tyler (1969, p.342) is of the opinion that “examinations have profound educational effects on students. Those students who are confident in their ability to perform in examinations find the information they are given stimulating to study.” Students are strongly influenced in preparation for examinations of what ability they would need to exhibit. Examinations also act as a signal or exert a trigger effect and suggest that the quickest way to change students' learning is to change the assessment system. The common practice of using past examination papers leads them to understand what is important in the course.

Davies (1985, p.7) argues, “change in education could be effectively implemented through the syllabus, the examination and the teacher". He goes on to state that the test/examination is a major and creative influence for change and development in language teaching. Morris (1972, p.82) adds that “Reform in school work must begin by reforming examinations.” It is therefore plausible to argue that the insights gained while making and using tests may lead to improvements in the quality of the learning experiences and the clarity and practicality of objectives.

1.1.1 SLC Examination System in Nepal

The SLC examination is an external examination conducted annually by the office of the controller of examination under the Ministry of Education, Government of Nepal. It is administrated at the end of the tenth year formal schooling. Now a days, SLC examination has become a major landmark in an individual's life in the Nepalese society. It provides the ladder for one to get on to higher education and also opens up the vista of making his/her own career development. Performance in the SLC examination is also considered as one of the major criteria for sanctioning the operation of schools. Success in the SLC is, thus, critically important to the students as well as the school. But, unfortunately, the recent trend in SLC performance shows the national pass rate in most of the regular SLC exams for the year 2060 B.S. to 2065 B.S. is 50.8 percent only. It is sad to note that the SLC pass rate in Nepal is significantly lower than the pass rates in the tenth grade SLC examinations of other SAARC countries (CERID, 1996).

In the past, Nepalese education system was influenced by religious and classical Sanskrit system of education. The traditional education was the Sanskrit Gurukul system characterized by the lack of standardization, uniform admission policy, uniform curriculum, and a system for awarding certificates and diplomas (CERID, 2006). In that educational system, observation of the disciple's character and competency in philosophic discourse and group examination were the methods used for assessment. Disciples were awarded diplomas after they successfully defended themselves in the committee of scholars (CERID, 1996).

The history of examination is not very old in Nepal. The first English medium high school, Darbar School, was established in 1854 B.S., after Jung Bahadur Rana returned from Britain. The school followed the British model of India

which was patterned after the Oxford and Cambridge System (NNEPC, 1956, p.26). In 1929, SLC examination was conducted in Kathmandu for the first time. Only in 1934 A.D. the Board of SLC examination was established. Prior to this period, this examination was conducted by Calcutta University and later by Patna University (Jha, 2044 B.S., p.22). In these initial years the aggregate mark was 800 and one had to obtain 288 marks in order to pass. National Education System Plan (NESP), 2028 B.S. revised the curriculum of 900 marks for secondary level. NESP also devised 25% marks from internal evaluation to be added to the total SLC marks. The educational structure applied in 2043/44 B.S. reduced the grand total marks for the SLC examination to 700. This structure, too, ended in 2055 B.S. and the SLC examination system of grand total marks of 800 began which is still in vogue in the Nepalese education system (Kadel, 2006). From 2064 B.S., the question papers are designed only from the course of grade ten.

1.1.2 Curriculum of Secondary Level

The new secondary level curriculum was introduced in 1999 A.D. with an aim of maintaining SAARC standard in education. This curriculum was prepared in order to make the secondary courses more applicable to the society, both in Nepal and in outside Nepal. It included eight subjects, among which six are compulsory and other two are optional. All eight subjects carry 100 full marks each. Out of eight subjects, four subjects (three compulsory - English, Science and Health Population and Environment, and one optional subject) have practical exam in which English carries 20% full marks and other three subjects carry 25% full marks for practical exam.

English is a compulsory subject in secondary curriculum. It has two main purposes: one is to enable students to exchange ideas with people of any nationality who speak or write English, and the other is to expose them to the

vast treasures of knowledge and pleasure available in written and spoken English. It contains a set of language functions to be practiced, which are realized linguistically by grammatical structures and lexical items. Demonstration, dramatization, role play, simulation, group work, pair work, discussion, inquiry, discovery are the techniques to be used in classroom. English curriculum gives emphasis on all four language skills which are tested in SLC examination. Listening and speaking skills are tested internally and externally within schools in a continuous basis. Reading and writing skills are tested externally by using a final examination. The allocation of marks in the SLC examination is as indicated in the grid below:

Listening	Speaking	Reading	Writing
8	12	45	35

A set of model questions is produced by CDC for submission to Office of the Controller of Examination (OCE) to guide question setters and examiners and for the dissemination to secondary schools (Secondary Education Curriculum, 2055).

1.1.3 Statistical Methods of Analyzing Data

Statistical methods provide an indispensable tool for collecting, organizing, analyzing and interpreting data expressed in numerical terms. By synthesizing the data, these methods can facilitate the derivation of conclusions and formulation of generalizations. Best and Kahn (1993, p. 274) define statistics as "a body of mathematical technique or process for gathering, organizing, analyzing and interpreting numerical data." Similarly, Koul (1997) says, “statistical methods use measurement as the most precise and universally accepted method for assigning quantitative values to the characteristics of

properties of objects or events for the purpose of discovering relationship between variables under study" (p.222).

The statistical methods may be classified into four sets of techniques according to the major purposes that they are intended to serve (Joshi, 2001, p.134). The first set of technique enables to organize group data, to describe and interpret these data in terms of derived measures of central tendency, of variability and to portray these data in graphical form for more convenient interpretation or more ready assimilation. The second set of techniques will be useful to describe quantitatively the limits within which the generalization of populations on the basis of facts derived from these populations. The third set of techniques will help to describe quantitatively the degree of relationship existing between measures of different characteristics. The fourth set of techniques will enable to describe quantitatively fluctuations occurring in time series, to isolate these variations and to eliminate their influence from the basic data, when it is desired.

The statistical method studies only a group of individuals but not a single unit. The statistical units which are totaled, multiplied, divided and manipulated in other ways and are important in the collection, analysis and interpretation of statistical data. "A satisfactory statistical unit should have four qualities: appropriateness, clarity, measurability and comparability" (Joshi, 2001, pp.134-35).

The appropriateness can of course be measured with the help of purpose of study. A unit, which might be appropriate for one study, may not be so in the case of other study. Clarity implies precision and simplicity of definition. A unit should be so defined that it is really understandable and possess the same meaning for all concerned in terms of measurability and comparability too. The statistical methods widely used in research analysis are: frequency distribution,

measures of central value, measures of variability, measures of relative positions, measures of relationship, and hypothesis testing.

1.1.3.1 Measures of Central Value

One of the most important Objectives of statistical analysis is to get one single value that describes the characteristic of the entire mass of unwieldy data. Such a value is called the central value or an average or the expected value of the variable. The tendency of the items or value of the items is clustered in the central part of the distribution. So, averages are the statistical constants which enable us to comprehend in a single effort, the significance of the whole, which gives us an idea about the concentration of the value in the central part of the distribution.

Since an average depicts the characteristics of the whole group, its value lies somewhere in between the two extremes, i.e., the largest and the smallest items. For this reason, an average is frequently referred to as a measure of central tendency. There are two main objectives of studying averages. The first one is that measures of central value, by condensing the mass of data in one single value, enable us to get a birds-eye view of the entire data. On the other hand, measures of central value, by reducing the mass of data to one single figure, enable comparison to be made. Comparison can be made either at a point of time or over a period of time. For example, we can compare the percentage results of the students of different colleges in a certain examination and thereby conclude which college is the best or we can compare the pass percentage of the same college for different time periods and thereby conclude as to whether the results are improving or deteriorating. Such comparisons are of immense help in framing suitable and timely policies.
The following are the important types of averages:

A. Arithmetic mean
B. Median

C. Mode

D. Geometric mean

E. Harmonic mean

Among these averages only the two most commonly used measures of central tendency i.e., mean and median are used in the present research.

I. Mean

The most commonly and popularly used measured of representing the entire data by one value is what most laymen call an average and what the statisticians call the arithmetic mean (Gupta, 1991). Its value is obtained by adding together all the items and dividing this total by the number of items. When the number of observations or scores is large, we first group the data in a suitable frequency distribution and then, compute the mean by using this formula:

$$Mean(\bar{x}) = A + \frac{\sum fd}{N}$$

Where,

A = Assumed mean

f = Frequency of the class interval

d = Deviation of the scores from the assumed mean

N = Total number of scores

The mean is probably the most useful of all statistical measures, for, in addition to the information that it provides, it is the base from which many other important measures are computed (Best and Kahn, 1993).

II. Median

The median by definition refers to the middle value in the distribution. It is a point (not necessarily a score) in an array, above and below which one half of the scores fall (Best and Kahn, 1993). It is a single value which divides total number of observation (scores) into equal two parts, such that fifty percent of the items lie above when it is arranged in ascending or descending order of the score or magnitude. The median is just the 50^{th} percentile value below which 50 percent of the values in the sample fall.

As distinct from the arithmetic mean which is calculated from the value of every item in the series, the median is what is called a positional average. The term position refers to the place of a value in a series. The place of the median in a series is such that an equal number of items lie on either side of it. Thus, when N is odd, the median is an actual value, with the reminder of the series in two equal parts on either side of it. If N is even, the median is a derived figure, i.e., half the sum of the middle values. So, the median is a measure of position rather than of magnitude and is frequently found by inspection rather than by calculation.

For large observation or scores, we group the data in a suitable frequency distribution and then compute the median by using the following formula:

N /2 to determine the particular class in which the value of median lies.

The formula:

$$\text{Median (Md)} = L + \frac{N/2 - C.F}{f} \times i$$

Where,

L = Lower limit of the median class

c.f. = Cumulative frequency of the class preceding the median class

f. = Simple frequency of the median class

i = Class interval of the median class

1.1.3.2 Measures of Dispersion

The average alone cannot adequately describe a set of observations, unless all the observations are the same. It is necessary to describe the variability or dispersion of the observation. In two or more distributions the central value may be the same but still there can be wide disparities in the formation of the distribution.

In this chapter, the researcher especially concerned with the measures of variability, or spread or dispersion. A measure of variation or dispersion is one that measures the extent to which there are difference between individual observation and some central or average value. In measuring variation, we shall be interested in the amount of variation or its degree but not in the direction. Dispersion is the measure of degree of the scatteredness of the individual items about the central value. The more the dispersion, the more heterogeneity between the observations and vice versa. The purpose of dispersion is to determine the reliability of central value and to compare the consistency of two or more series. The measures of central value are insufficient to describe the variability of distribution. So, dispersion is an important measure for describing the character of variability of data. It supports the measure of central tendency and is used for comparing the consistency of two or more series, determining the causes of variability and controlling the quality.

The following are the methods of measuring dispersion. But for our purpose, we discussed and used only the most commonly and widely used methods such as Range and Standard Deviation.

1. Range
2. Quartile deviation or semi inter-quartile range
3. Mean deviation or average or average deviation
4. Standard deviation
5. Lorenz’s curve

I. Range and Coefficient of Range

Range is the difference between the most extreme scores in a distribution. It is the most general and simplest measure of variability (Koul, 1997). It is calculated by subtracting the smallest item from the largest item of the distribution.

Hence,

Range = L-S

The range is an absolute measure of dispersion. Its unit is same as the unit of the given data. It cannot be used for the purpose of comparison. For comparing variability of the distribution given in different units of measurement, we need the coefficient of range. Gupta (1991) states "the relative measure corresponding to range, called the coefficient of range, is obtained of applying the following formula."

$$\text{Coefficient of range} = \frac{L - S}{L + S}$$

If the averages of the two distributions are about the same, a comparison of the range indicates that the distribution with the smaller range has less dispersion, and the average of that distribution is more typical of the group.

II. Standard Deviation and Coefficient of Variation

A standard deviation is the positive square root of average sum of squares of deviations of observation from the arithmetic mean of the distribution (Joshi, 2001). Its value is based upon each and every item of the series and it also takes account algebraic sings. Standard deviation is also known as *root mean square deviation* for the reason that it is the square root of the mean of the standard deviations from the arithmetic mean. It is denoted by the Greek letter σ (read as sigma).

The standard deviation is a very useful device for comparing characteristics that may be quite different or may be expressed in different units of measurement. The standard deviation is independent of the magnitude of the mean and provides a common unit of measurement (Best and Kahn, 1993).

Similarly, Gupta (1991, p. E 8.17) says

> the standard deviation measures the absolute dispersion of a distribution; the greater amount of dispersion the greater the standard deviation, for the greater will be the magnitude of the deviations of the values from their mean. A small standard deviation means a high degree of uniformity of the observation as well as homogeneity of a series; and large standard deviation means just the opposite.

The standard deviation for grouped data is calculated by using the following formula: Standard deviation $(\sigma) = {}^{i}/_{N}\sqrt{N\sum fx'^{2} - (\sum fx')^{2}}$

In which,

i	=	Width of the class interval
N	=	Total number of scores
f	=	Frequency of the class interval
x’	=	Deviation of raw score from the assumed mean divided by the length class interval.

The standard deviation discussed above is an absolute measure of dispersion. The corresponding relative measure is known as the coefficient of variation. It is used in such problems where we want to compare the variability of two or more than two series. That series (or group) for which the coefficient of variation is greater is said to be more variable or conversely less consistent, less uniform, less stable or less homogeneous. On the other hand, the series for

which coefficient of variation is less is said to be less variable or more consistent, more uniform, more stable or more homogeneous. Coefficient of variation is denoted by C.V. and is obtained as follows:

$$\text{Coefficient of variation (C.V.)} = \frac{\pm}{\bar{x}} \times 100$$

Gupta (1991) states,

> the standard deviation enables us to determine, with a great deal of accuracy, where the values of a frequency distribution are located with help of Tchebycheff's theorem, no matter what the shape of the distribution is, at least 75 percent of the values will fall with in ±2 standard deviations from the mean of the distribution, and at least 89 percent of the values will lie within ±3 standard deviation from the mean. With the help of normal curve we can measure even with greater precision the number of items that fall within specific ranges (pp. E-8. 25-26).

1.1.3.3 Measures of Relative Position

A raw score on a test, taken by itself, has no meaning. It gets meaning only by comparison with some reference groups. So, measures of relative position is a method of interpreting scores in a distribution which is reference to other scores in that distribution. For example, Arjun obtained 60 marks in English, 60 mark is not definable itself but in the distribution the other students obtained these scores i.e., Renuka 50, Gopal 67,Jivan 72 etc. in these scores Arjun's score is definable because it is compared with other scores.

The comparison may be done with the help of the following measures:

1. Sigma scores (σ scores)
2. Standard scores (Z or T scores)
3. Percentiles
4. Percentile ranks

I. Standard scores (Z or T scores)

In comparing or averaging scores on distributions where total points may differ, the use of raw scores may create a false impression of a basis for comparison. A sigma score makes possible a realistic comparison of scores and may provide a basis for equal weighting of the scores. Koul (1997, p. 254) defines sigma scores as "Deviations from mean expressed in σ terms." On the sigma scale, the mean of any distribution is converted to zero and the standard deviation is equal to one.

Koul (1997) defines sigma score as

> sigma scores are often small decimal fractions and half of them are negative, and hence somewhat inconvenient to deal with in computation. For these reasons, σ scores are usually converted into a new distribution with mean and standard deviation so selected as to make all scores positive and relatively easy to handle in computation. Such scores are called standard scores and are expressed as Z or T scores (p. 255).

The conversion of raw scores into standard scores is done with the help of a linear transformation which does not change the shape of the distribution in any way. The formula for the conversion of a raw score to standard score is as follows:

Let,

X = a score in the original distribution,

X′ = a standard score in the new distribution.

M and M′ = mean of the raw and standard scores

σ and σ′ = SD's of raw and standard scores.

$$X1 = \frac{\pm 1}{\pm}(X - M) + M1$$

When the mean (M′) and standard deviation taken to be 50 and 10 respectively, the standard score is called a T score.

i.e. $T = \frac{10}{\pm}(X - M) + 50$

II. Percentile Ranks

Best and Kahn (1993, p. 295) state that "often useful to describe a score in relation to other scores, the percentile rank is the point in the distribution below which a given percentage of scores fall. If the eighteenth percentage of scores of 65, 80 percent of the scores fall below 65. The median is the fifteenth percentile rank, for 50 percent of the scores fall below it." In general, we may say that if K percent of the members of the sample have scores less than a particular point value X, then X is the K^{th} percentile and K is the percentile rank of X. The calculation of the percentile ranks is the reverse process of calculation of percentile to points. We have to calculate ranks corresponding to particular scores. In case of discrete series, we use the following formula to calculate the percentile ranks:

$$\text{Percentile ranks (PR)} = \frac{100}{N}(c.f. + {}^{f}\!/_{2})$$

Where,

PR	=	Percentile ranks for the discrete score
c.f.	=	Cumulative frequency below the score X
f	=	Frequency of the score
N	=	Total number of scores

1.1.3.4 Measures of Relationship

The data in which we secure measures of two variables for each individual is called a bivariate data. The essential feature of the bivariate data is that one measure can be paired with another measure for each member of the group. When we study bivariate data we may like to know the degree of relationship between variables of such data. This degree of relationship is known as correlation. It can be represented quantitatively by the coefficient of correlation. Gupta (1991) states that if two quantities vary in such a way that movement in one is accompanied by movements in the other, these qualities are correlated. The degree of relationship between the variables under consideration is measured through the correlation analysis. The measure of correlation called the correlation coefficient or correlation index summarizes in one figure the direction and degree of correlation. The correlation analysis refers to the techniques used in measuring the closeness of the relationship between the variables.

We can find various types of relations. The relation can be either positive or negative or zero correlation. If two variables tend to move together in a same direction i.e., an increase in the value of one variable is accompanied by an increase in the value of other variable or a decrease in the value of one variable is accompanied by a decrease in the value of other variable then the correlation is called positive. One the other hand, if two variables tend to move together in opposite directions so that an increase or decrease in the values of one variable

is accompanied by a decrease or increase in the value of the other variable, then the correlation is negative. When the relationship between two sets of variables is a pure change relationship, we say there is zero correlation.

I. Correlation Coefficient Analysis

Koul (1997), states that the intensity or degree of linear correlation is represented quantitatively by coefficient of correlation. Its value ranges from -1.00 to +1.00. A value of -1.00 describes a perfect negative correlation and +1.00 describes perfect positive correlation. A zero value describes complete lack of correlation between the two variables. The sign ($\pm$) of the coefficient indicates the direction either positive or negative of the relationship and the numerical values its strength.

To interpret the magnitude of correlation coefficient qualitatively, Carret (1997) has given the following established criteria:

a) r's from 0.00 to $\pm$ 0.20 = very low, negligible

b) r's from $\pm$ 0.21 to $\pm$ 0.40= low, present , but slight

c) r's from $\pm$ 0.41 to 0.70 = substantial or marked

d) r's from $\pm$ 0.71 to $\pm$ 1.00= high or very high

Similarly, Sthapit and Aryal (2004) have also given some relevant criteria for the interpretation of correlation coefficient which the researcher has used for his convenience in this research work as follows:

	Direction	
	Positive	Negative
Perfect	+1.0	-1.0
Very high	+0.75 to +1	-0.75 to -1.0
High	+0.5 to + 0.75	-0.5 to -0.75
Low	+0.25 to +0.5	-0.25 to -0.5
Very low	+0.0 to + 0.25	-0.0+ 0- 0.25
Absent	0.0	0.0

II. Methods of Calculating Correlation

There are various methods of calculating correlation. Their use is relative to the situation and type of data. We may have data in scores. There are many situations in which the researcher does not have scores and has to work with data in which differences in a given attribute can be expressed only by ranks, or by classifying an individual into one of several descriptive categories. Some of these methods of correlations are as follows:

i. Product –moment correlation
ii. Rank order correlation
iii. Bi-serial and point bi-serial correlation
iv. Tetrachoric an phi-coefficient correlation
v. Partial correlation
vi. Multiple correlation

Hence, the researcher got the data in scores. And Karl Person's *Product-moment correlation* is suitable for his purpose. Therefore, he used this method in order to find out the correlation of different variables of his study.

i) Product-Moment Correlation

In some situations the data for two variables X and Y are expressed in interval or ratio level of measurement and the distributions of these variables have a linear relationship. Moreover, the distributions of the variables are uni-model and their variances are approximately equal. In such situations we may make use of Product-moment method of correlation. It is also called Pearson's 'r' (Koul, 1997). While using this method we make use the following formula to calculate the correlation:

$$r_{xh} = \frac{N\sum xy - \sum x.\sum y}{\sqrt{\left[N\sum x^2 - (\sum x)^2\right]\left[N\sum y^2 - (\sum y)^2\right]}}$$

In which,

X = Scores of one variable

Y = Scores of another variable

1.1.3.5 Regression Analysis

Regression analysis reveals average relationship between two variables and this makes possible estimation or prediction. Gupta (1991, p. E-11.2), defines regression analysis as "the measure of the average relationship between two or more variables in terms of the original units of the data."

Generally, regression analysis is a statistical device with the help of which we are in a position to estimate the unknown values of one variable from known values of another variable. The variable which is used to predict the variable of interest is called the explanatory variable and the variable we are trying to predict is called the explained variable. The independent or explanatory variable is denoted by X and the dependent or explained variable by Y. The analysis used is called the simple linear regression analysis. The term linear means that an equation of a straight line of the form Y= a + bX, where ‘a’ and ‘b’ are constants, is used to describe the average relationship that exists between the two variables (Gupta, 1991).

I. Regression Lines

Regression lines provide estimates of values of the dependent variables from values of the independent variable. The device used to accomplish this estimation procedure is the regression line. The regression line describes the average relationship existing between X and Y variables. If we take the case of two variables X and Y, we shall have two regression lines as the regression of X on Y and the regression of Y on X. The regression like of Y on X gives the most probable values of Y for given values of X and the regression line of X on

Y gives the most probable values of X for given values of Y. However, when there is either perfect positive for perfect negative correlation between the two variables (±1) the regression lines will coincide. The farther the two regression lines from each other, the lesser is the degree of correlation. If the variables are independent, r is zero and the lines of regression are at right angles, i.e., parallel to OX and OY.

It should be noted that the regression lines cut each other at the point of average of X and Y, i.e., if from the point where both the regression lines cut each other a perpendicular is drawn on the X-axis, it will get the mean value of X and if from that point a horizontal line is drawn on the Y-axis, we will get the mean value of Y Gupta (Ibid).

II. Regression Equations

Regression equations, also known as estimating equations, are algebraic expressions of the regression lines. Since there are two regression lines, there are two regression equations - the regression equation of X on Y is used to describe the variations in the values of X for given changes in Y and the regression equation of Y on X is used to describe the variation in the values of Y for given changes in X.

The regression equation of Y on X is expressed as: $Y = a + bX$ .It may be noted that in this equation Y is a dependent variable and X is independent variable 'a' is y intercept because its value is the point at which the regression line crosses the Y-axis. 'b' is the slope of line. It represents change in y variable for a unit change in X variable. 'a' and 'b' in the equation are called numerical constants because for any given straight line, their value does not change. If the values of the constant 'a' and 'b' are obtained, the line is completely determined. To determine the values of ‘a’ and ‘b’, the following two normal equations are to be solved simultaneously:

$$\sum Y = Na + b\sum X$$

$$\sum XY = a\sum X + b\sum X^2$$

The regression equation of X on Y is expressed as:

$$X = a + bY$$

1.1.3.6 Testing Hypothesis

Inferential or sampling statistics are useful statistical methods because they enable the researcher to make generalization or inferences about populations from the observations of the characteristics of samples. In statistical inference sample statistics is selected and used to draw inference about a population parameter based on a subset of it − the sample draw from the population. Statistical inference treats two different classes of problems: Hypothesis testing and estimation. However, the researcher had been confined to hypothesis testing only.

Gupta (1991) states that hypothesis testing begins with an assumption, called a hypothesis, that we make about a population parameter. A hypothesis is a supposition made as basic for rationale. According to Hamburg as cited in Gupta (1991, p. A-3.3),

> a hypothesis in statistics is simply a quantitative statement about a population. In order to make proper decision about the quantitative statement of the population, testing hypothesis technique is used. The testing of hypothesis is carried out by using sample information.

Hypothesis can be set is two ways via null hypothesis (H_0) and alternative hypothesis (H_1). The null hypothesis is the hypothesis to be tested referred as hypothesis of no difference. It is usually set for the express purpose of being rejected.

In its simplest form (Gupta, 1991); the hypothesis asserts that there is no true difference in the sample and the population in the particular matter under consideration. The null hypothesis is a kin to a legal principle that a man is innocent until he is proved guilty.

A hypothesis which is set up against the null hypothesis is called an alternative hypothesis. It should be noted that alternative hypothesis is a mutually exclusive and complementary statement of null hypothesis. If null hypothesis is rejected then alternative hypothesis will be accepted.

I. Errors in Hypothesis Testing

In testing hypothesis we have to make the decision of accepting or rejecting the null hypothesis after inspecting the sample observation. In the time of making decision, there exist four types of decision which are:

a) Reject H_0/H_0 is true. [Type I error]

b) Accept H_0/H_0 is true [Correct]

c) Accept H_0/H_0 is false [Type II error]

d) Reject H_0/H_0 is false [Correct]

II Levels of Significance

The maximum size of type I error which we are prepared to bear is called level of significance. For the sake of convenience, the researchers have 0.05 and 0.01 levels of significance as two arbitrary standards for accepting or rejecting a null hypothesis (Koul, 1991). Best and Kahn (1993), say that rejecting a null hypothesis at the 0.05 level indicates that a difference in means as large as that would have resulted from sampling error less than five out of 100 replication of the experiment. This suggested that a 95 percent probability that the difference was due to the experimental treatment rather than to sampling error.

III. Degree of Freedom

Degree of freedom refers to the number of values in a sample that can be chosen freely. In other words, a degree of freedom represents the numbers of observations that remain unspecified. Degree of freedom is also determined as the sample size minus the number of population parameters that are estimated from sample observations.

1.1.3.7 Analysis of Variance

The analysis of variance (ANOVA) is statistical technique used to test whether the difference among the means of three or more population is significant or not. In this process the significant difference among three or more sample means are observed by investigating variance. Basically, ANOVA consists of classifying and cross-classifying statistical results and testing whether the means of results and testing of a specified classification differ (Gupta 1991). In this way, it is determined whether the given classification is important in affecting the results. For this, ANOVA tests the significance of the different among sample means via the mechanism of the F-test, but the test is so designed that the variances being compared are different only if the means under consideration are not homogeneous. In this way, a calculated value of F-ratio indicates that the means are significantly different from one another.

1.1.3.8 Chi-square Test (χ^2)

χ^2 test was first developed by Karl Pearson in 1900. χ^2test explains the magnitude of discrepancy between expected frequency and observed frequency. So, it is often used to know the differences in theory and observation.

χ^2 is a non-negative quantity. Hence, its value ranges from zero to infinity. If χ^2 is zero, the discrepancy between observed and expected frequency

completely vanishes. And if the χ^2 values increase, the discrepancy between observed and estimated frequency goes up. So, the chi- square test is performed to know whether the difference between observed and estimated frequency is significant or that is only due to sampling fluctuations.

The degree of freedom is a number of observations or values that are independent on each other. Generally, degree of freedom in chi-square test is:
(r-1) (c-1)
Where,

r = no. of rows

c = no. of columns

The χ^2 test has wide application in testing of hypothesis when the data available for analysis are in the form of frequencies. The mostly used tests are:

a) Test of goodness of fit
b) Test of independence of attributes
c) Test of homogeneity
d) Test of population variance

Among all of these applications the researcher used only the test of independence of attributes for the purpose of this research. This application of Chi-square is one of the powerful tests to test whether two attributes are independent or associate. In this test, the attributes are classified into a two way table or contingency table as the case may be. The observed frequency in each cell is known as cell frequency. The total frequency in each row or column of the way contingency table is known as the Marginal Frequency.

1.2 Review of the Related Literature

Several studies have been carried out on examination system at school level. Some of them are concerned with general issues of examination system as a whole and some others have focused on SLC Examination in Nepal. Only a few of them deal with the statistical analysis of examination keeping in view the SLC examination, some researchers have carried out the studies in several aspects of the SLC examination.

Awasthi (1979) conducted a research entitled "A Study of Attitudes of Different Groups of People towards the English Language in Secondary Schools of Kathmandu District" to identify the attitudes of the different groups of people towards the English language and found that more than 80% failures were in English in the SLC examination. He concluded that although the failure percentage is high in English in the SLC examination, the people had positive attitudes towards the English language. Similarly, **CERID (1989)** attempted a research entitled "Causes of Failure in English in the SLC Examination" to identify the causes for the high percentage of failure of SLC examinees in English. The study concluded that the SLC result is very low due to examination system, theory oriented syllabus, textbooks and unqualified teachers. Likewise, **Rathbone (1969)** as cited in CERID (1989) conducted a research entitled "Deficiencies of Nepali Learners of English in Various Areas" to analyze the deficiencies of Nepali learners of English in various areas. The research showed how SLC students were ill-equipped with English. Their vocabulary was inadequate and they are unable to handle even simple sentence structures. Rathbone lays emphasis on the need for teaching functional English as a skill.

In the same way, **Somerset** as cited in CERID (1989) conducted a study entitled "Development of the Public Relevant Ways to Solve the Problems of School Examination and the Need for Reform" to discuss the problems of examinations in relation to the office of the controller of examination, SLC Board. The whole report is about examinations at various levels of the school and their problems. It provides relevant information about problems of school examinations and the need for reform. **Khaniya (1990)** conducted a research on "Examination as Instrument for Educational Change: Investigating the Washback Effect of the Nepalese English Exams" and concluded that washback is inherent in an exam, an exam is bound to influence teaching and learning. Similarly, **Giri (1995)** conducted a research on "a Survey into People's Attitudes towards the Existing SLC Examination in Nepal" to find out if people think it was appropriate to conduct the SLC examination throughout the kingdom at the same time. The research concluded that people did not have faith in the SLC examination due to the inherent defects in the examination mechanism.

CERID (1996) carried out another research entitled "SLC Examination in Nepal" to probe upon the issues and problems in Nepal's SLC examination prevalent at present. The study also aimed to present an overview of the school leaving examination (SLE) system prevailing in selected countries which aimed to trace out relevant implications for solving the problems connected with the SLC examination system in Nepal. At last, the study suggested measures to tackle the issues and problems of SLC examination in Nepal. Likewise, **Kshetree (2001)** carried "A Study on the Washback Effect of the SLC Examination" to findout the washback effect of the SLC examination in teaching and learning of English. The research also aimed to analyze very

common non-classroom practices done by the students to prepare for English examination and concluded that only 84% of the teachers believe that the SLC questions are asked according to the curriculum. So, 96% teachers believe that their students achieve the objectives of the course and only 56% teachers believe that the oral test system will be successful and fair.

Batala (2004) conducted a research entitled "Validation of the SLC English Examination" and attempted to find out the predictive and content validity of English question paper of SLC examination and found that the content validity was satisfactory but it had low predictive validity. **Bhandari (2004)** carried out a research on "A Descriptive and Attitudinal Study on the SLC English Question Papers and Specification Grid, 1999" to examine the extent to which SLC examination questions represent the SLC English specification grid. The research concluded that some question items followed the specification grid properly but some items did not. Likewise, **Kadel (2006)** carried-out a research on "A Study on the Correlationship between Sent-up and the SLC Examination Results" to find out the correlationship between the sent up and the SLC examination results of 2062 B.S. The research concluded that the coefficient of correlation between the two sets of scores on sent-up and SLC English examinations was +0.79, i.e. very high.

The present study is different from the previous ones. No research in the past investigated the area it has undertaken to study. The area and scope of this study are well defined and confined to the statistical analysis of the English examination results of SLC Exam. In this sense, it differs from the other works in its objective.

1.3 Objectives of the Study

The present research had the following objectives:

a. to analyze the English examination result statistically.
b. to find out the correlation of result of English with other compulsory subjects
c. to compare the English examination result of public schools with that of private schools.
d. to suggest some pedagogical implications on the basis of the findings of the study.

1.4 Significance of the Study

Since there are no researches carried out on statistical method to analyze data in the Department of English Education, this study will prove to be worth for the department itself. This study has found the interrelationship among subjects and analyzes the relation of result of public and private schools. So, this study is expected to be beneficial to the prospective researchers who want to carryout the researches related to the statistical analysis of the SLC English examination as well as any other disciplines. More particularly this study can be significant to those teachers who are directly involved in teaching English in secondary level. This study is also expected to be very useful to English textbook writers of secondary level, SLC question setters, course designers, syllabus designers, curriculum planners, educational administrators and all the persons who are directly or indirectly involved in this field.

CHAPTER - TWO

METHODOLOGY

The following methodological strategies were adopted to achieve the specified objectives:

2.1 Sources of Data

The study made use of secondary sources for the collection of data.

2.1.1 Secondary Sources of Data

The researcher used only secondary source of data. The data were the raw marks of SLC appeared students obtained in SLC examination 2064 which was taken from the Office of the Controller of Examination, Sanothimi, Bhaktapur. In order to facilitate the study, the researcher consulted the books, journals, articles, theses and reports related to the present research. Some of them were Kumar (1999), Best and Kahn (1993), Kothari (2004), Koul (2006), Gupta (1991).

2.2 Sampling Procedure

The researcher selected ten schools of the Kathmandu district on the basis of purposive sampling. While selecting the schools, fifty percent schools were public schools and fifty percent were the private schools. The researcher prepared a list of students who appeared in the SLC examination 2064 from those schools. Then, the researcher selected twenty students from each school on the basis of random sampling.

2.3 Tools for Data Collection

Observation was the main tool for data collection in this study. The researcher observed the raw marks obtained by the students in SLC exam, 2064.

2.4 Process of Data Collection

For data collection, the researcher visited to Mr. Gopal Bhattarai, Deputy Controller, Office of the Controller of SLC Examination, Bhaktapur. There, he explained the purpose of visiting and asked for permission to see the data. With that permission he selected and recorded the raw scores of SLC examination 2064.

2.5 Limitations of the Study

The present research was carried out under the following limitations:

1. This study was limited to the result of SLC examination 2064.
2. The scope of the study was confined to Kathmandu district only.
3. This study used certain statistical methods such as central value, dispersion, relative position, correlation coefficient, hypothesis testing only.
4. The correlation of English result was compared only with Science and Mathematical results.

CHAPTER - THREE

ANALYSIS AND INTERPRETATION OF DATA

This chapter deals with analysis and interpretation of the data. The main concern of the present research work was to analyze the English exam result statistically. For this purpose, the SLC Examination, 2064 was taken to be analyzed. The researcher selected five public and five private schools of Kathmandu district. The researcher sampled twenty students randomly from each of these schools. The main focus was given to the mark obtained in English subject (compulsory). Further, the marks obtained in English were compared with other two compulsory subjects i.e., Mathematics and Science. For the purpose of analyzing the exam results, the researcher used both descriptive and inferential statistics. While analyzing the data, measures of central value, measures of dispersion, measures of relative position, measures of relationship and hypothesis testing were main statistical methods.

3.1 Statistical Analysis of English Exam Result

In this chapter, the researcher analyzed the English exam result statistically in terms of central values, dispersion and relative positions.

3.1.1 Analysis of Central Value of English Exam Result

The tendency of the items or value of the items is clustered in the central part of the distribution. So, averages are the statistical constants which enable us to comprehend in a single effort, the significance of the whole, which gives us an idea about the concentration of the value in the central part of the distribution.

Among these central values only the two most commonly used measures of central tendency, i.e. mean and median were used for the purpose of the present research. The number of observations or scores is large. So, the researcher first

grouped the data in a suitable frequency distribution and then, computed the mean and median of English exam result. After computing the mean and median, the researcher found the mean and median of English exam result which are presented in the table as follows:

Table No. 1: Mean and Median of English Exam Result

Mean of English	65.19
Median of English	69.33

The above table shows that the average score in SLC English 2064, in Kathmandu district was 65.19, which can be taken as a good achievement score. The achievement mean fall into the first division score. Similarly, the median of SLC English score of 2064 shows that the point 69.33 divides the observation into two parts, which means 50 percent of the scores fall under the mark 69.33 and 50 percent of scores fall above 69.33 mark.

3.1.2. Analysis of Dispersion of English Exam Result

The researcher analyzed the dispersion of English exam results in terms of range, coefficient of range, standard deviation and coefficient of variation. The dispersion of the English exam result is presented as follows:

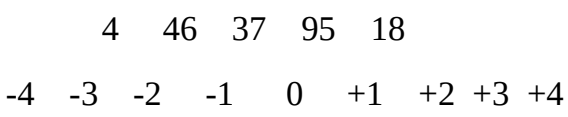
Table No. 2: Dispersion of English Exam Result

Range	66
Coefficient of Range	0.54
Standard Deviation	17.52
Coefficient of Variation	26.88%

The above table shows that the coefficient of range is 0.54, which can be analyzed as the distribution is modernity scattered. So, the achievement of the

students of SLC English subject is heterogeneous. Similarly, coefficient of variation of English i.e., 26.88 percent shows that the result is moderately scattered.

The researcher presented the above dispersion in normal distribution as follows:



From the above normal curve, it is found that the scores are scattered more below from mean then that of above mean. Four scores fall under -3 standard deviation but the scores above mean are scattered up to +2 standard deviation only. Thirty seven scores fall below the mean in -1 standard deviation and 95 scores fall above +1 standard deviation. Again, the normal curve shows that 46 scores fall below mean between -2 standard deviation and -1 standard deviation. And 18 scores fall above mean between +2 and +1 standard deviation. Similarly, 132 scores fall under ± 1 standard deviation which is 66 percent of the total scores and 196 scores fall under ± 2 standard deviation which is 99 percent of the total scores.

3.1.3 Analysis of Relative Position of English Exam Result

Measures of relative position is a method of interpreting scores in a distribution which is reference to other scores in that distribution. So, the researcher used T-score and percentile ranks to analyze the relative positions of the distribution. The relative positions of individual scores in terms of T-scores are presented in the following table as follows:

Table No. 3: Relative Position of English Exam Result Scores

Mark Scores	T score $\frac{10}{\pm}(X-M)+50$	Mark Scores	T score $\frac{10}{\pm}(X-M)+50$	Mark Score	T score $\frac{10}{\pm}(X-M)+50$
94	66.42	73	54.45	48	40.2
93	65.85	72	53.45	47	39.63
92	65.28	71	53.31	46	39.06
91	64.71	69	52.17	45	38.49
89	63.36	68	51.6	44	37.92
88	63	67	51.03	43	37.35
87	62.43	65	49.89	42	36.78
86	61.86	64	49.32	41	36.21
85	61.29	63	48.75	40	35.64
84	60.72	62	48.18	39	35.07
83	60.15	61	47.61	38	34.5
82	59.58	59	46.47	37	33.93
81	59.01	56	44.76	36	33.36
80	58.44	55	44.19	35	32.79
79	57.87	54	43.62	33	31.65
78	57.3	53	43.05	31	30.51
77	56.73	52	42.48	30	29.94
76	56.16	51	41.91	29	29.37
75	55.59	50	41.34	28	28.80
74	55.2	49	40.77		

The above table shows that the raw scores of English exam was converted into standard scores (T scores) and found out that 28.8 point is the lowest mark obtained and the point 66.42 is the highest mark obtained in the English exam. Using the above table we can relate one score with other in order to maintain comparison.

Similarly, the researcher calculated the PRs of the English exam result which are presented in the table as follows:

Table No. 4: Percentile Ranks of English Exam Result Scores

Scores	Percentile Ranks(PR) $^{100}/_{N}\ (c.f.+{}^{f}/_{2})$	Scores	Percentile Ranks (PR) $^{100}/_{N}\ (c.f.+{}^{f}/_{2})$
94	99.75	61	38
93	99.25	59	36
92	98.25	56	35
91	98.25	55	34.25
89	97.75	54	33
88	97	53	30.5
87	95.75	52	29.25
86	94.25	51	27.25
85	91.75	50	25.25
84	89.5	49	24.25
83	86.25	48	22.75
82	83.5	47	21.5
81	80.5	46	20.5
80	77	45	19.5
79	74.75	44	18
78	71.5	43	15.5
77	68	42	14
76	64.75	41	11.5
75	60.5	40	10.5
74	57.25	39	9
73	55.5	38	7.75
72	54	37	7.25
71	52	36	6.5
69	50.25	35	5.5
68	49	33	4.25
67	47.25	31	3.25
65	44.75	30	2.5
64	42.5	29	1.5
63	41	28	1
62	40		

The above table shows that the highest percentile rank is 99.75th percentile which score is 94 and lowest percentile rank is 1st percentile which score is 28. Here, 99th percentile rank is a score of 94, means that 99.75 percent of the scores fall below the mark 94. Similarly, 38th percentile rank is the score of 61, which shows that 38 percent of the scores fall below the mark 61. Likewise, 19.5 percentile rank is the score of 45, which shows that 19.5 percent of the scores fall blow the mark 45. Similarly, 77th percentile rank is a score of 80, which means 77 percent of the scores fall below the mark 80.

3.2 Correlation of English Exam Result with Maths and Science Achievement Scores

In this topic, the researcher compared the English result scores with achievement scores of Maths and Science in terms of central value, dispersion, relationship and hypothesis testing.

3.2.1 Comparison of Central Values among English, Maths and Science Achievement Scores

The researcher compared the central value of English exam result with Maths and Science exam results in terms of mean and median. The central values of these three subjects are presented in the table as follows:

Table No. 5: Central Values of English, Maths and Science Exam Results

Subjects Dispersion	English	Maths	Science
Mean	65.19	53.43	61.03
Median	69.33	55	68.17

The above calculated means show that the English achievement is the best achievement among all subjects compared, which is 65.19 as average. The English average is followed nearly by Science average by securing 61.03 mark

as average and the Maths achievement is the least better score among all which is only 53.43 as average. Both English and Science averages fall in the first division rank but the Maths average fall only in the second division rank. Similarly, the table shows that the English median is the best among all of the medians. It exerts that 50 percent of the scores fall above the marks 69.33 whereas 50 percent of the scores fall above the mark 68.17 in Science. Likewise, 50 percent marks fall above the mark 55 in Math.

3.2.2 Comparison of Dispersion among English, Maths and Science Achievement Scores

The researcher calculated the dispersion of English, Maths and Science exam results in terms of range, coefficient of range, standard deviation and coefficient of variation. The dispersion of the exam results of above mentioned subjects are presented in the table as follows:

Table No. 6: Dispersions of English, Maths and Science Exam Results

Subjects Dispersion	English	Maths	Science
range	66	89	63
coefficient of range	0.54	0.9	0.55
Standard deviation	17.52	22.14	13.56
coefficient of variation	26.82%	41.44%	22.22%

The above table shows that Maths subject has the largest range, i.e. 89 and the English score has the least range 63. From these ranges it can be said that the scatteredness of English scores are somehow equal to Science scores but the Maths score is largely scattered than that of other two scores.

Similarly, the table shows that the standard deviation of English, Maths and Science are 17.52, 22.14 and 13.56 respectively. While comparing the

coefficient of variation among three subjects, it is found that the Maths has the highest coefficient variation among all of the subjects, i.e. 41.44% which shows that the Maths achievement scores are more scattered and more heterogeneous than that of other two score distributions. English achievement score has 26.88% coefficient of variation, while the Science has 22.22% of coefficient of variation. Among all of the subjects Science has the score of more homogeneity than that of other two. The Z-score performances English, Maths and Science exam results are presented in the table as follows:

Table No. 7: Z-Scores of English, Maths and Science Exam Results

Z-score	English			Maths			Science		
No. of Students	±1	±2	±3	±1	±2	±3	±1	±2	±3
	132	64	4	137	60	3	106	89	5

The above table shows that 132 scores fall under ±1 standard deviation in English whereas 137 scores fall under ± 1 standard deviation in Math. Similarly, only 106 scores fall under ± 1 standard deviation in Science score. This depicts that Maths scores are scattered more than those of other two scores. Similarly, 64 scores fall between ± 1 and ± 2 standard deviation in English and 60 scores fall between ±1 and ± 2 standard deviation in Maths whereas 89 scores fall between ± 1 and ± 2 standard deviation in Science. Likewise, 4 scores of English fall between ± 2 and ± 3 standard deviation whereas 3 scores of Maths fall between ± 2 and ± 3 standard deviation and 5 scores of Science fall between ± 2 and ± 3 standard deviation.

3.2.3 Analysis of Correlation Coefficient

The researcher used Karl Person's Product-moment correlation to find out the correlation coefficient between two variables. He, further, applied the standard of Sthapit and Aryal (2004) to measure the degree of relationship between two variables. The correlation coefficient between English and Math, and English and Science are presented in the table as follows:

Table No. 8: Correlation Coefficient of English, Maths and Science Exam Results

Correlation Coefficient between	Degree of Relationship
English and Maths Scores	0.67
English and Science Scores	0.84

The above table shows that the correlation coefficient of English and Maths achievement scores is 0.67. So, the correlation coefficient of English and Maths achievement scores obtained in SLC exam is positively and highly correlated.

Similarly, the table shows that the correlation coefficient of English and Science achievement score is 0.84. So, the relationship of English and Science achievement score is positively and very highly correlated. The correlation coefficient between English and Science is stronger than the coefficient of correlation of English and Maths result scores.

3.2.4 Analysis of Multiple Correlation Among English, Maths and Science Exam Results

The multiple correlation is related to the inter-correlations among independent variables as well as to their correlations with the dependent variables. After calculating the multiple correlation coefficients among English, Maths and Science exam results the researcher found 0.86 as a degree of relationship. So, the relationship among English, Maths and Science exam results is positive and very high.

3.2.5 Calculation of Regression Line of English and Maths Exam Results

The researcher calculated the regression analysis of English and Maths exam scores. At first, the researcher let the English exam score as independent variable and Maths exam score as dependent variable. Then, the researcher found out that their regression analysis (Maths on English) as presented in the following table:

Table No. 9: Regression Analysis of Maths on English

English	30	40	50	60	70	80	90
Maths	20.97	29.77	38.57	47.37	56.17	64.97	73.77

The above table shows that English exam score is better than that of Maths exam result score. If the averages of English scores are 30, 40, 50, 60, 70, 80 and 90, the table shows, the average of Maths result scores will be 20.97, 29.77, 38.57, 47.37, 65.17, 64.97 and 73.77 respectively.

Similarly, the researcher let the Maths exam scores as independent variable and English exam score as dependent variable. Then, he found out the regression English on Maths is presented in the following table:

Table No. 10: Regression Analysis of English on Maths

Maths	30	40	50	60	70	80	90
English	53.29	58.39	63.49	68.59	73.69	77.99	83.89

The above table shows that if the averages of Maths are 30, 40, 50, 60, 70, 80 and 90 the average of English scores will be 53.29, 58.39, 63.49, 68.59, 73.69, 77.99 and 83.89 respectively.

3.2.6 Calculation of Regression Line English and Science Exam Results

To calculate the regression line of English and Maths the researcher let the English exam result as independent variable and Science exam result as dependent variable. Then, the researcher computed regression analysis of Science on English and presented in the table as follows:

Table No. 11: Regression Analysis of Science on English

English	30	40	50	60	70	80	90
Science	47.6	52.3	57	61.7	66.4	71.1	75.8

The above table shows that English exam score is better than that of Science exam score. If the averages of English scores are 30, 40, 50, 60, 70, 80 and 90, the table shows, the average of Science score will be 47.6, 52.3, 57, 61.7, 66.4, 71.1 and 75.8 respectively.

Similarly, the researcher let the Science exam scores as independent variable and English exam score as dependent variable. Then, the researcher found out the regression of English on Science which is presented in the following table:

Table No. 12: Regression Analysis of English on Science

Science	30	40	50	60	70	80	90
English	13.29	28.39	43.49	58.59	73.69	88.79	103.89

The above table shows that if the averages of Science are 30, 40, 50, 60, 70, 80 and 90, the averages of English scores will be 13.29, 28.39, 43.49, 58.59, 73.69, 88.79 and 103.89 respectively.

3.2.7 Test of Significant Difference between Two Sampled Means of English and Maths Achievement Scores

To test the significant difference between two sampled means of English and Maths exam results, the researcher used the statistics Z-test because the observed sample is greater than 30. For the convenience, he took the 0.01 and 0.05 levels of significance. The researcher made the hypotheses as follows:

a) H_0: $\mu_1 = \mu_2$ [There is no significant difference in the average scores between English and Maths exam results.

b) H_1: $\mu_1 \neq \mu_2$ [These is significant difference in the average scores between English and Maths exam results

After computing the Z-test the researcher found the 5.84 as a computed Z-value. The critical value at 5 % and 1% level of significance and for two tailed test are 1.98 and 2.58 respectively. As the computed Z-value is greater than tabulated Z-value at both 5% and 1% level of significance the null hypothesis is rejected. This indicates that the mean scores of English and Maths subjects are significantly different.

3.2.8 Test of Significance of Different between Two Sampled Means of English and Science Achievement Scores

Similarly, the researcher used Z-test to test the significant difference between English and Science exam results and took the 0.01 and 0.05 levels of significance. The hypotheses are as follows:

a) Ho: $\mu_1 = \mu_2$ [There is no significant difference in the average scores between English and Science exam results.

b) H_1: $\mu_1 \neq \mu_2$ [These are significant difference in the average scores between English and Science exam results

After computing the Z-test the researcher found the 2.56 as a computed Z-value. The critical value at 5 % and 1% level of significance and for two tailed test are 1.98 and 2.58 respectively. As the computed Z-value is less than tabulated Z-value at 5% level of significance, the null hypothesis is accepted, whereas the calculated Z-value is grater than tabulated Z-value at 1% level of significance the null hypothesis is rejected. This means the mean numbers of English and Science exam results are not significantly different at 5% level of significance and are significantly different at 1% level of significance.

3.2.9 Analysis of Variance Among the Means of English, Maths and Science Achievement Scores

To test the variance among the means of English, Maths and Science achievement scores analysis of variance (ANOVA) is used. ANOVA tests the significance of the different among sample means via the mechanism of the F-test, but the test is so designed that the variances being compared are different only if the means under consideration are not homogeneous. The researcher tested the F-ratio at 0.01 and 0.05 levels of significance. The hypotheses for testing F-ratio are as follows:

a) Ho: $\mu_1 = \mu_2 = \mu_3$ [Means among these three subjects scores are not significantly different].

b) H_1: $\mu_1 \# \mu_2 \# \mu_3$ [Means of these subjects scores are significantly different]

After computing the F-ratio, the following findings were found:

Table No. 13: Variance Ratio of Means of English, Maths and Science Exam Results

Source of variation	Sum of squares	d. f.	Mean sum of square	F- ratio
Between samples	5551	3-1=2	$\frac{5551}{2}=2775.5$	$\frac{2775.54}{328.46}$ = 8.45
Within samples	48283.96	150-3 = 147	$\frac{48283.96}{147}=328.46$	
Total	53834.96			

The above table shows that the F-ratio is 8.45. Tabulated value of $F_{0.05}$ at $ύ_1 = 2$ and $ύ_2 = 147$ degree of freedom is 3.06, and $F_{0.01}$ at degree of freedom 2 and 147 is 4.75. Since calculated F-value > Tabulated F-value at both level of significance, null hypothesis is rejected. This means that the mean scores of English, Maths and Science are significantly different.

3.3 Comparison of English Exam Scores between Public and Private Schools

In this topic, the researcher compared the English exam results of public and private schools in term of central value, dispersion, relative position and hypothesis testing.

3.3.1 Comparison of Central Value of English Achievement Scores of Public and Private Schools

The researcher compared the central values of English exam results of public and private schools in terms of mean and median. The central values of English exam results of public and private schools are presented in the table as follows:

Table No. 14: Central Values of English Exam Results of Public and Private Schools

Types of Schools Central value	Public	Private
Mean	50.57	78.35
Median	50.29	79.83

The above table shows that the English score of private school is 78.35 as average which is very good achievement score. While comparing it with public school, the public school's exam result is far more less than that of private score. The average of private exam result seemed near to distinction level but the public average is hardly crossed fifty percent. Again, the table

shows that the point 50.29 divides public achievement scores into two-halves but private exam result is divided by 79.83. Hence, in public school's exam result 50 percent of scores fall under 50.29 mark but in private school's exam result 50 percent of scores fall under 79.83 mark. The researcher found a far inequality between public and private schools' results in English. The public achievement level is very poor in comparison with that of private school.

3.3.2 Comparison of SD of English Exam Results of Public and Private Schools

The researcher compared the dispersion of English exam results of public and private schools in terms of standard deviation and coefficient of variation. The dispersion of public and private schools' exam results are presented in the table as follows:

Table No. 15: Dispersion of English Exam Results of Pubic and Private Schools

Subjects / Dispersion	Public	Private
Standard deviation	12.97	8.03
Coefficient of variation	25.56%	10.24%

The above table shows that the coefficient of variation of two types of school is 25.56% and 10.24% for public and private schools respectively. It signifies that the private school's result score is more homogeneous, i.e., only 10.24% scores are scattered. At that time, 25.56% scores are scattered in public school's result scores, which is more heterogeneous than that of private school. So, it can be said that the private school's result is better than that of public schools' result.

3.3.3 Percentile Ranks of the English Exam Result Scores of Public School

Percentile ranks is the points in the distribution below which a given percentage of scores fall. Using the percentile rank we can compare the individual scores with other scores. The percentile ranks of English exam result of public schools is presented in the table as follows:

Table No. 16: Percentile Ranks of English Exam Result Scores of Public School

Scores	Percentile Ranks (PR) $^{100}/_{N}\ (c.f.+{}^{f}/_{2})$	Scores	Percentile Ranks (PR) $^{100}/_{N}\ (c.f.+{}^{f}/_{2})$
78	99.5	49	47.5
75	97.5	48	44.5
73	95.5	47	42
71	93.5	46	40
69	91	45	38
68	89	44	35
67	86.5	43	30.5
65	82.5	42	26
64	78.5	41	23
63	76	40	21
62	74.5	39	18
61	72.5	38	15.5
59	70	37	14.5
56	68	36	13
55	66.5	35	11
54	63	33	8.5
53	59.5	31	6.5
52	57.5	30	5
51	53.5	29	3
50	50	28	2

The above table shows that the highest percentile rank that is 99.5^{th} percentile which score is 78 and lowest percentile rank is 2^{nd} percentile which score is 28. Here, 99.5^{th} percentile rank is a score of 78, means that 99.5 percent of the scores fall below 78 mark. Similarly, 72.5^{th} percentile rank is a score of 61, which shows that 72.5 percent of the scores fall below 61. Likewise, 38^{th} percentile rank is the score of 45, which shows that 38 percent of the scores fall below 45. No students could obtain distinction marks from public school in compulsory English.

3.3.4 Percentile Ranks of the English Exam Result Scores of Private Schools

The researcher calculated the percentile ranks of English exam result pf private schools and presented in the table as follows:

Table No. 17: Percentile Ranks of English Exam Result Scores of Private School

Scores	Percentile Ranks (PR) $^{100}/_{N}(c.f.+{}^{f}/_{2})$	Scores	Percentile Ranks (PR) $^{100}/_{N}(c.f.+{}^{f}/_{2})$
94	99.5	78	43.5
93	98.5	77	37
92	97.5	76	30.5
91	96.5	75	23.5
89	95.5	74	18.5
88	94	73	15.5
87	91.5	72	13
86	88.5	71	10.5
85	84.5	69	9.5
84	79	67	8
83	72.5	64	6.5
82	67	62	5.5
81	61	61	3.5
80	54	53	1.5
79	49.5	43	1

The above table shows that highest percentile rank that is 99.5^{th} percentile whose is the mark 94 and lowest percentile rank is 1^{st} percentile whose score is the mark 43. Here, 99.5^{th} percentile rank is a score of 94, means that 99.5 percent of the scores fall below the mark 94. Similarly, 54^{th} percentile rank is a score of 80, which means 54 percent of the scores fall below 54 mark. Likewise, 35^{th} percentile rank is the score of 61, which means 3.5 percent of the scores fall below the mark 61. Similarly, only one score felt below the mark 45.

3.3.5 Analysis of Correlation of English Exam Results between Public and Private Schools

The researcher used Karl Person's Product-moment correlation to find out the correlation coefficient between two variables. He, further, applied the standard of Sthapit and Aryal (2004) to measure the degree of relationship between two variables. The correlation coefficient between public and private schools' exam result in English was found 0.46. So, the public and private schools' achievement scores in English have positive but low correlation.

3.3.6 Test of the Independence of Achievement Scores and Types of School

To test the independence of achievement scores and types of school the researcher used Chi-square test. The researcher found the values in observation which are given below in the table.

Table No. 18: Frequency Distribution of English Exam Results of Public and Private Schools

Scores / Schools	Above median	Below Median	Total
Public	8	92	100
Private	90	10	100
Total	98	102	200

By using these values the researcher calculated Chi-square test. At first, the researcher made hypothesis as follows:

> H_0: There is no association between achievement scores and types of school.

For the connivance, the researcher took 0.01 and 0.05 levels of significance. After calculating the Chi-square the researcher found 134.53 as calculated value. The tabulated value of χ^2at 5% level and l d.f. is $\chi^2_{0.05}$,1 = 3.84 and at 1% level and 1 d.f. is $\chi^2_{0.01}$, l = 6.64. So, calculated χ^2 is greater than tabulated χ^2, i.e. H_0 is rejected. This means there is association between achievement scores and types of school.

CHAPTER - FOUR

FINDINGS AND RECOMMENDATIONS

This chapter deals with the major findings of the study. On the basis of the findings, recommendation for the improvement of methods of teaching, examination, curriculum as well as the course put forward.

4.1 Findings

The followings are the major findings of this research:

1. a) The mean and median scores of SLC English exam result 2064, are 65.19 and 69.33 respectively, which can be taken as good achievement.

   b) The coefficient of range of SLC English exam result is 0.54. This indicates that the scores are moderately scattered.

   c) The standard deviation of SLC English exam result is found 17.52 and coefficient of variation is 26.88. This indicates that the scores are moderately scattered. The scores are more scattered below from the mean than that of above mean.

   d) On the whole, 38 percent of the SLC English exam scores fall below the mark 61. Likewise, 19.5 percent of the scores fall below the mark 45, and 77 percent of the scores fall below the mark 80.

2. a) The mean of SLC English exam achievement is better among three subjects i.e., 65.19 and which is followed nearly by Science achievement score (61.03) and the students in Maths are quite weaker i.e., 53.43 as a mean score.

   b) The median scores of SLC English, Maths and Science are 69.33, 55 and 68.17 respectively. This exerts that the English median scores seemed better which is followed nearly by Science median and Maths achievement is a bit less than other two median scores.

c) The coefficient of range of English, Maths and Science scores are 0.54, 0.9 and 0.55 respectively. This indicates that the Maths scores is scattered very largely, and English and Science scores are moderately scattered.

d) The coefficient of variation of SLC English exam score is 26.88, which is more scattered than Science (22.22) and Maths achievement scores are the most scattered (41.44) among all.

e) The correlation coefficient between SLC English and Maths exam result is 0.67. This shows that English and Maths achievement obtained in SLC exam is positively and highly correlated.

f) The correlation coefficient between SLC English and Science exam results is 0.84. This exerts that their relationship is positively and very highly correlated.

g) The correlation coefficient between English and Science is more strong and positive than that of relationship between English and Math.

h) The multiple correlation coefficient among English, Maths and Science achievement scores is 0.86. The Intercorrelation among their scores is positive and very high.

i) The mean of achievement scores between English and Maths subjects are significantly different at both 5% and 1% level of significance.

j) The mean of achievement scores between English and Science subjects are not significantly different at 5% level of significance and are significantly different at 1% level of significance.

k) The mean scores among English, Maths and Science are significantly different.

l) We can predict that when English subject has the scores of 30, 50, 70 and 90, the Maths scores will be 20.97, 38.57, 56.17 and 73.77

respectively. Similarly, when Maths subject has the scores of 30, 50, 70 and 90, the English scores will be 53.29, 63.49, 73.69 and 83.89 respectively.

m) We can predict that when English subject has the scores of 30, 50, 70 and 90, the Science scores will be 47.6, 57, 66.4 and 75.8 respectively. Similarly, when Science subject has the score of 30, 50, 70 and 90, the English subject scores will be 13.29, 43.49, 73.69 and 103.89 respectively.

3. a) The mean and median of private achievement score is seemed near to distinction level but the public mean and median have hardly crossed fifty percent. There are far more difference of mean and median between public and private schools' achievement scores.

b) The private schools' result scores is more homogeneous, i.e., only 10.24% scores scattered. On the other hand, 25.56% scores are scattered in public schools' result scores, which is more heterogeneous than that of private schools' result.

c) In public schools' result, 72.5 percent of the scores fall below the mark 61, while only 3.5 percent of the scores fall below 61. Likewise, 38 percent of the scores fall below the mark 45 in public schools' result while only one percent of the scores fall below 45. Similarly, no students could get distinction mark from public schools'. This indicates that there is great inequality between public and private schools' achievement scores.

d) The correlation coefficient of English exam results between private and public school is 0.46, which exerts that their relationship is positive but low correlation.

e) There is strong association between English achievement scores and types of school.

4.2 Recommendations

On the basis of the findings the following recommendations are suggested:

1. The English achievement score in SLC is 65.19 only. So, the attempts should be made to increase the average achievement.
2. The English achievement score is scattered more. So, proper action should be taken to minimize this scatteredness.
3. The central value of English, Maths and Science are not same. So, the concerned agencies should review the curriculum, examination system and methods of teaching.
4. The correlation coefficient among English, Maths and Science exam results should be made positive and very high.
5. The mean of achievement scores among English, Maths and Science significantly different. So, the curriculum, education system and methods of teaching should be reviewed.
6. The achievement score of public school is poor in comparison with private school. So, the concerned agencies should bee aware of this fact.
7. The correlation coefficient of English exam results between private and public schools is low. So, the attempts should be made to make the relation strong and very high.
8. Resources, materials and trained and qualified teachers should be made available in public schools.
9. Teacher training and monitoring programmes should be conducted to provide quality education.
10. Close supervision should be made in government schools and teachers should be made responsible in their subjects.

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APPENDIX – I

Tabulation of English Exam Result

Scores (x)	Frequency (f)	Mid point (m)	d = m-A	fd	Cumulative Frequency (c.f.)	x'	fx'	fx'^2	$z = \frac{x - \bar{x}}{\pm}$
25-29	4	27	-33	-132	4	-7	28	196	-2.18
30-34	6	32	-28	-168	10	-6	36	216	-1.89
35-39	10	37	-23	-230	20	-5	50	250	-1.61
40-44	18	42	-18	-324	38	-4	72	288	-1.32
45-49	12	47	-13	-156	50	-3	36	108	-1.04
50-54	18	52	-8	-144	68	-2	36	72	-0.75
55-59	5	57	-3	-15	73	-1	5	5	-0.47
60-64	14	62	3	42	87	0	0	0	-0.18
65-69	15	67	8	120	102	1	15	15	0.1
70-74	15	72	13	195	117	2	30	60	0.39
75-79	34	77	18	612	151	3	102	306	0.67
80-84	31	82	23	713	182	4	124	496	0.96
85-89	14	87	28	392	196	5	70	350	1.25
90-94	4	92	33	132	200	6	24	144	1.53
	N=200			$\sum fd = 1037$		$\sum fx^1 = 102$		$\sum fx^{12} = 2506$	
Mean = 65.19		Median = 69.33		Standard Deviation =17.52			Coefficient of Variation = 26.82%		

APPENDIX – II

Tabulation of Maths Exam Result

Scores (x)	Frequency (f)	Mid point (m)	d = m-A	fd	Cumulative Frequency (c.f.)	x′	fx′	fx′^{2}	$z = \frac{x - \bar{x}}{\pm}$
05-09	3	7	-45	-135	3	-9	-27	243	-2.1
10-14	6	12	-40	-240	9	-8	-48	384	-1.87
15-19	6	17	-35	-120	15	-7	-42	292	-1.65
20-24	12	22	-30	-324	27	-6	-72	435	
25-29	0	27	-25	0	27	-5	0	0	1.42
30-34	24	32	-20	-480	51	-4	-96	384	0.97
35-39	10	37	-15	-150	61	-3	-30	90	0.74
40-44	6	42	-10	-60	67	-2	-12	24	0.52
45-49	18	47	-5	-90	85	-1	-18	24	0.29
50-54	15	52	0	0	100	0	0	18	0.06
55-59	9	57	5	45	109	1	9	0	0.16
60-64	29	62	10	290	138	2	58	9	0.39
65-69	15	67	15	225	153	3	45	116	0.61
70-74	11	72	20	220	164	4	44	135	0.84
75-79	7	77	25	175	171	5	35	176	10.06
80-84	8	82	30	240	172	6	48	175	1.29
85-89	12	87	35	420	191	7	84	288	1.52
90-94	9	92	40	360	200	8	72	576	1.74
	N=200			Σfd= 286			$\sum fx1 = 5$		$\sum fx12 = 3935$
Mean = 53.43		Median = 55		Standard Deviation = 22.14			Coefficient of Variation = 41.44		

APPENDIX – III

Tabulation of Science Exam Result

Scores (x)	Frequency (f)	Mid point (m)	d = m-A	fd	Cumulative Frequency (c.f.)	x'	fx'	fx'^2	$z = \frac{x - \bar{x}}{\pm}$
25-29	3	27	-30	-90	3	-6	-18	108	-2.51
30-34	2	32	-25	-50	5	-5	-10	50	-2.14
35-39	4	37	-20	-80	9	-4	-16	64	-1.77
40-44	3	42	-15	-45	12	-3	-9	27	-1.4
45-49	22	47	-10	220	34	-2	-44	88	-1.03
50-54	16	52	-5	-80	50	-1	-16	16	-0.67
55-59	12	57	0	0	62	0	0	0	-0.3
60-64	19	62	5	95	81	1	19	19	0.07
65-69	30	67	10	300	111	2	60	120	0.44
70-74	29	72	15	435	130	3	87	261	0.81
75-79	34	77	20	680	164	4	136	544	1.18
80-84	22	82	25	550	196	5	110	550	1.55
85-89	4	87	30	120	200	6	24	144	1.92
	N=200			$\sum fd = 805$			$\sum fx1 = 323$	$\sum fx12 = 1991$	
Mean = 61.03		Median = 68.17			Standard Deviation = 13.56			Coefficient of Variation = 22.22%	

APPENDIX – IV

Tabulation of English Exam Result of Public School

Scores (x)	Frequency (f)	Mid point (m)	d = m-A	fd	Cumulative Frequency (c.f.)	x'	fx'	fx'^2
25-29	6	27	-25	-100	4	-5	-20	100
30-34	4	32	-20	-120	10	-4	-24	96
35-39	10	37	-15	-150	20	-3	-30	90
40-44	17	42	-10	-170	37	-2	-34	68
45-49	12	47	-5	-60	49	-1	-12	12
50-54	17	52	0	0	66	0	0	0
55-59	5	57	5	25	71	1	5	5
60-64	9	62	10	90	80	2	18	36
65-69	12	67	15	180	92	3	36	108
70-74	4	72	20	80	44	4	16	64
75-79	4	77	25	100	100	5	20	100
	N=200			$\sum fd$ =-125				$\sum fx^{12} = 679$
Mean =50.57		Median = 50.29		Standard deviation = 12.97		Coefficient of Variation = 25.56%		

APPENDIX – V

Tabulation of English Exam Result of Private School

Scores (x)	Frequency (f)	Mid point (m)	d = m-A	fd	Cumulative Frequency (c.f.)	x′	fx′	fx'^2
40-44	1	42	-25	-25	1	-6	-6	36
45-49	0	47	-20	0	2	-4	-4	16
50-54	1	52	-15	-15	7	-10	-10	20
55-59	0	57	-10	0	10	-3	-3	3
60-64	5	62	-5	-25	21	0	0	0
65-69	3	67	0	0	51	30	30	30
70-74	11	72	5	55	82	62	62	124
75-79	30	77	10	300	96	42	42	126
80-84	31	82	15	465	100	16	16	64
85-89	14	87	20	280			$\sum fx1 = 127$	$\sum fx^{12} = 419$
90-94	4	92	25	100				
	N=100			$\sum fd = 1135$				
Mean =78.35		Median =79.83		Standard Deviation = 8.03		Coefficient of Variation =10.24%		

APPENDIX – VI

Tabulation of Percentile Ranks of the English Exam Result Scores

Scores	Frequency	Cumulative frequency	Percentile Ranks (PR) $^{100}/_{N}\,(c.f.+{}^{f}/_{2})$
94	1	200	99.75
93	1	199	99.25
92	1	198	98.25
91	1	197	98.25
89	1	196	97.75
88	2	195	97
87	3	193	95.75
86	3	190	94.25
85	5	187	91.75
84	6	181	89.5
83	7	176	86.25
82	4	169	83.5
81	8	165	80.5
80	6	157	77
79	3	151	74.75
78	10	148	71.5
77	4	138	68
76	9	134	64.75
75	8	125	60.5
74	5	117	57.25
73	2	112	55.5
72	4	110	54
71	4	106	52
69	3	102	50.25
68	2	99	49
67	5	97	47.25
65	5	92	44.75
64	4	87	42.5

63	2	83	41
62	2	81	40
61	6	79	38
59	2	73	36
56	2	71	35
55	1	1	34.25
54	6	68	33
53	2	62	30.5
52	3	60	29.25
51	5	57	27.25
50	2	52	25.25
49	3	50	24.25
48	3	47	22.75
47	2	44	21.5
46	2	42	20.5
45	2	40	19.5
44	4	38	18
43	6	34	15.5
42	4	28	14
41	2	24	11.5
40	2	22	10.5
39	4	20	9
38	1	16	7.75
37	1	15	7.25
36	2	14	6.5
35	2	12	5.5
33	3	10	4.25
31	1	7	3.25
30	2	6	2.5
29	2	4	1.5
28	2	2	1

APPENDIX – VII

Tabulation of Percentile Ranks of the English Exam Result Scores of Public School

Scores	Frequency	Cumulative frequency	Percentile Ranks (PR) $^{100}/_{N}\ (c.f. + {}^{f}/_{2})$
78	1	100	99.5
75	3	99	97.5
73	1	96	95.5
71	3	95	93.5
69	2	92	91
68	2	90	89
67	3	88	86.5
65	5	85	82.5
64	3	80	78.5
63	2	77	76
62	1	75	74.5
61	3	74	72.5
59	2	71	70
56	2	69	68
55	1	67	66.5
54	6	66	63
53	1	60	59.5
52	3	59	57.5
51	5	56	53.5
50	2	51	50
49	3	49	47.5
48	3	46	44.5

47	2	43	42
46	2	41	40
45	2	39	38
44	4	37	35
43	5	33	30.5
42	4	28	26
41	2	24	23
40	2	22	21
39	4	20	18
38	1	16	15.5
37	1	15	14.5
36	2	14	13
35	2	12	11
33	3	10	8.5
31	1	7	6.5
30	2	6	5
29	2	4	3
28	2	2	2

APPENDIX – VIII

Tabulation of Percentile Ranks of the English Exam Result Scores 0f Private Schools

Scores	Frequency	Cumulative frequency	Percentile Ranks (PR) $^{100}/_{N}\,(c.f.+{}^{f}/_{2})$
94	1	100	99.5
93	1	99	98.5
92	1	98	97.5
91	1	97	96.5
89	1	96	95.5
88	2	95	94
87	3	93	91.5
86	3	90	88.5
85	5	87	84.5
84	6	82	79
83	7	76	72.5
82	4	69	67
81	8	65	61
80	6	57	54
79	3	51	49.5
78	9	49	43.5
77	4	39	37
76	9	35	30.5
75	5	26	23.5
74	5	21	18.5
73	1	16	15.5
72	4	15	13
71	1	11	10.5
69	1	10	9.5
67	2	9	8
64	1	7	6.5
62	1	6	5.5
61	3	5	3.5
53	1	2	1.5
43	1	1	1

APPENDIX – IX

Calculation of Correlation between English and Maths Exam Results

S.N.	English (X)	Maths (Y)	XY	X^2	Y^2
1	39	63	2457	1521	3969
2	29	32	928	841	1024
3	71	46	3266	5041	2116
4	33	32	1056	1089	1024
5	39	32	1248	1521	1024
6	35	05	175	1225	25
7	41	10	410	1681	100
8	28	36	1008	784	1296
9	42	44	1848	1764	1936
10	51	48	2448	2601	2304
11	80	78	6240	6400	6084
12	53	32	1696	2809	1024
13	88	87	7656	7744	7269
14	84	78	6552	7056	6084
15	84	53	4452	7056	2809
16	46	32	1472	2116	1024
17	54	11	594	2916	121
18	69	20	1380	4761	400
19	40	07	280	1600	49
20	73	21	1533	5329	441
21	49	45	2205	2401	2025
22	42	24	1008	1764	576
23	71	46	3266	5041	2116
24	44	72	3168	1936	5184
25	54	32	1728	2916	2916
26	74	63	4662	5476	3969

27	76	74	5624	5776	5476
28	76	32	2432	5776	1024
29	78	64	4992	6084	4096
30	80	51	4080	6400	2601
31	77	48	3696	5929	2304
32	88	94	8272	7744	8836
33	85	50	4250	7225	2500
34	64	62	3968	4096	3844
35	72	54	3888	5184	2916
36	68	67	4556	4624	4489
37	69	52	3588	4761	2704
38	61	46	2806	3721	2116
39	61	68	4148	3721	4624
40	30	21	630	900	441
41	87	93	8091	7569	8649
42	74	60	4440	5476	3600
43	81	54	4374	6561	2916
44	75	57	4275	5625	3249
45	83	46	3818	6889	2116
46	83	61	5063	6889	3721
47	79	70	5530	6241	4900
48	78	93	7254	6084	8549
49	85	87	7395	7225	7569
50	74	89	6586	5476	7921
	$\Sigma x=3179$	$\Sigma y=2542$	$\Sigma xy=176492$	$\Sigma x^2=220365$	$\Sigma y^2=156578$
Correlation Coefficient = 0.67					

APPENDIX – X

Calculation of Correlations between English and Science Exam Results

S.N.	English (X)	Science (Y)	XY	X^2	Y^2
1	39	70	2730	1521	4900
2	29	54	1566	841	2916
3	71	80	5680	5041	6400
4	33	59	1947	1089	3481
5	39	40	1560	1521	1600
6	35	49	1715	1225	2401
7	41	50	2050	1681	2500
8	28	61	1708	784	3721
9	42	54	2268	1764	2916
10	51	63	3213	2601	3969
11	80	77	6160	6400	5929
12	53	54	2862	2809	2916
13	88	75	6600	7744	5625
14	84	75	6300	7056	5625
15	84	67	5628	7056	4489
16	46	38	1748	2116	1444
17	54	38	2052	2916	1444
18	69	48	3312	4761	2304
19	40	39	1560	1600	1521
20	73	51	3723	5329	2601
21	49	29	1421	2401	841
22	42	51	2142	1764	2601
23	71	66	1686	5041	4356
24	44	75	3300	1936	5625
25	54	58	3132	2916	3364
26	74	80	5920	5476	6400

27	76	78	5548	5776	5329
28	76	75	5700	5776	5625
29	78	74	5772	6084	5476
30	80	59	4720	6400	3481
31	77	74	5698	5929	5476
32	88	83	7304	7744	6889
33	85	66	5610	7225	4356
34	64	68	4352	4096	4624
35	72	57	4104	5184	3249
36	68	80	5440	4624	6400
37	69	72	4968	4761	5184
38	61	62	3782	3721	3844
39	61	69	4209	3721	4761
40	30	53	1590	900	2809
41	87	80	6960	7569	6400
42	74	70	5180	5476	4900
43	81	67	5427	6561	4489
44	75	58	4350	5625	3364
45	83	52	4316	6889	2704
46	83	73	6059	6889	5329
47	79	78	6162	6241	6084
48	78	79	6162	6084	6241
49	85	80	6800	7225	6400
50	74	74	5476	5476	5476
	$\Sigma x=1397$	$\Sigma y=3177$	$\Sigma xy=210672$	$\Sigma x^2=220365$	$\Sigma y^2=206859$
Correlation Coefficient = 0.84					

APPENDIX – XI

Calculation of Correlation of English Exam Results between Public and Private Schools

S.N.	Public(X)	Private (Y)	XY	X^2	Y^2
1	39	80	3120	1521	6400
2	29	53	1537	841	2889
3	71	88	6248	5041	7744
4	33	84	2772	1089	7056
5	39	84	3276	1521	7056
6	35	74	2590	1225	5476
7	41	76	3113	1681	6084
8	28	76	2128	784	6400
9	42	78	3276	1764	5929
10	51	80	4080	2601	7744
11	46	77	3542	2116	7225
12	54	88	4752	2916	4096
13	69	85	5865	4761	5184
14	40	64	2560	1600	7569
15	73	72	5256	5329	5184
16	49	87	4263	2401	6561
17	42	74	3108	1764	7569
18	71	81	5751	5041	5476
19	44	75	3300	1936	6561
20	54	83	4482	2616	5625
21	68	83	5644	4624	6889
22	69	79	5451	4761	6241
23	61	78	4758	3721	6084
24	61	85	5185	3721	7225
25	30	74	2220	900	5476
	$\Sigma x=1239$	$\Sigma y=1958$	$\Sigma xy=98280$	$\Sigma x^2=66575$	$\Sigma y^2=154790$
Correlation Coefficient = 0.46					

APPENDIX - XII

Critical Values of Student's t-distribution

df	Level of Significance for one tailed test					
	.10	.05	.25	.01	.005	.0005
	Level of Significance for two tailed test					
	.20	.10	.05	.02	.01	.001
1	3.078	6.314	12.706	31.821	63.657	636.61
2	1.886	2.920	4.303	6.965	9.925	31.59
3	1.638	2.353	3.182	4.541	5.841	12.941
4	1.533	2.132	2.776	3.747	4.604	8.610
5	1.476	2.015	2.571	3.365	4.032	6.859
6	1.440	1.943	2.447	3.143	3.707	5.959
7	1.415	1.895	2.365	2.998	3.499	5.405
8	1.397	1.860	2.306	2.896	3.355	5.041
9	1.383	1.833	2.262	2.821	3.250	4.781
10	1.372	1.812	2.228	2.764	3.169	4587
11	1.363	1.796	2.201	2.718	3.106	4.437
12	1.356	1.782	2.179	2.681	3.055	4.318
13	1.350	1.771	2.160	2.650	3.012	4.221
14	10345	1.761	2.145	2.624	2.977	4.140
15	1.341	1.753	2.131	2.602	2.947	4.073
16	1.337	1.746	2.120	2.583	2.921	4.015
17	1.333	1.740	2.110	2.567	2.898	3.965
18	1.330	1.734	2.101	2.552	2.878	3.922
19	1.328	1.729	2.093	2.539	2.861	3.883
20	1.325	1.725	2.086	2.528	2.845	3.850
21	1.323	1.721	2.080	2.518	2831	3.819
22	1.323	1.721	2.074	2.508	2.819	3.792
23	1.319	1.717	2.074	2.508	2.819	3.792
24	1.318	1.711	2.064	2.492	2.797	3.745
25	1.316	1.708	2.060	2.485	2.787	3.725
26	1.315	1.706	2.056	2.479	2.779	3.707
27	1.314	1.703	2.052	2.473	2.771	3.690
28	1.313	1.701	2.048	2.467	2.763	3.674
29	1.311	1.699	2.045	2.462	2.756	3.659
30	1.310	1.697	2.042	2.457	2.750	3.646
40	1.303	1.684	2.021	2.423	2.704	3.551
60	1.296	1.671	2.000	2.390	2.660	3.460
120	1.289	1.658	1.980	2.358	2.617	3.373
∞	1.282	1.645	1.960	2.326	2.576	3.291