CHAPTER– I

Introduction

1.1   Background of the Study

The 21th century is also introduced as the century of science and technology. Science is a body of information and principle that help us to understand the world around us from atom to stars from microscopic water life to man. It may also define as method of discovery by which new information and facts. Science is an essential a challenging subject of school curriculum so; every student should gain the best achievements. There are many studies on the achievements of science that have given the different such as gender, rural –urban variable castes. etc.

There is another kind of study which will be experimental in methods justifying the effectiveness of different teaching methods in teaching different areas of science such as Physics, Chemistry, Biology, Geology and Astronomy. But the present study is different from these previous studies. The present study in method is survey design but the various of concern in achievements is other than those of the previous study. The variable is a type of test item (pattern of the test item). There is intellectual guess among science teachers that the number of items included in the test an very short type of questions which will not actually short in solving time needed to the students will the major cause of increasing failure rate and lower achievements scores. This generalization will realize and made change in the type of test items but, there will not a research base justification when then the change of pattern of test items can bring positive change in students achievements scores. The result of the presents study gives a justification of the effect of the pattern of test items. What is the main significant test item of present study?

This study will add one more variable that can bring effect in students' achievements. Even though, it cannot be generalized perfectly because of limitation of the sample size and representativeness. It has given an indication for designing the big survey of analyzing the effect of pattern of test items in different categorical variables related to students population by the help of extensive research on the same topic. It will be helpful for the question setting policy ultimately improve the quality science test and ultimately improve more authentic.

Science is the concerned with human effort to understand or to understands better, the history of the nature word and how the natural world works with observable physics evidence as the basis of that understanding. It is done through observation of natural phenomena, and or through experimentation that tries to simulate natural processes under controlled conditions. Science is a systematic enterprise that builds and organizes knowledge in the form of testable explanations and predictions about the universe.

Contemporary science is typically subdivided into the natural science, Which studies people and societies and similarly the formal science which studies logic and mathematics from atom to the universe itself, Science presents an unending number of questions to children, problem. They can do so, through method of problem solving serving the problem hypothesizing, gathering datable drawing conclusions and testing them.

Science is a cumulative and endless series of empirical observations which result in the formation of concept and theories, with both concept and theories being subject to modification is the light of further empirical observations. Science is both a body of knowledge and the process of acquiring it.

According to Dr. Gottlieb in a lecture series at the universities of south Alabama, Science is an intellectual activity carried on by humans that is designed to discover information about the natural world in which humans live and to discover the ways aim of science is to collect fact. An ultimate purpose of science is to discern the order that exists between and amongst the various facts.

According to Robert H. Dott, Jr, and Henry L. Batlen (1996), Evolution of the Earth, Science consists similarly of the formation and testing of hypothesis based on observational evidence, experiments are importance where applicable

Their function is merely to simplify observations by the improving controlled condition .Science education is a sub-discipline of the broader fields of education which is another humans endeavor focusing on the learning process as preparation for a career and life. Similarly, science education is considered as a discipline concerned with the interference between science and the whole of society. The discipline is fundamentally defined by science as a human activity and moves freely between people practicing science and all citizens are not a part of the scientific academic. Science education is concerned that science by appropriate, useful and understandable by all, regardless of age or level of intellectual developments. The field of science education comprises science contact, some science and some teaching pedagogy.

Science is mean's weapon to cope with nature and the weakness in this own body. Science helps us to use the minerals of the earth to improve agriculture. The husbandry of animals and to fight against the diseases of the human body. Science is the organizations of our

knowledge which enables us to command nature to man's reason and those laws can describe its functioning. Thus scientific knowledge is the most to all students.

In Nepal, science subject is introduced late 1930's and made as a optional subject until 1961. At that time home science was only for girls from 1961- 1971 science was compulsory for boys but girls could choose home science or science. In 1971 science was made a compulsory subject for all. In 1981 overall secondary education and curriculum was revised and science was combined with health. In 1984, Science was made optional subject again and form 1992 Science has been made compulsory subject up to secondary level.

Modern age is the age of science. It has become essential to impact scientific education to all children in the society.

In 1983, Science education development central (SEDEC) was established under "Science education development project (SEDP) under ministry of education and culture, which gave momentum to teaching of science at school level.

Quality of science education at school levels is very poor because of poor teaching lack of instructional materials; lack of effective planning management, teachers training and examination system has added much its poor quality. The government established science education project (SEP) for the first time in Nepal in 18th November, 1982.

The main aim of the science education project (SEP) was to improved the quality of school science education through upgrading science teaching skills and facilities. In 1981, (NCSP), recommended science subject as optional at secondary level in science subject was

understand the world, not a mountain of facts science is an integrated parts of life which cannot be isolated. It has been made compulsory subject in our school educations. The modern society is technology based society so, everyone through science education. Science involves more than the gaining of knowledge science is about understanding the world.

According to Das (1996), developments in the field of science and technology i.e. transportations communication agriculture, industry, medicine, environment food, fuels etc. have revolutionary human life. Thus, science has played the significance role we are depends upon the science and scientific inventions and discoveries. Hence, science is very important in school education secondary school science curriculum has been developed in the form of general science which includes physics, chemistry, biology, astronomy and geology science education is necessary because of its immense value in an individual life as well as in the society. The most significant aspect of modern science is the impact it has in solving variety of problem of practical and technological importance as well as those related to the pressing problem of man kinds a large number of this problem require a proper understanding and application of principles processes.

A theoretical framework of reliability is necessary to study the reliability between two texts Sings (1998) says, reliability is the correlation between two or more sets of scores on reliability coefficient for a set of scores and another set of scores on an equivalent test obtained independently from the member of the same group. UNESCO's International Education Commission (1962) recommended as "Science and technology must become essential components in any educational enterprise; they must be incorporated into all educational activity intended for children, young people and adults, in order to help the individual to control social energies as well as natural and productive ones, thereby achieving mastery over himself, his

choices and actions and finally, they must help man to acquire a scientific turn of mind so, that he becomes able to promote science without being enslaved by it."

District Level Examination System in Nepal

The Ministry of Education (MoE) which was established in 1951 AD is the main body that controls all the activities associated with education in the country. It initiates and manages the educational activities in the country by the development of the education related policies, planning and monitoring and evaluating the programs. Under the Ministry of Education, there are five regional directorates and 75 district education offices in 5 developmental regions and 75 districts respectively. District level examination is taken district wise among 75 districts of Nepal and DLE result is published with a competition between students in a district.

The educational structure in Nepal encompasses school education and higher education. After the amendment to the Education Act of 1971 in 2016 AD, the school education subsumes basic level (from grade 1 to 8) and secondary level (from grade 9 to 12). These form the school education. Higher education consists of Bachelors, Masters and PhD level. Along with the school education, a student in Nepal has to undergo three main examinations: District Level Examination (DLE) in grade 8 as the final exam of basic level, Secondary Education Examination (SEE) in grade 10 as the examination of regional level and School Leaving Certificate (SLC) examination in grade 12 as the examination of national level.

As mentioned, District Level Examination (DLE), "*Jilla Stariya Parichya*" also known as the basic level final exam is taken in grade 8 in Nepal which is coordinated by district

education offices (DEO). There are 75 DEOs in Nepal, and each one manages the district level examination in their respective districts. This exam takes place in Chaitra, the last month in the Nepali calendar. Every student must pass this examination before proceeding to further education. The examination comprises of 8 compulsory subjects which are Nepali, English, Science & Environment, Mathematics, Social Studies & Population Education, Occupation Business & Technology Education, Moral Education and Health & Physical Education. The optional subjects may be Sanskrit Language, Extra English, Computer Education, Geography & History Education, Extra Mathematics, Business Education, Technology Education and Office Practice & Accountancy.

The DEOs give any information regarding District Level Examination like routines for the examination, examination centers, publishing of the results in each district. This information is imparted to the schools via notices. The school then conveys the information to its students. You can also get up to date information about the examination in the official DEO websites. The websites for each district is different, but the websites have been built in the same style and manner so that conveying the information becomes easier.https://wapnepal.com.np/district-level-examination

District level examination system (DLE) is also known as the Basic level final exam is taken in grade VIII. In Nepal, this exam is coordinated by district education office. This district level examination system has been including the different subject like, Nepali, English, Science and environment, Mathematics, Social studies, and Population education, Occupation, Business and teaching education, normal education, health and physical education and also participation as an optional subject like Sanskrit language, extra English, computer education , geography history education, extra mathematics, technology and others language.

It is very important examination for developing the career of the students. It used to measure the knowledge of students she/ he gained in grade eight. It has been started to measure the knowledge of the students they gain in the grade eight only.

When the modern educational system are being evolved and adopted in western countries. Nepal is falling behind in many ways. The system of education prevailing in Nepal is to some extent a proto type of the Indian system. Several distinct types of educational system existed side by side.

The education system of Nepal was controlled by the administration; the ministry of education is the apex body responsible for initiating and managing education activities in the country. The ministry of education (assisted by the state, assistant minister provides political leadership of the ministry. The ministry as a part of the government bureaucracy is headed by the secretary of education and consists of the central office. Various functional offices and located at the regional and district level. The central office of the ministry is mainly responsible for policy development, planning and monitoring and evaluation regarding different aspect of education.

The ministry has established five regional directorates and 75 district education offices in five development regions and 75 districts respectively. This was done with the intention of brining education administration closer to the people. These decentralized offices are responsible for overseeing informal and school level education activities in their respective areas. Regional directorates are mainly responsible for co-ordination and monitoring as well as the evaluation offices are primarily responsible for implementation services.

In starting period of the district level education system is known as the middle school / school leaving certificate. The first English high school, Durbar school was established in Nepal in 1853 after Jung Bahadur Rana returned from Britain. The school followed the British model of India which one time was patterned after the oxford and Cambridge system (Nepal National

education. Planning commission i.e. NNEPC 1995) page no. 26, In 1929 School leaving Certificate (SLC) examination system was conducted in Kathmandu for the first time similarly, district level examination system was also conducted in Kathmandu only. In 1934 the Board of School leaving Certificate examination was established and district level was also established. Prior to this period, this examination was conducted by the Calcutta University and later by the Patna University.

In these initial years, the aggregate marks were 800 and one had to obtain 268 marks in order to pass.

Classroom instruction as well as examination was conducted through the medium of English only after 1936. Nepali grammar as a vernacular subject was introduced in the examination, NESP also devised a system of internal evaluation and 25% marks from internal evaluation to be added to the total SLC many SLC test to be administrated at the district level. The education structure applied in 1989 reduced the total marks for the SLC examination to 700. Correctly it is 800 marks for 2056 B.S , The SLC examination is externally administrated the school level test examination is conducted at the end of the tenth year of formal schooling cycle OSE grants sheet to the examines that appeared in the examination.

In the same way, now, in district level examination system aggregate marks is 800 and one had to obtain 256 marks in order to pass. Classroom instruction as well as examination in to conducted through the medium both of English and Nepali in the school level and even in district level, the vocational education is replaced by the normal education at 2060.

District level science curriculum or prescribed by the curriculum development center (CDC) consists of six prominent areas of science, Physics, chemistry, Biology, astronomy and Geology and environment. The curriculum has assigned each areas is further divided into a

number units. Each unit contains specific objectives with the development of expected outcomes among students. The given specific objectives can be classified into knowledge, comprehension, and higher ability type.

According to Bloom's taxonomy, educational objective are divided into three categories which as follows

I)   Cognitive domain – Related to mental skills

II) Affective domain – Related to growth in feeling or emotional area

III) Psychomotor domain – Related to manual or physical skills

Above three types of objectives, purposed by Bloom's taxonomy in 1956 under the leadership of educational psychologist Dr. Benjamin Bloom's in order to prominent higher forms of thinking in education, such as analyzing and evaluating concept, processes, procedures and principles. Rather than just remembering facts. It is most often used when designing educational training and learning process.

1.2   Statements of the Problem

This study was mainly concerned with the test items and result analysis of district level examination of five public and five private schools of Bhaktapur district. Test items of the district level examination 2072 B.S. were included in the analysis. The purpose of this study was to improve the district level result in science subject.

The problem of this study was mainly concerned with student's achievements in science and its test items. In other words, this study would answer whether the test items bring positive change in the achievement score of the students in district level examination. The statement of the problem of this study was followed:

What is the relation between the specification grid and its test items and students achievement score obtained by the students of class 8 at District Level Examination?

1.3   Objectives of the Study

This study targeted the following objectives:

a) To analyze the specification grid of compulsory science of grade eight with respect to level of test items and scores.

b) To compare the relation between the district level test items and specification grid.

c) To compare the achievement score of boys and girls students in public and private school in DLE.

d) To explore the teacher perception on test items and specification grid of district level examination.

1.4   Research Hypothesis

The research hypothesis of this study was followed:

I) There is no relationship between the specification grid and test items of district level examination.

H_0: There was no significance relationship between the test items and specification grid.

H_A: There was significance difference between the test items and specification grid.

Where, H_0 = Null hypothesis

H_A = Alternative hypothesis

1.5   Research Questions

This study was tried to find out the answer of the following questions:

a) Are the test items and specification grid interrelated with each other?

b) What is the teachers' and students' perspective towards the test items and score of district level examination?

1.6   Significance of the Study

This study is beneficial to all those who are concerned in evaluation and more particularly teachers test designees who are involved in the teaching and testing of district level science. It would help to make parallel sets of question papers having equal difficulty level. Are the teachers and test designers are familiar in constructing test papers they were awarded of the variations a mistake hidden in the sets and try to minimize them. As a whole we can say that, it is significance to obtain beneficial back wash.

This study provides the best guideline to education researches curriculum developments to learn the achievements differentiate between the two district level test items and result in science subject and then encourage them to decrease failure rate in district levels and to balance these item and result. It encourages the established district level achievements of district level result of the students. This has helped to compare the district level test items and result analysis of the students.

This study provided the paper ideas to the administration and science teachers of Bhaktapur district in improving the achievements level of students in science and to overcome the affecting the test items and result examination.

1.7   Delimitations of the Study

This study had following delimitations,

a) This study was delimited to the Bhaktapur district of Bagmati zone.

b) This study was delimited to the document analysis of district level science textbook and the curriculum.

c) This study was delimited to the analysis of specification grid of 2072 and 2073 B.S. of district level compulsory science.

d) This study was analyzed the score of the district level test item and score.

e) The study was carried to 5 public and 5 private schools located at Bhaktapur district from where 5 girls and 5 boys were taken of each school as sample of the study.

1.8 Operational Definition of the Key Terms

The operational definition of key points of this study was followed below:

a) Achievement

In this study, achievement is defined in terms of the scores obtained by the students in an achievements test prepared by the researcher.

b) Test item analysis

The test item analysis is a process which examines students' response to individuals test item in order to assess the quality of those items and of the test as a whole. The quality of individual's items is assessed by comparing student's item responses to their total scores.

c) Result analysis

A result analysis is a systematic examination and evaluation data or information by breaking into its components parts of uncovers their inter-relationship opposite of synthesis. An examination of data and facts to uncovers and understand cause effect relationship.

d) District Level Examination

The examination held by Government of Nepal at the end of the lower secondary level is called district level examination. This certifies students as lower secondary level.

e) Public School

Schools are established and sponsored by government of Nepal. The overall budget for the education of school is granted by the government.

f) Private School

The schools which are established without any aid of the government is ran by private investment by individuals union's agencies and any particulate group.

g) Gender

The condition of being male or female is gender. Hence, it refers to the male students and female students.

CHAPTER – II

Review of Related Literature

2.1   Review of Related Literature

The review of related literature deals with the theories or research studies which have been conducted earlier. It helps to conduct the new research in a systematic manner by providing the general outline of the research study and avoid the unnecessary duplications. Realizing the importance of literature will make to present the significant result or conclusion of different studies making focused in student's achievements which are relevant to the present study.

Poudel H. M. (1960), He did a research entitled, "A study on analysis of Nepali question paper". concluded that the objective type of question should be asked and the language of test paper should be improved. The internal analysis of the test papers of grade eight seems to poor.

The history of testing is very old in the assessment of student's achievements system of written test for the first time, came into existence in testing students' performance in the educational institutions in Chaina. This practice was introduced in India after the English system of education propounded by Lord Maculay. In the middle of the ninth tenth century, comments on the superiority of the written test over the oral examination were made in the united states of American. In 1845 Horance Mann argued that the written examination (Ruch, G.M. 1929) from the district past to the present 21th century. The importance of written high stake testing is not decreases. Different international assessment of education progress and national assessment of achievements are still done by using standardized high stake testing.

Shrestha, K. M. (2006), He did research entitled, "A students on students' performance level". he found the curriculum and the weightage of specific objectives given in the secondary

school science do not coincide. The discrepancy school weightage and specific objectives weightage is very sharp in physics, Biology, Chemistry, Astronomy and geology areas. In chemistry, such a discrepancy is normal, further the discrepancy in the expected development of higher abilities in science curriculum and specification grid is very larger, especially in chemistry, Biology, astronomy and geology areas. This discrepancy in the curricular weightage and the weightage in specification of grid should be avoided. Moreover, school science teachers should be given training in conducting science classes to develop higher abilities among students.

Different researchers on district level test items and result of achievements in science have justified status of different categorical variable in student's achievements in science.

Rao, L. (1994), has done various researchers about the comparative achievements of science has effected various factors. Different group of students have different achievements in science. Among these factors some are instructional materials methods class size, location and background of academic carrier.

Panta, Y. R. (1997), He did a research entitled, "A study report by research central for innovation and developments was district level test items and examination emphasizes the knowledge aspect of learning and encourage rote learning. Teaching learning also operates at the knowledge level with a strong bias towards rote learning. The central role played by the traditional district level examination test items system is largely responsible for giving stimulate to rote learning at the cost of critical, logical and creative thinking.

Batala, K. (2004), He did a research entitled, "A study on the validation of the district level examination and classroom practice." The study shows that the aim of the specification grid does not match the trend of question setting from controlled writing.

Khatri, R. (2001), "A study on relationship between the objectives of science curriculum and present classroom practice at district level test items"

Shrestha, B. K. (1995), made "A comparative study of the effectiveness of discovery method and traditional method of teaching "In terms of the student achievements of the students taught by the discovery method improved significant when compared against the performance of students taught by the traditions methods"

Binamon, R. (2000), conducted a study entitled, " effectiveness of three approaches in instructions modular, lecture cum modular and conventional lecture in learning in the topic fisheries " at plus two levels, the study concluded that modular approach in more effective than the others two methods such as lecture cum modular and conventional lecture method.

Neupane, R. K. (1987), concluded a research entitled, "the comparative achievements of mathematics by location and sex of grade eight students. It is found that there is significant difference in the achievements of grade students by sex and location of school". The achievements of science has affected by the nature of school (public and private) private school have higher achievements score of the students than public school.

CERID (1981), published report entitled factor affecting science teaching learning at secondary school in Nepal show that private schools have better academic environments, seventy present of public school have well managed office space and equipment. The facilities of public school have better school managements lab facilities, garden, library etc. classroom discipline was better in private school. Most of the private school use English as a medium and public school used Nepali medium private school checks their students regularly. Private school scored higher mark in English, mathematics and social studies.

These and several other studies related to students achievements in science were analysis among different social variables, teaching methods and teachers quality , but this study has been done to find the effect of different sets of test consisting of different patterns of test items in students achievements in science. In Nepal, much of the discussion was centered among the teachers for the lower achievements scores in science was the cause of the test items used so, ministry has achievements scores of the students in district level but, it is still unknown whether a different pattern of test items sets questions affect the students' performance.

2.2 Conceptual Framework of the Study

The conceptual framework of this study was followed below:
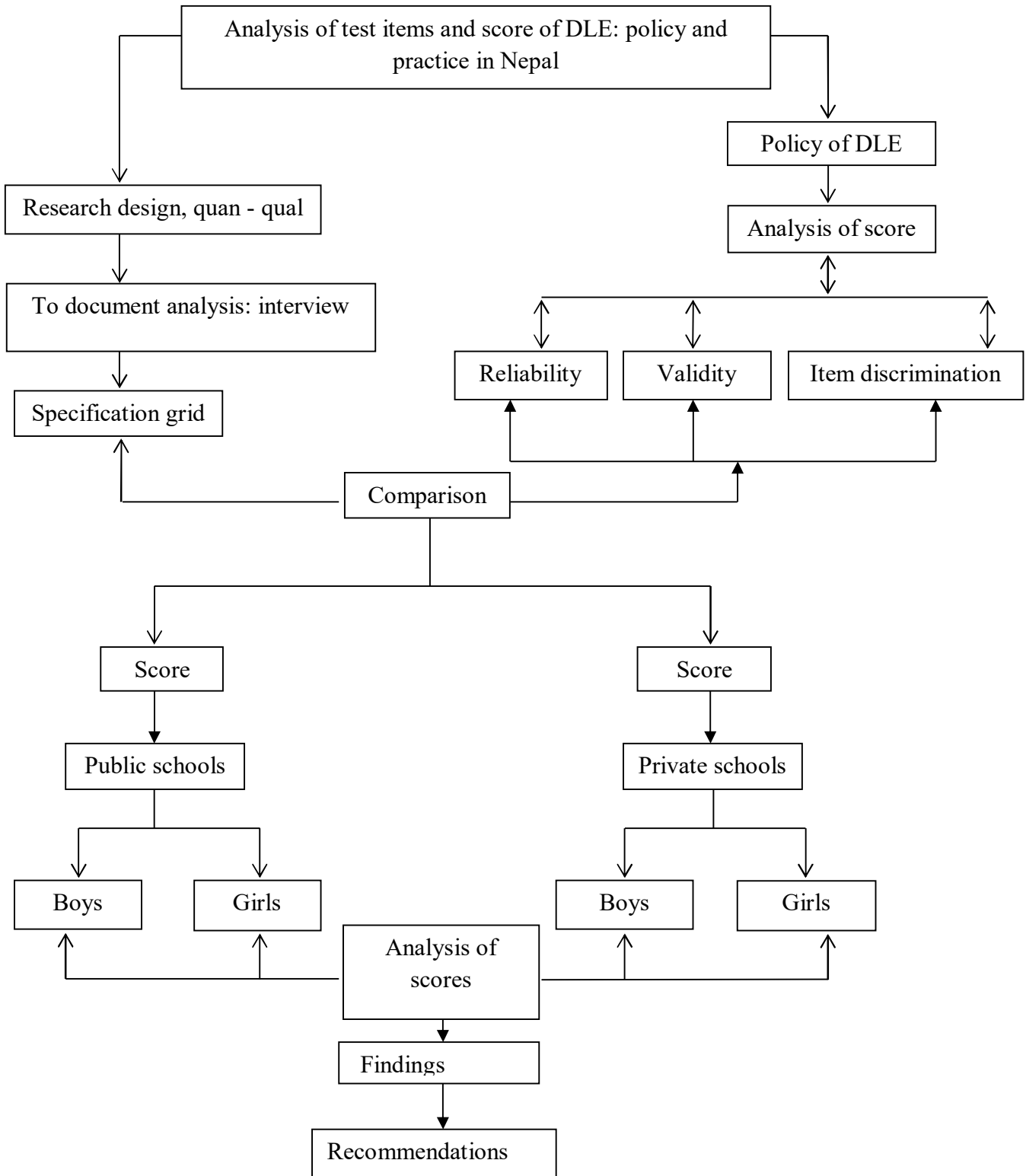
CHAPTER III

Research Methodology

This chapter presents the procedure of the study which was carried out to active the objectives of the study and to got the answer of the statements of the problem. In this chapter, design of the study, population of the study, sample of the study, sampling, procedure data collection procedure tools used in study was included. e.tc

3.1 Design of the Study

The research was based on the quantitative qualitative research design in which the quantitative domains was dominated.

3.2 Source of the Data

I collected the data and information from secondary resources i.e., test items and scores for quantitative analysis and science teachers interview was taken for qualitative analysis.

3.2.1 Primary Source of Data

I collected the data and information of teachers' interview by the use of questionnaire as a primary source.

3.2.2 Secondary Source of Data

Different types of related books, research reports, journals, magazine, school reports, and used as secondary sources of data to collect data and information.

3.3 Population, Sampling and Sampling Strategy

This study was carried out on schools of Bhaktapur district. Students who have appeared in the district level science test items and examination in 2072 B.S. the selected schools students considered as the population of the study.

The sampling procedure was purposive. These schools are divided into two categories i.e. public and private schools, in which five private and five public schools was selected purposively to make the sample. The main purpose of selected these schools was to make comprehensive sample of the population covering all the schools. Out of the total number of district level school with five private and five public schools was selected purposively.

The sample size of this study were 100 students from different types of schools out of them 5 Boys and 5 Girls from each school in the academic year of 2072 B.S. The random sampling was adopted for the selection of students from each school 100 students was selected out of them 5 boys and 5 girls were taken from each school.

3.4 Tools Used in Study

Main tools for the data collection in this study was achievements test based on the specification grids 2072 B.S. district level test items analysis by the researcher and these test items implemented by Nepal Government in 2072 and 2073 B.S. The statistical analysis based on mean, standard deviation, variance, t-test and z-test were analyzed quantitatively and opinionnaire of the teachers was selected to analyze qualitatively.

3.5 Data Collection Procedure

All the test items of science used in district level test items and examination in the year of 2072 B.S was collected from the DEO of Bhaktapur district.

3.6 Data Analysis Procedure

Statistical analysis of the secondary data to find out the mean, standard deviation, variance, t-test and z-test analyzed quantitatively and opinionnaire of the teacher was analyzed qualitatively.

CHAPTER IV

Analysis and Interpretation of Data

This chapter deals with the statistical analysis and interpretation of data on the basis of achievement test and test items. In order to analyze and interpret the collected data and descriptive analysis were used. The difference between mean were computed by using two tailed z and t-test at 0.05 levels of significance. Mean, standard deviation and variance were also computed to analyze data. Bar diagrams were also drawn to show the interpretation of data.

This chapter is divided into four parts. The first part is about the analysis of district level test item with respect to specification grid, second part is to compare the relation between the test items and specification grid, Third part is to compare the achievement score of boys and girls students in public and private school in district level examination of (2072 B.S.), and last part is to explore the teachers perception towards the test items, score, specification grid, science curriculum of district level examination with the respect of the types of schools (Public and private school) and gender (Boys and Girls).

The main focus of this study was to analysis the district level examination science test materials such as district level examination science test item (question paper), scores and specification grid.

4.1   Analysis of Test Items on the basis of Specification Grid (2072 B.S.)

In district level examination (DLE) system, the analysis of test items with specification grid is shown in given table 1.

Time: 2: 15 hrs   Full Marks: 75

Subject: Science   Pass Marks: 30

Table 1: *Specification Grid of Science Test*

Areas	Unit	Topics	No. of questions	No. of sub-questions	Specification Grade	
					Match	Non Match
Physics	1	Measurement, Force and Velocity	1	a b	✓	
	2	Simple Machine, Pressure	1	a b	✓	
	3	Heat, Work, Energy and Power	1	a b	✓	
	4	Light, Sound	1	a b	✓	
	5	Magnetism, Electricity	1	a b	✓	
Chemistry	1	Matter	1	a b	✓	
	2	Mixture, Metal And Non-Metal	1	a b	✓	
	3	Acid, Base and Salt, Some Useful Chemicals	1	a b	✓	
Biology	1	Living Beings	1	a	✓	

				b		
	2	Cell and Tissue	1	a b	✓	
	3	Life Process	1	a b	✓	
Geology and Astronomy	1	Structure of the Earth				
	2	Weather and Climate	1	a b	✓	
	3	Earth and Space				✗
Environment Science	1	Environment and its Balance	1	a b	✓	
	2	Environment Degradation and Its Conservation	1	a b	✓	
	3	Environment and Suitable Development	1	a b	✓	

Table 1 shows that the district level examination (DLE) specification grid of test items. The number of questions and sub-questions both are correct. There are 17 topics included in specification grid and one main question with two sub-questions of each topic included for the test in the area of physics, chemistry, biology, geology and astronomy and environmental science. The grid has provision for five questions from physics, three questions from chemistry,

three questions from biology, one question from geology and astronomy and three questions from environmental science.

4.2 Specification Grid of District Level School Science Curriculum 2072 B.S.

Time: 2: 15 hrs   Full Marks: 75

Subject: Science   Pass Marks: 30

Table 2: *District Level Examination Specification Grid*

Areas	Unit	Topics	No. of questions	No. of sub-questions	Marks	K 30%	U 20%	A 20%	H.A. 10%	Total Marks	Remarks
Physics	1	Measurement, Force and Velocity	1	a b	5	1.5	10	5	2.5	25	5 questions
	2	Simple Machine, Pressure	1	a b	5						
	3	Heat, Work, Energy and Power	1	a b	5						
	4	Light, Sound	1	a b	5						
	5	Magnetism, Electricity	1	a b	5						
Chemistry	1	Matter	1	a b	5	4.5	6	3	1.5	15	3 questions

The header row spans: Marks | Ability Level (K U A H.A.) | Total Marks | Remarks

	2	Mixture, Metal And Non-Metal	1	a b	5						
	3	Acid, Base and Salt, Some Useful Chemicals	1	a b	5						
Biology	1	Living Beings	1	a b	5	4.5	6	3	1.5	15	3 questions
	2	Cell and Tissue	1	a b	5						
	3	Life Process	1	a b	5						
Geology and Astronomy	1	Structure of the Earth			5	1.5	2	0	1.5	5	1 question
	2	Weather and Climate	1	a b	5						
	3	Earth and Space			5						
Environment Science	1	Environment and its Balance	1	a b	5	4.5	6	3	1.5	15	3 questions
	2	Environment Degradation and Its Conservation	1	a b	5						
	3	Environment and Suitable Development	1	a b	5						
			15	30	75	22.5	30	14	8.5	15	75

Note: *There are fifteen questions and each carrying five marks. Each question has two sub-questions and each sub-question is the weightage of 2 marks to 3 marks.*

The guidelines are

a. To construct of the questions should be cover all units.

b. To construct of the questions should be based on the different level such as knowledge, understanding, ability, higher ability.

K = Knowledge   A = Ability/Application

U = Understanding   HA = Higher Ability (Application, Synthesis, analysis and evaluation)

The above table no.2 showed that, the specification grid 75 marks in district level school science curriculum. There are 17 topics included in the specification grid. Each topic included one main question and two sub-questions for the test. The specification grid has provision for 5 questions from physics with weightage 25 marks, 3 questions from chemistry with weightage 15 marks, 3 questions from biology with weightage 15 marks, 1 questions from geology and astronomy with weightage 5 marks and 3 questions from environmental science with weightage 15 marks respectively.

The grid included 30% knowledge level, 40% understanding level, 20% application level and 10% higher ability level of test items in each branch of science like physics, chemistry, biology, geology and astronomy and environment science.

However, District Level Examination test items did not always meet the standard set of different levels of question such as knowledge, understanding, application and higher ability of test items.

For example,

Geology and astronomy test items did not match the grid. The test items were not covered all the units (like, Earth and space) and only some test items covered the unit. The specification grid demands one question with the two sub-questions of five marks with weightage from the topic of geology and astronomy.

4.3   Analysis of DLE Test Items

Table 3: *Cognitive Level of DLE Science Test Items*

Area of subject	Knowledge	Grid	Understanding	Grid	Application	Grid	Higher ability	Grid	Total Marks
Physics	7 (28%)	30%	10 (40%)	40%	5 (20%)	20%	4 (16%)	10%	25
Chemistry	4 (26.66%)	30%	6 (40%)	40%	3 (20%)	20%	1 (10%)	10%	15
Biology	5 (33.33%)	30%)	5 (33.33%)	40%	2 (13.33%)	20%	3 (20%)	10%	15
Geology and Astronomy	1 (20%)	30%	3 (60%)	40%	0	20%	1 (20%)	10%	5
Environment Science	4 (26.66%)	30%	11 (73.33%)	40%	0	20%	0	10%	15
Total	21		35		10		9		75
	28%		46.66%		13.33%		12%		99.99%

Table 3 shows that the marks and percentage of different cognitive levels questions in each branch of science of (2072 B.S.). Physics area covered 28% knowledge, 40% understanding, 20% application and 16% marks of higher ability levels of test items and chemistry area covered 26.66% knowledge, 40% understanding, 20% application, and 10% marks of higher ability levels of test items respectively. Biology area covered 33.33% knowledge, 33.33% understanding, 13.33% application and 20% marks of higher ability levels of test items. Similarly, Geology and astronomy covered 20% knowledge, 60% understanding, 20% higher ability levels and no marks application level of test items and environmental science covered 26.66% knowledge, 72.33% understanding, no marks application and higher ability levels of test items respectively.

But, specification grid demands only 30% knowledge level, 40% understanding level, 20% application level, and 10% higher ability level (HA) of test items. It shows that, there were not gap between weightage of understanding 40% and application 20% levels of physics and chemistry with specification grid and there was small gap between the weightage of knowledge 28% and higher ability level 16% of physics with specification grid respectively. Similarly, there was small gap between the weightage of knowledge level 26.66% and were not gap between the weightage of higher ability level 10% of chemistry with specification grid.

In biology, it showed that, there was small gap between the weightage of knowledge level 33.33% and also shows that the large gap between the weightage of understanding 33.33%, application 13.33, and higher ability 20% levels of biology with the demands of specification grid respectively.

Similarly, in environmental science and geology and astronomy, it shows that, there was large gap between the weightage of different cognitive levels like, knowledge 26.66% and 20%,

understanding 73.33% and 60%, application 0% and 0% and higher ability 0% and 20%) levels with the demands of specification grid respectively.

However, district level test items do not always meet the standard set of different levels, such as knowledge, understanding, application and higher ability levels of test items. But in this test items, it shows that, there was small gap between weightage of specification grid of physics, chemistry and biology and large gap between the weightage of environmental science and geology and astronomy respectively. It was a great weakness of test items.

4.4   Comparison between Grid and Test Items Set 'A'

Table 4: *Comparison between Specification Grid and Test Paper*

Ability level	Specification grid	Test paper
Knowledge	30%	28%
Understanding	40%	46.66%
Application	20%	13.33%
Higher ability	10%	12%

Table 4 shows that the comparison between specification grid and test paper. The specification grid demands 30% knowledge level of the test item and covered 28% marks of knowledge level of test items. It also shows that, there was small gap between specification grid

and test paper. Table also shows the comparison between specification grid and test paper. The specification grid demands 40% understanding level of test items and covered 46.66% marks of understanding level of test items. It shows that, there was large gap between specification grid and test paper. It also shows that the comparison between specification grid and test paper. The specification grid demand 20% application level of test items and covered 13.33% marks of knowledge level of test items. It shows that, there was large gap between specification grid and test paper. Table 4 also shows that the comparison between specification grid and test paper. The specification grid demands 10% higher ability level of test items and covered12% marks of higher ability of test items. It shows that, there was large gap between specification grid and test paper.

The bar diagram showing the specification grid and test paper of different cognitive levels.
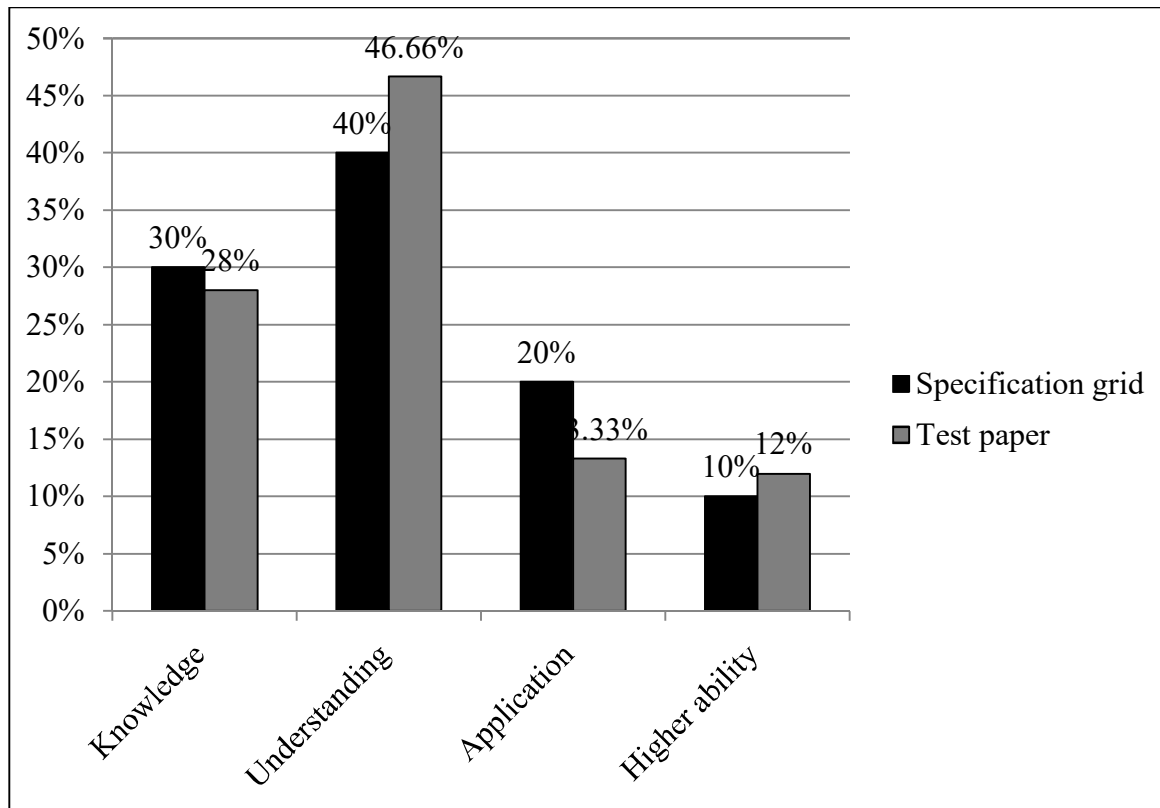
Figure 1: *Comparison between Specification Grid and test Items*

Figure 1 shows that the different level in different specification grid and test paper. The specification grid of knowledge, understanding, application and higher ability is 30%, 40%, 20% and 10% respectively. Similarly, the test paper of knowledge, understanding, application, and higher ability is 28%, 46.66%, 33%, and 12% respectively.

4.5   Analysis of test Items on the basis of Specification Grid (2073 B.S.)

In district level examination (DLE) system, the analysis of test items with the specification grid is shown in table 5.

Time: 2:15 hrs.   Full Marks: 75

Subject: Science   Pass Marks: 30

Table 5: *Specification Grid of Science test*

Areas	Unit	Topics	No. of questions	No. of sub-questions	Specification Grade	
					Match	Non Match
Physics	1	Measurement, Force and Velocity	1	a b	✓	
	2	Simple Machine, Pressure	1	a b	✓	
	3	Heat, Work, Energy and Power	1	a b	✓	
	4	Light, Sound	1	a b	✓	
	5	Magnetism, Electricity	1	a b	✓	
Chemistry	1	Matter	1	a b	✓	
	2	Mixture, Metal And Non-Metal	1	a b	✓	
	3	Acid, Base and Salt, Some Useful Chemicals	1	a b	✓	
Biology	1	Living Beings	1	a b	✓	

	2	Cell and Tissue	1	a b	✓	
	3	Life Process	1	a b	✓	
Geology and Astronomy	1	Structure of the Earth				
	2	Weather and Climate	1	a b	✓	
	3	Earth and Space				✗
Environment Science	1	Environment and its Balance	1	a b	✓	
	2	Environment Degradation and Its Conservation	1	a b	✓	
	3	Environment and Suitable Development	1	a b	✓	

Table 5 shows that the district level examination (DLE) specification gird of test items. The number of questions and sub - questions both are correct. There are 17 topics included in specification grid and one main question with two sub-questions of each topic included for the test in the area of physics, chemistry, biology, geology and astronomy and environmental science. The specification grid has provision for five questions from physics, three questions from chemistry, five questions from biology, one question from geology and astronomy and three questions from environmental science respectively.

4.6   Specification Grid of District Level School Science Curriculum 2073 B.S.

Time: 2:15 hrs.   Full Marks: 75

Subject: Science   Pass Marks: 30

Table 6: District Level Examination *Specification Grid*

Areas	Unit	Topics	No. of questions	No. of sub-questions	Marks	K 30%	U 20%	A 20%	H.A. 10%	Total Marks	Remarks
Physics	1	Measurement, Force and Velocity	1	a b	5	1.5	10	5	2.5	25	5 questions
	2	Simple Machine, Pressure	1	a b	5						
	3	Heat, Work, Energy and Power	1	a b	5						
	4	Light, Sound	1	a b	5						
	5	Magnetism, Electricity	1	a b	5						
Chemistry	1	Matter	1	a b	5	4.5	6	3	1.5	15	3 questions
	2	Mixture, Metal And	1	a b	5						

The header row spans: "Ability Level" covers K, U, A, H.A. columns.

Subject	No.	Chapter	Count	Sub	Marks						Total
		Non-Metal									
	3	Acid, Base and Salt, Some Useful Chemicals	1	a b	5						
Biology	1	Living Beings	1	a b	5	4.5	6	3	1.5	15	3 questions
	2	Cell and Tissue	1	a b	5						
	3	Life Process	1	a b	5						
Geology and Astronomy	1	Structure of the Earth			5	1.5	2	0	1.5	5	1 question
	2	Weather and Climate	1	a b	5						
	3	Earth and Space			5						
Environment Science	1	Environment and its Balance	1	a b	5	4.5	6	3	1.5	15	3 questions
	2	Environment Degradation and Its Conservation	1	a b	5						
	3	Environment and Suitable Development	1	a b	5						
		Total	15	30	75	22.5	30	14	8.5	15	75

[Note: *There are fifteen questions and each carrying five marks. Each main question has two sub-questions and each sub-question is the weightage of 2 marks to 3 marks.*

The guidelines are

- To construct of the questions should cover all unit.

- To construct of the questions should be based on the different level such as, knowledge, understanding, applications and higher ability.

Where,

K = Knowledge   A = Applications

U = Understanding   HA = Higher Ability (synthesis, analysis in duration)

The above table no 6.showed that, the specification grid of 75 marks in district level school science curriculum. There were 17 topics included in the specification grid. Each topic included one main question and two such questions for the test. The specification grid has provision for 5 questions from physics with weightage 25 marks, 3 questions from chemistry with weightage 15 marks, 3 questions from biology with weightage 15 marks, 1 questions from geology and astronomy with weightage 5 marks and 3 questions from environment science with weightage 15 marks respectively.

The specification grid has included 30% knowledge level, 40% understanding level, 20% application level and 10% higher ability level of test items in each branch of science like physics, chemistry, biology, geology and astronomy and environmental science.

However, District Level Examination questions do not always meet the standard set of different levels of questions such as knowledge, understanding, applications and higher ability level of test items.

For example, geology and astronomy test item did not match the specification grid. The test items were not covered all the units (like, Earth and space) and only some test items covered the unit.

The specification grid demands 1 question of two sub-questions with 5 marks weightage from the topic geology and astronomy.

4.7 Analysis of DLE Test Items

Table 7: *Cognitive Level of DLE Science Test-Items*

Area of Subject	Knowledge (K)	Grid (G)	Understanding (U)	Grid (G)	Application (A)	Grid	HA	Grid	Total
Physics	8 (32%)	30%	5 (20%)	40%	10 (40%)	20%	2 (8%)	10%	25
Chemistry	6 (40%)	30%	5 (33.33%)	40%	4 (26.66%)	20%	0	10%	15
Biology	4 (26.66%)	30%	6 (40%)	40%	3 (20%)	20%	2 (12.33%)	10%	15
Geology and Astronomy	3 (60%)	30%	2 (40%)	40%	0	20%	0	10%	15
Environment Science	7 (46.66%)	30%	8 (53.33%)	40%	0	20%	0	10%	15
Total	28		26		17		4		15
	37.33%		34.66%		22.66%		5.33%		100% (99.98)

Table 7 shows that the marks and percentage of different cognitive levels questions in each branch of science of (2073 B.S.). Physics area covered 32% knowledge, 20% understanding, 20% applications and 8% marks of higher ability levels of test items and chemistry area covered 40% knowledge, 33.33% understanding, 26.66% applications and no marks higher ability levels of test items respectively. Biology area covered 26.66% knowledge, 40% understanding, 20% applications, and 13.33% marks of higher ability levels of test items. Similarly, Geology and astronomy area covered 60% knowledge, 40% understanding, no marks application and higher levels of test items and the environment science area covered 46.66% knowledge, 53.33% understanding, no marks application and higher ability levels of test items respectively.

But specification grid demands only 30% knowledge, 40% understanding, 20% applications and 10% higher ability levels of test items. It shows that, there was small gap between the weightage of knowledge 32% and higher ability 8% and also shows that, there was large gap between the weightage of understanding 20% and application 40% levels of physics with specification grid respectively. It also shows that, there was large gap between the weightage of different cognitive levels like, knowledge 40%, understanding 33.33%, application 26.66% and higher ability 10% levels of chemistry with the demands of specification grid respectively.

Above table also shows that, there was large gap between the weightage of knowledge 26.66% and higher ability 12.33% levels of biology with the specification grid and there were not gap between the weightage of understanding 40% and application 20% levels of biology with the demands of specification grid respectively. Similarly, in geology and astronomy, it showed that, there were not gap between the weightage of understanding level 40% with the specification grid.

Similarly, both environmental science and geology and astronomy, It shows that, there was large gap between the weightage of different cognitive levels like, knowledge 46.66% and 60%, understanding 53.33%, application 0% and 0% and higher ability 0% and 0% levels of environmental science and geology and astronomy with the demands of specification grid respectively.

However, district level examination test items do not always meet the standard set of different levels. Such as knowledge, understanding, applications and higher ability level of test items. But, in this test items, it shows that, there was small gap between weightage of specification grid of physics, chemistry and biology and large gap between weightage of

specification grid of geology and astronomy and environment science. It was a great weakness of test items.

4.8 Comparison between Grid and Test Items Set 'B'

Table 8: *Comparison between Specification Grid and Test Items*

Ability level	Specification grid	Test papers
Knowledge level	30%	37.33%
Understating level	40%	34.66%
Application level	20%	22.66%
Higher ability	10%	5.33%

Table 8 shows that the comparison between the specification grid and test paper. The specification grid demands 30% knowledge level of test items and covered 37.33% marks of knowledge level of test items. It shows that, there was large gap between specification grid and test paper. It also shows that the comparison between the specification grid and test paper. The specification grid demands 40% understanding level of test items and covered34.66% marks of understanding level of test items. It means, there was large gap between specification grid and test paper. It also shows that the comparison between the specification grid and test paper. The specification grid demands 20% application level of test items andcovered22.66% marks of application level of test items. It shows that, there was small gap between specification grid and test paper. Table shows that the comparison between the specification grid and test paper. The specification grid demands 10% higher ability level of test items and covered5.33% marks of higher ability level of test items. It shows that, there was large gap between specification grid and test paper.

The bar diagram showing the specification grid and test paper of different cognitive levels.
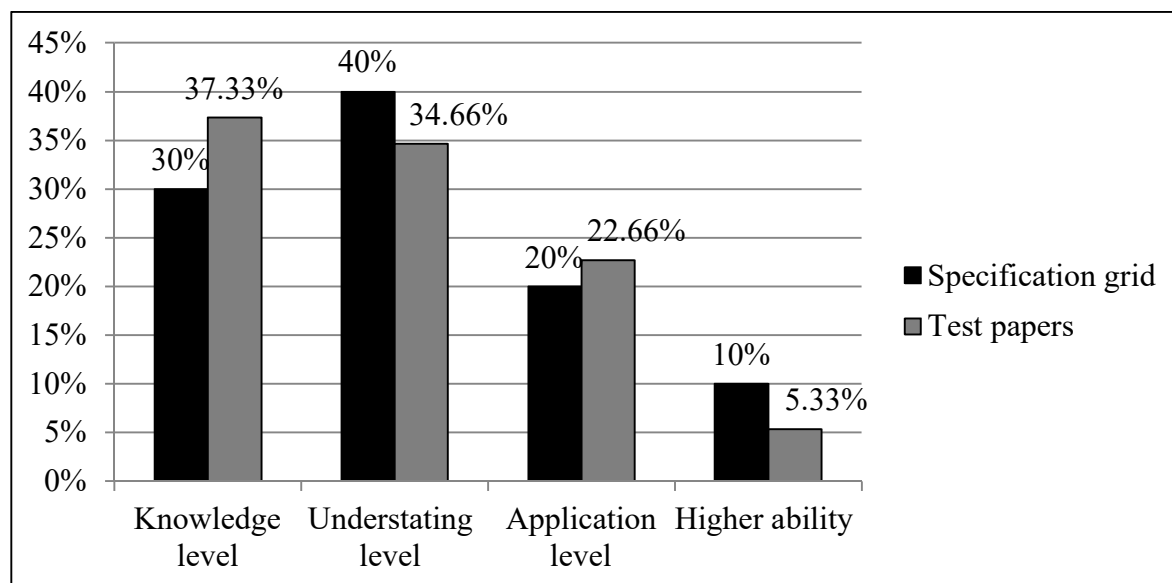
Figure 2: *Comparison between Specification Grid and Test Paper*

Figure 2 shows that the different levels in different specification grid and test paper. The specification grid of knowledge, understanding, application and higher ability is 30%, 40%, 20% and 10% respectively. Similarly, the test paper of knowledge, understanding, application and higher ability is 37.33%, 34.66%, 22.66% and 5.33% respectively.

4.9 Comparison among the Grid and Two Set 'A' and Set 'B' of Science test Items of District Level Examination of 2072 B.S. and 2073 B.S.

Table 9: *Comparison among Specification Grid and Two set 'A' and Set 'B' of Science test Items of District Level Examination of 2072 B.S. and 2073 B.S.*

Set of test items on test paper (2072 or 2073 B.S>)	Knowledge level mark in %		Understanding level of marks in %		Application level marks in %		Higher ability level marks in %	
	Grid	Test paper	Grid	Test paper	Grid	Test paper	Grid	Test paper
Set 'A' (2072 B.S.)	30%	28%	40%	46.66%	20%	13.33%	10%	12%
Set 'B' (2073 B.S.)	30%	37.33%	40%	34.66%	20%	22.66%	10%	5.33%

Table 9 shows that the comparison among specification grid and test paper set 'A' and set 'B' respectively. In the set 'A' of test items included 28% of knowledge, 46.66% of understanding, 13.33% of applications and 12% marks of higher ability level of the test items respectively and similarly, in the set 'B' of test paper included 37.33% of knowledge, 34.66% of understanding, 22.66% of applications and 5.33% marks of higher ability of test items respectively. Therefore, table also shows that, there was large gap between the set 'A' and set 'B' of the specification grid and test items.

4.10 Comparison between Specification Grid of District Level Examination of Set 'A' and Set 'B'

Both the specification grid of district level examination of set 'A' and set 'B' are not different. There are similarities between with each other. Because, there are 17 topics included in the specification grid and each topic included one main question and two sub-questions of each topic included for the test in the area of physics, chemistry, biology, geology and astronomy and environmental science. The grid has provision for the 5 questions with weightage 25 marks in physics, 3 questions in chemistry with weightage 15 marks, 3 questions in biology with

weightage 15 marks and 1 questions in geology and astronomy with weightage 5 marks and 3 questions in environmental science with weightage 15 marks respectively. In the area of geology and astronomy was included the more units but asked any one question in exam and was not covered the all units. It was a great weakness of specification grid.

Note: However, DLE question does not always meet the standard set of different level of question such as knowledge, understanding, application and higher ability.

4.11 Comparison between Specification Grid and Average Percentage Marks of different Cognitive Level Test Items of two set (A and B)

Table 10: *Comparison between Grid and Average Percentage Marks of Different Cognitive Level Test Stems of Two Set (A and B)*

	Knowledge level %	Understanding level %	Application level %	Higher ability level %
Grid	30%	40%	20%	10%
Test paper	32.66%	40.66%	17.99%	8.66%

Table 10 shows that the comparison between specification grid and percentage marks of different cognitive level test items of two set (A and B). The specification grid of knowledge, understanding, application and higher ability level is 30%, 40%, 20% and 10% respectively. Similarities, the test paper of knowledge, understanding, application and higher ability is 32.66%, 40.66%, 17.99% and 8.66% respectively. It also shows that the specification grid of knowledge level was lower than that of test items, and also the specification grid of understanding level was lower than that of test items. Similarly, the specification grid of

application level was higher than that of test paper. And again the specification grid of higher ability level was higher than that of test items deceptively.

Analysis of test items in the set 'A' and set 'B' shows that, there was variation between test paper and specification grid in two sets (A and B).

4.12 Analysis of Score obtained by Students of District Level in Science Achievement Test

The first objective of the study was to find the analysis of specification grid of compulsory science of grid eight with respect to level of test items and scores of public and private schools of Bhaktapur district and second objective was to compare the relation between the test items and specification grid and determined the level of science achievement and compare this achievement scores. The collected data were analyzed by computing mean, standard deviation, variance, t- test, and z- tests showing them in bar diagram.

4.13 Analysis in Scores obtained in Science Achievement Test of Public Schools (2072 B.S)

Table 11: *School, Adarsha H.S. Schools (Sanothimi)*

Gender	S.N	Name of Students	Total Score	Mean	Average mean	σ	σ^2	t-value
Boys	1	Student (PBS$_1$)	85					
	2	Student (PBS$_2$)	77					
	3	Student (PBS$_3$)	69	68.6		11.55	133.40	
	4	Student (PBS$_4$)	58					
	5	Student (PBS$_5$)	54		68.5			0.0009
Girls	1	Student (PGS$_1$)	93	68.4				
	2	Student (PGS$_2$)	83					
	3	Student (PGS$_3$)	62			16.76	280.89	
	4	Student (PGS$_4$)	50					
	5	Student (PGS$_5$)	54					

Degree of Freedom (df) = 9   (0.0009<2.26) insignificant at 0.05 level of significant

Table 11 shows that the number of the students taken from public school of district level. The mean score of public school of boys and girls was 68.6 and 68.4 respectively. It indicated that, the mean score of boys 68.6 was greater than that of girls, and there average mean value was 68.5 and the calculated standard deviation and variance of public school of boys and girls was 11.55, 16.76 and 133.40, 280.89 respectively.

Table shows that the calculated t-value was found to be 0.0009, which was less than that of the standard t-value 2.26 at 0.05 level of significance using two tailed t-test. It indicates that, there was no significant difference between the achievement of district level public school of boys and girls students in science achievement test and the boys was better than girls in public school.
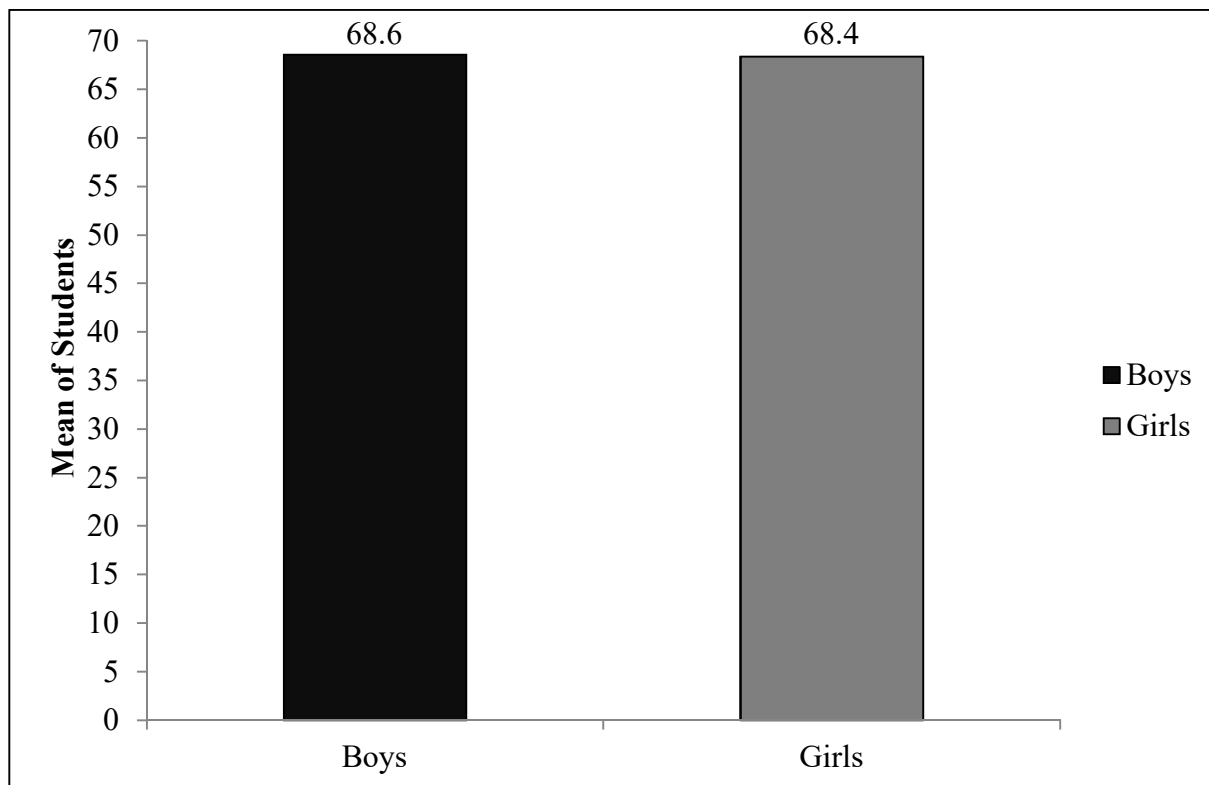
Figure 3: *Frequency distribution of Mean in Science Achievement test of Public School Students*

Figure 3 shows that the mean value of boys was 68.6 and mean value of girls was 68.4. It shows that the academic performance of boys was better than that of girls in public school.

Table 12: *Shree Padma H.S. School (Durbar Square Bhaktapur)*

Gender	S.N	Name of Students	Total Score	Mean	Average mean	σ	σ^2	t- value
Boys	1	Student (PBS₁)	77	59.4		10.09	101.80	
	2	Student (PBS₂)	64					
	3	Student (PBS₃)	55					
	4	Student (PBS₄)	50					
	5	Student (PBS₅)	51		62.5			0.09
Girls	1	Student (PGS₁)	85	65.6		13.63	185.77	
	2	Student (PGS₂)	78					
	3	Student (PGS₃)	61					
	4	Student (PGS₄)	54					
	5	Student (PGS₅)	50					

(df) = 9   (0.09<2.26) insignificant at 0.05 level of significant

Table 12 shows that the number of the students taken from the public school of district level. The mean scores of public school of boys and girls were 59.4 and 65.6 respectively. It indicated that the mean score of girls 65.6 was greater than that of boys and their average mean value was 62.5. Table also shows that the calculate standard deviation and variance of public schools of boys and girls was 10.09, 13.63 and 101.80, 183.77 respectively.

The calculated t-value was found to be 0.09 which was less than the standard t-value 2.26 at 0.05 level of significance using the two tailed t-test. It indicates that, there was no significant difference between the achievement of district level public schools of boys and girls students in science achievement test.
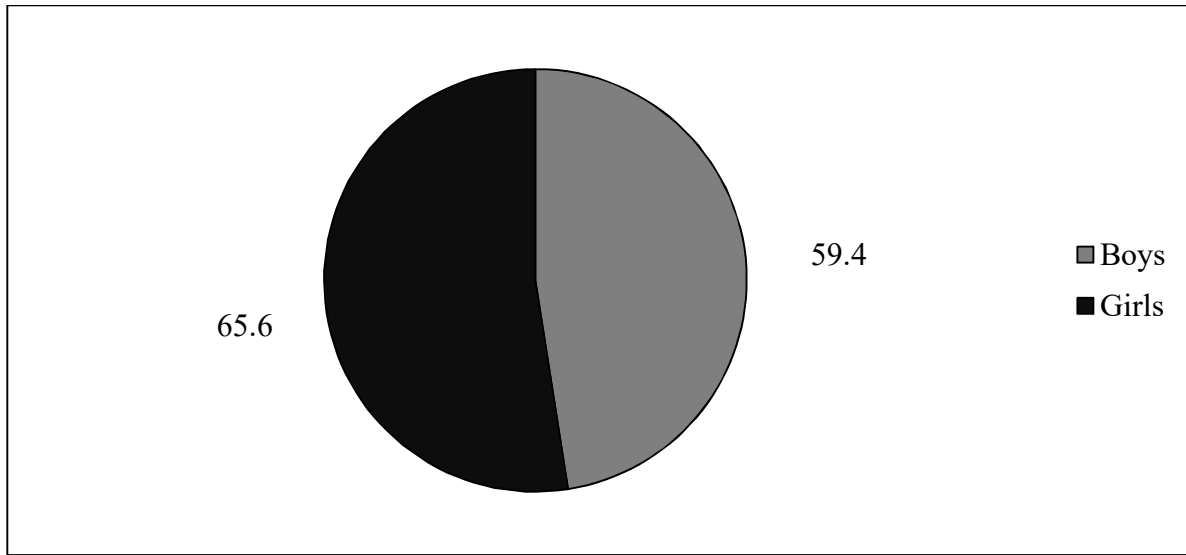
Figure 4: *Frequency Distribution of Mean in Science Achievement test of Public School Students*

Figure 4 shows that the mean value of boys and girls was 59.4 and 65.6 respectively. It also shows that the academic performance of girls was better than of boys in public school.

Table 13: *Saraswati Vidya Grim Navadurgasthan, Bhaktapur*

Gender	S.N	Name of Students	Total Score	Mean	Average mean	σ	σ^2	t- value
Boys	1	Student (PBS$_1$)	54					
	2	Student (PBS$_2$)	52					
	3	Student (PBS$_3$)	53	51.6		5.55	30.80	
	4	Student (PBS$_4$)	52					
	5	Student (PBS$_5$)	47		60.3			0.09
Girls	1	Student (PGS$_1$)	50					
	2	Student (PGS$_2$)	50					
	3	Student (PGS$_3$)	86	69		16.22	263.08	
	4	Student (PGS$_4$)	86					
	5	Student (PGS$_5$)	73					

(df)= 9   (0.09<2.26) insignificant at 0.05 level of significant

Table 13 shows that the number of the students taken from the public schools of district level. The mean scores of public school of boys and girls were 51.6 and 69 respectively. It indicates that the mean scores of girls 69 were greater than that of boys 51.6 and there average value was 60.3. Table also shows that the calculated standard deviation and variance of public of boys and girls was 5.55, 30.80 and 16.22, 263.08 respectively.

The calculated t-value was found to be 0.09 which was less than that of standard t-value 2.26 at 0.05 level of significance using two tailed t-test. It indicates that, there is no significant different between the achievement of district level public school of boys and girls.
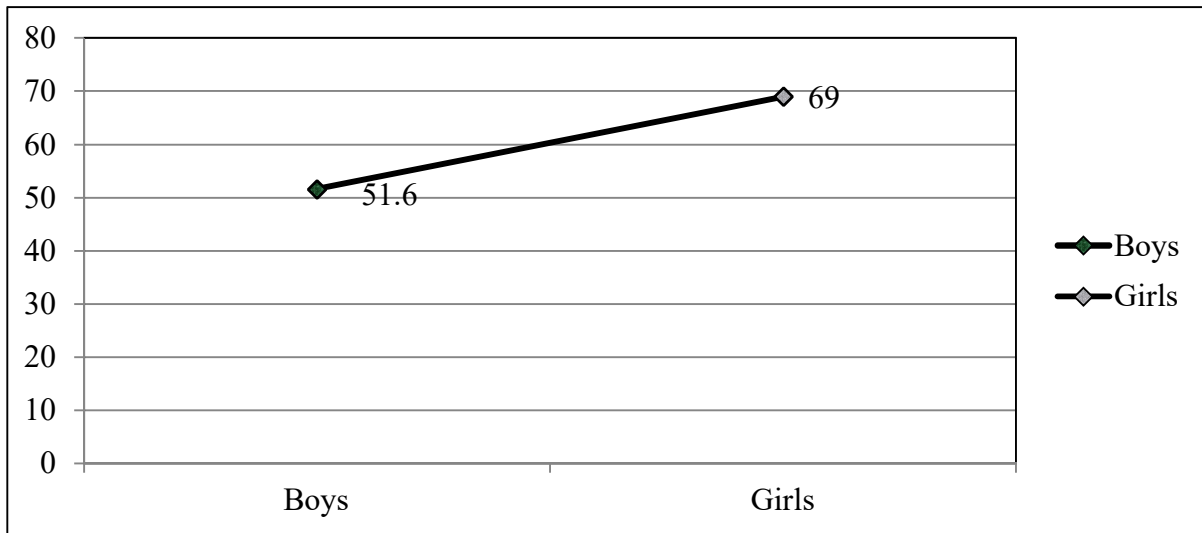

Figure 5: *Frequency Distribution of Mean in Science Achievement test of Public School Students*

Figure 5 shows that the mean value of boys was 51.6 and the mean value of girls was 69 respectively. It shows that the academic performance of girls was better than that of boys in public school.

Table 14: *Adarsha H.S School Layaku*

Gender	S.N	Name of Students	Total Score	Mean	Average mean	σ	σ^2	t- value
Boys	1	Student (PBS$_1$)	50					
	2	Student (PBS$_2$)	50					
	3	Student (PBS$_3$)	51	49.4		1.2	1.44	
	4	Student (PBS$_4$)	48					
	5	Student (PBS$_5$)	48		48			0.55
Girls	1	Student (PGS$_1$)	50					
	2	Student (PGS$_2$)	48					
	3	Student (PGS$_3$)	51	46.6		2.65	7.022	
	4	Student (PGS$_4$)	48					
	5	Student (PGS$_5$)	46					

(df)= 9   (0.55<2.26) insignificant at 0.05 level of significant

Table 14 shows that the number of the students taken from the public school of district level. The mean scores of public school of boys and girls were 49.4 and 46.6 respectively. It also shows that the mean score of boys 49.4 was better than that of the girls 46.6 and there average mean value was 48. The calculated standard deviation and variance of public school of boys and girls was 1.2, 1.44 and 2.65, 7.022 respectively.

The above table also shows that the calculated t-value 0.55 which was less than that of standard t-value 2.26 at 0.05 level of significance using the two tailed t-test. It indicated that, there was no significance different between the achievement of district level public school of boys and girls students in science achievement test.
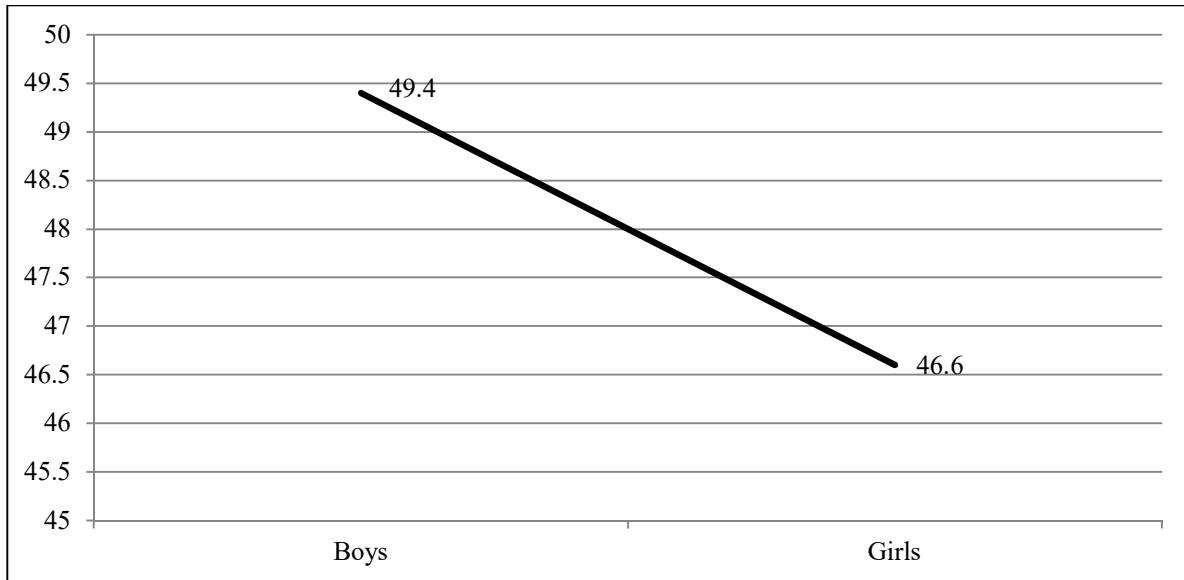
Figure 6: *Frequency Distribution of Mean in Science Achievement test of Public School Students*

Figure 6 shows that the mean value of boys was 49.4 and the mean value of girls was 46.6. It shows that the academic performance of boys was better than that of girls in public school.

Table 15: *Devi H.S School (Tathali)*

Gender	S.N	Name of Students	Total Score	Mean	Average mean	σ	σ^2	t- value
Boys	1	Student (PBS$_1$)	50					
	2	Student (PBS$_2$)	48					
	3	Student (PBS$_3$)	50	50.4		1.49	2.22	
	4	Student (PBS$_4$)	52					
	5	Student (PBS$_5$)	52		51.1			0.27
Girls	1	Student (PGS$_1$)	52					
	2	Student (PGS$_2$)	50					
	3	Student (PGS$_3$)	50	51.8		1.6	2.56	
	4	Student (PGS$_4$)	54					
	5	Student (PGS$_5$)	53					

(df)= 9   (0.27<2.26) insignificant at 0.05 level of significant

Table 15 shows that the number of the students taken from the public school of district level. The mean scores of public school of boys and girls were 50.4 and 51.8 respectively. It shows that the mean scores of girls 51.8 was greater than that of boys 50.4 and their average mean value was 51.1. The calculated standard deviation and variance of public school of boys and girls was 1.49, 2.22 and 1.6, 2.56 respectively.

Table also shows that the calculated t-value was found to be 0.27 which was less than that of standard t-value 2.26 at 0.05 level of significance using the two tailed t-test it indicates that, there was no significant difference between the achievement of district level public school of boys and girls students in science achievement test.
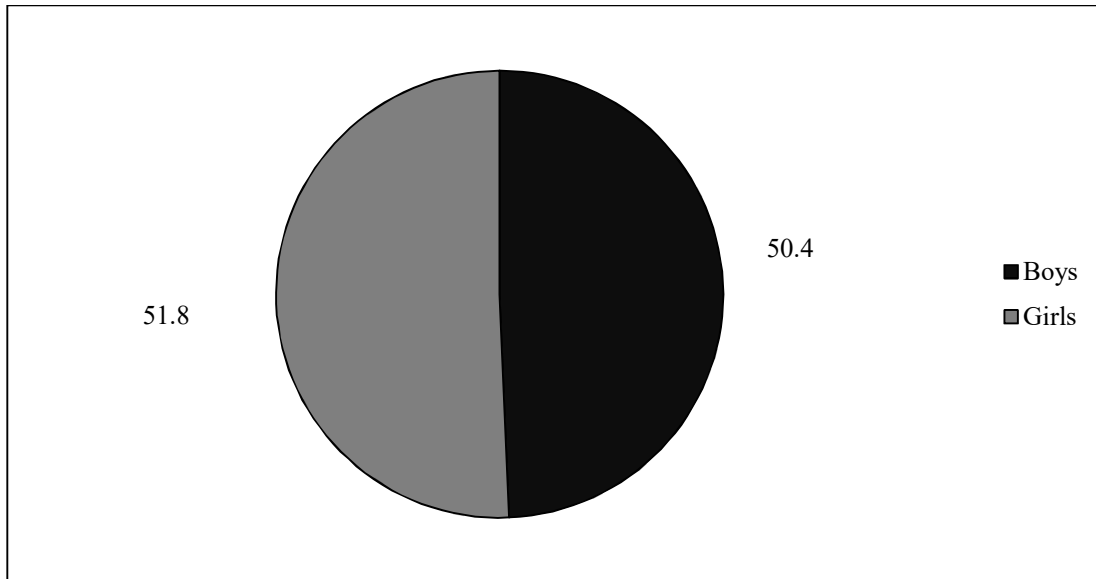

Figure 7: *Frequency Distribution of Mean in Science Achievement test of Public School Students*

Figure 7 shows that the mean value of boys was 50.4 and the mean value of girls was 51.8. It indicated that the academic performance of girls was better than that of boys in public school.

4.14 Analysis of Scores Obtained in Science Achievement Test of Private Schools (2072 B.S.)

Table 16: *Vidhya Arjun English Boarding School (Bhaktapur)*

Gender	S.N	Name of Students	Total Score	Mean	Average mean	σ	σ^2	t- value
Boys	1	Student (PVBS$_1$)	51	55.4		5.76	33.17	
	2	Student (PVBS$_2$)	54					
	3	Student (PVBS$_3$)	52					
	4	Student (PVBS$_4$)	56					
	5	Student (PVBS$_5$)	55		59.3			0.07
Girls	1	Student (PVGS$_1$)	53	63.2		11.74	137.82	
	2	Student (PVGS$_2$)	53					
	3	Student (PVGS$_3$)	79					
	4	Student (PVGS$_4$)	76					
	5	Student (PVGS$_5$)	55					

(df)= 9   (0.07<2.26) insignificant at 0.05 level of significant

Table16 shows that the number of the students taken from the private school of district level. The mean score of private school of boys and girls was 55.4 and 63.2 respectively. It indicated that the mean score of girls 63.2 was greater than that of boys 55.4 and their average mean vale was 59.3. The calculated standard deviation and variance of private school of boys and girls was 5.76, 33.17 and 11.74, 137.82 respectively.

Table also shows that the calculated t-value 0.07 which was less than that of standard t-value 2.26 at 0.05 level of significance using the two tailed t-test. It indicated that, there was no significant different between the achievement of district level private school of boys and girls students in science achievement test.
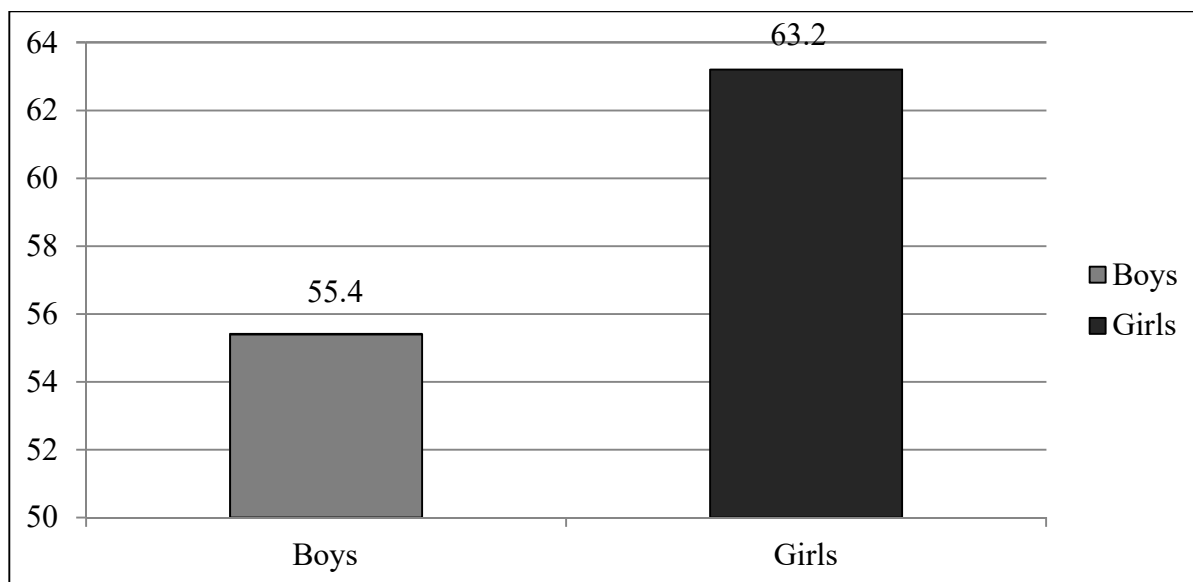
Figure 8: *Frequency Distribution of Mean in Science Achievement test of Private School*

Students

Figure 8 shows that the mean value of boys was 55.4 and the mean value of girls was 63.2. It also shows that the academic performance of girls was better than boys in the private school.

Table 17: *Modern Boarding H.S School (Dadhikot)*

Gender	S.N	Name of Students	Total Score	Mean	Average mean	σ	σ^2	t- value
Boys	1	Student (PVBS$_1$)	69					
	2	Student (PVBS$_2$)	85					
	3	Student (PVBS$_3$)	55	75.6		12.45	155.00	
	4	Student (PVBS$_4$)	79					
	5	Student (PVBS$_5$)	90		72.2			0.03
Girls	1	Student (PVGS$_1$)	60					
	2	Student (PVGS$_2$)	55	68.6		14.31	204.77	
	3	Student (PVGS$_3$)	95					
	4	Student (PVGS$_4$)	72					

	5	Student (PVGS$_5$)	61					

(df)= 9   (0.03<2.26) insignificant at 0.05 level of significant

   Table 17 shows that the number of the students taken from the private school of district level. The mean score of private school of boys and girls was 75.6 and 68.6 respectively. It shows that the mean score of boys 75.6 was greater than that of girls 68.6 and their average mean vale was 72.2. The calculated standard deviation and variance of private school of boys and girls was 12.45, 155.00 and 14.11, 204.77 respectively.

   Table also shows that the calculated t-value was found to be 0.03 which was less than that of standard t-value 2.26 at 0.05 level of significance using the tailed t-test. It indicated that, there was no significance difference bet the achievement of district level private school of boys and girls students in science achievement test.
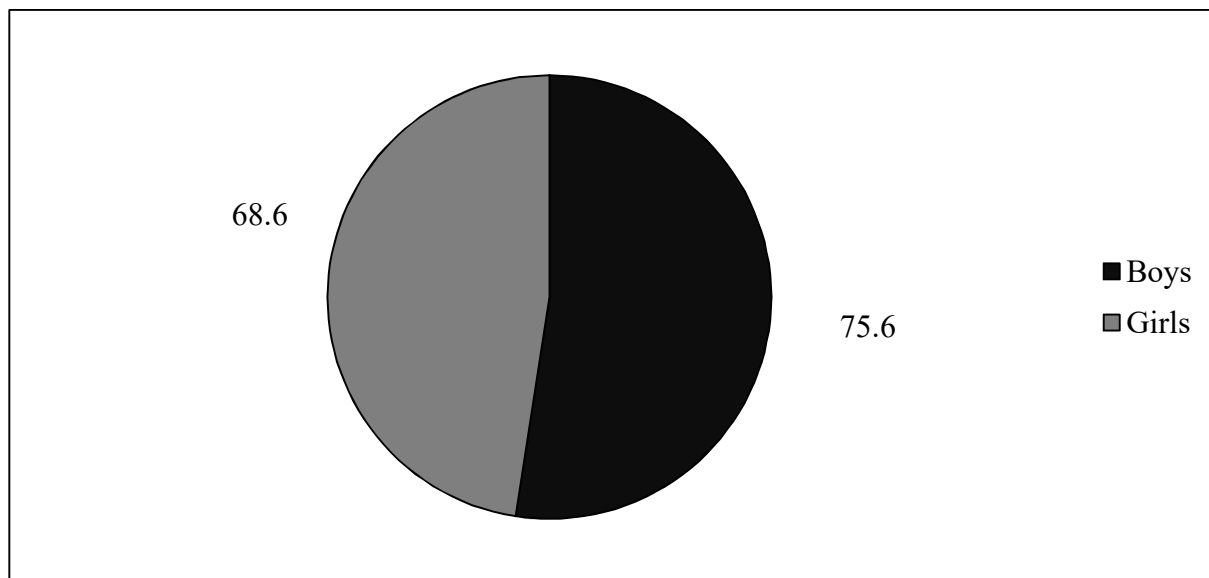

Figure 9: *Frequency Distribution of Mean in Science Achievement test of Private School Students*

Figure 9 shows that the mean value of boys was 75.6 and the mean value of girls was 68.6. It shows that the academic performance of boys was better than girls in private school.

Table 18: *Gland Stone Academy Secondary School (Thimi)*

Gender	S.N	Name of Students	Total Score	Mean	Average mean	σ	σ^2	T-value
Boys	1	Student (PVBS$_1$)	96	91.2		6.01	36.12	
	2	Student (PVBS$_2$)	94					
	3	Student (PVBS$_3$)	96					
	4	Student (PVBS$_4$)	90					
	5	Student (PVBS$_5$)	80		87.4			0.02
Girls	1	Student (PVGS$_1$)	98	89.6		9.02	81.36	
	2	Student (PVGS$_2$)	80					
	3	Student (PVGS$_3$)	90					
	4	Student (PVGS$_4$)	92					
	5	Student (PVGS$_5$)	88					

(df)= 9   (0.02<2.26) insignificant at 0.05 level of significant

Table 18 shows that the number of the students taken from the private school of district level. The mean score of private school of boys and girls was 91.2 and 89.6 respectively. It shows that the mean score of boys 91.2 was greater than that of girls 89.6 and their average mean vale was 87.4. The calculate standard deviation and variance of private school of boys and girls was 6.01, 36.12 and 9.02, 81.36 respectively.

Table also shows that the calculated t-value was found to be 0.02 which was less than that of standard t-value 2.26 at 0.05 level of significance using two tailed t-test. It indicated that, there was no significant difference between the achievement of district level private school of boys and girls students in science achievement test.
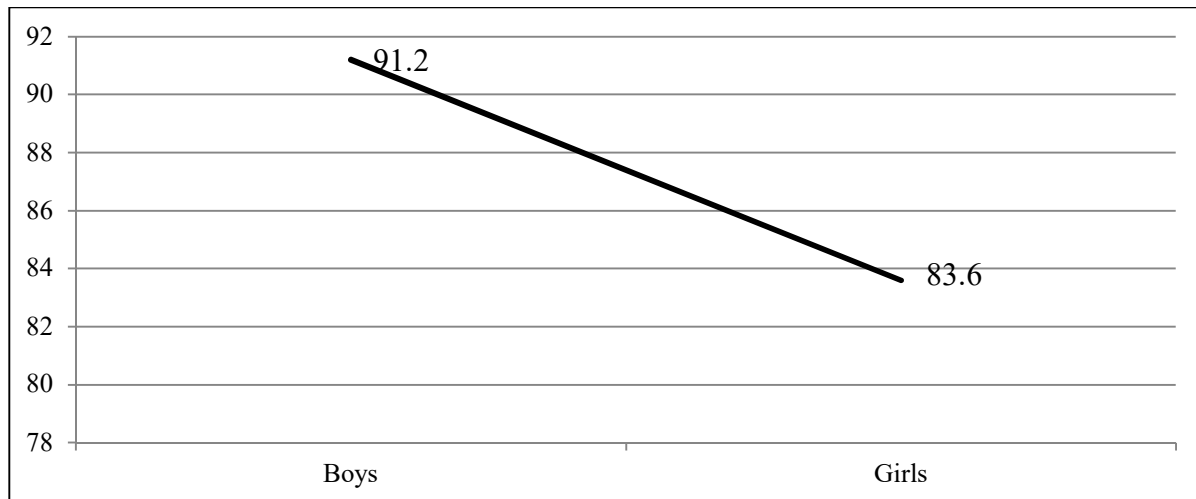
Figure 10: *Frequency Distribution of Mean in Science Achievement test of Private Schools Students*

Figure 10 shows that the mean value of boys was 91.2 and the mean value of girls was 83.6. It indicates that the academic performance of boys was better than girls in private school.

Table 19: *Supreme Academy H.S School (Thimi)*

Gender	S.N	Name of Students	Total Score	Mean	Average mean	σ	σ^2	T-value
Boys	1	Student (PVBS$_1$)	95					
	2	Student (PVBS$_2$)	63					
	3	Student (PVBS$_3$)	89	72.2		16.47	271.26	
	4	Student (PVBS$_4$)	59					
	5	Student (PVBS$_5$)	55		68.3			0.03
Girls	1	Student (PVGS$_1$)	55					
	2	Student (PVGS$_2$)	75					
	3	Student (PVGS$_3$)	70	64.4		8.08	65.28	
	4	Student (PVGS$_4$)	55					
	5	Student (PVGS$_5$)	67					

(df)= 9   (0.05<2.26) insignificant at 0.05 level of significant

Table 19 shows that the number of the students taken from the private school of district level. The mean scores of private school of boys and girls were 72.2 and 64.4 respectively. It also showed that, the mean score boys 72.2 was greater than that of girls 64.4 and their average mean value was 68.3. The calculated standard deviation and variance of private school of boys and girls was 16.47, 271.26 and 8.08, 65.28 respectively.

Table also shows that the calculated t-value was found to be 0.03 which was less than that of standard t-value 2.26 at 0.05 level of significance using two tailed t-test. It indicated that, there was no significance difference between the achievement of district level private school of boys and girls students in science achievement test.
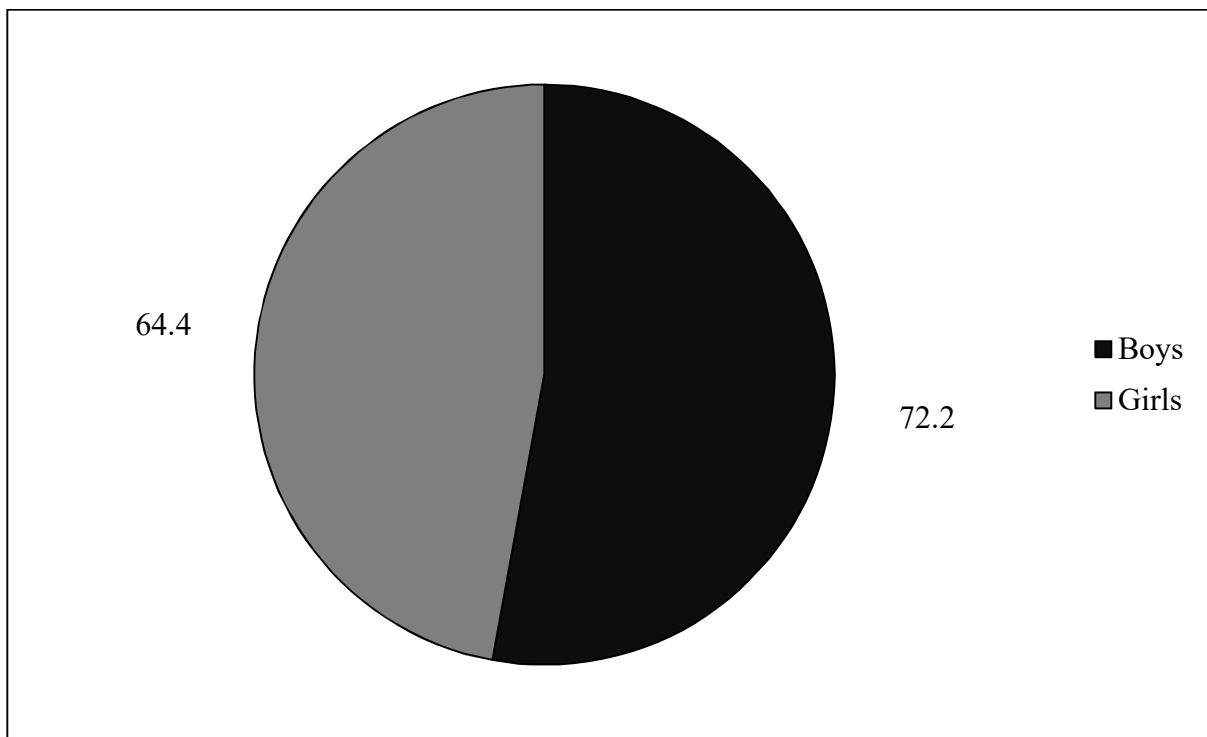

Figure 11: *Frequency Distribution of Mean in Science Achievement test of Private School Students*

Figure 11 shows that the mean value of boys was 72.2 and the mean value of girls was 64.4. It means, the academic performance of boys was better than girls in private school.

Table 20: *Nabin English School (Jhaukhel)*

Gender	S.N	Name of Students	Total Score	Mean	Average mean	σ	σ^2	T-value
Boys	1	Student (PVBS$_1$)	55	74		12.21	149.08	
	2	Student (PVBS$_2$)	76					
	3	Student (PVBS$_3$)	88					
	4	Student (PVBS$_4$)	85					
	5	Student (PVBS$_5$)	66		69.9			0.04
Girls	1	Student (PVGS$_1$)	62	65.8		13.36	178.48	
	2	Student (PVGS$_2$)	55					
	3	Student (PVGS$_3$)	92					
	4	Student (PVGS$_4$)	58					
	5	Student (PVGS$_5$)	62					

(df)= 9   (0.04<2.26) insignificant at 0.05 level of significant

Table 20 shows that the number of the students taken from the private school of district level. The mean score of private school of boys and girls was 74 and 65.8 respectively. It also shows that the mean value of boys 74 was greater than that of girls 65.8 and their average mean value was 69.9. The calculated standard deviation and variance of private school of boys and girls was 12.21, 149.08 and 13.36, 178.48 respectively.

Table also shows that the calculated t-value was found to be 0.04 which was less than that of standard t-value 2.26 at 0.05 level of significance using two tailed t-test. It indicated that,

there was no significant difference between the achievement of district level private school of boys and girls students in science achievement test.
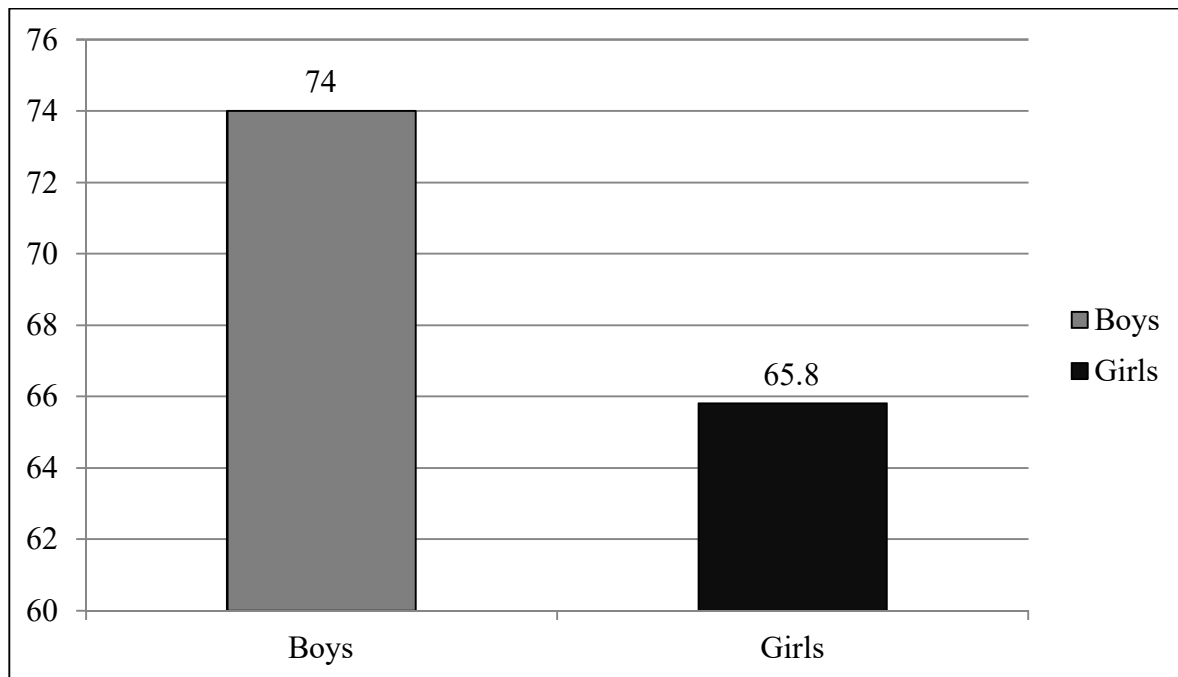

Figure 12: *Frequency Distribution of Mean in Science Achievement test of Private School Students*

Figure 12 shows that the mean value of boys was 74 and mean value of girls was 65.8. It indicated that the academic performance of boys was better than girls in private school.

4.15 Frequency Distribution of Scores in Science Achievement test of Public School Students

Table 21: *Frequency Distribution of Scores in Science Achievement test of Public School Students*

S.N	Class interval of scores	No. of students
1	0-9	00
2	10-19	00
3	20-29	00
4	30-39	00
5	40-49	7
6	50-59	29
7	60-69	4
8	70-79	4
9	80-89	5
10	90-100	1
Total		50

Table 21 shows that most of the student's score lies in class interval 50-59 but only one student's score lies in class interval 90-100. This frequency distribution of scores indicated that the most of students were satisfied in public schools at district level.
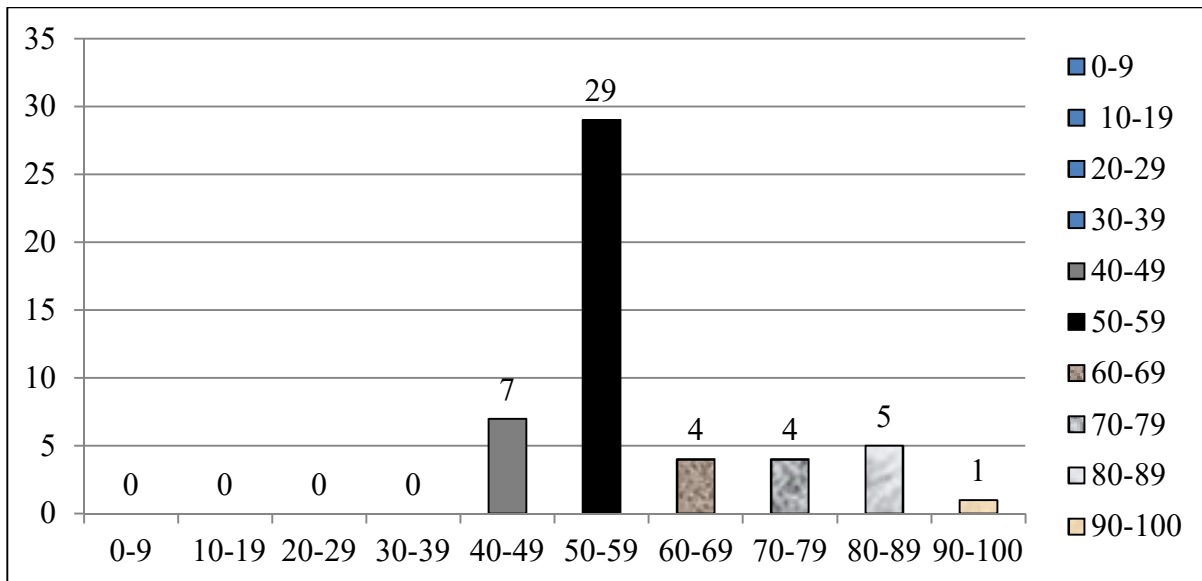
Figure 13: *Scores in Science of Public School Students*

Figure 13 shows that the mode of score of public schools students was class interval 50-59.This also shows that most of the students in public schools at district level were satisfied in science achievement.

Figure also shows that the mode of score of public schools students was class intervals 0-9, 10-19, 20-29 and 30-39 respectively. It has indicated that the students in public schools at district level have not completely satisfied in science achievement. Similarly, the mode of scores of public schools students was class intervals 40-49, 60-69, 70-79, 80-89 and 90-100 respectively. It also shows that the some of the students in public schools at district level were satisfied in science achievement.

4.16 Frequency Distribution of Scores in Sciences Achievement test of Private Schools

Table 22: *Frequency Distribution of Scores in Sciences Achievement test of Private Schools*

S.N	Class interval of scores	No. of students
1	0-9	00
2	10-19	00
3	20-29	00
4	30-39	00
5	40-49	16
6	50-59	9
7	60-69	00
8	70-79	8
9	80-89	8
10	90-100	9
Total		50

Table 22 shows that the most of the student's scores lies in class interval 40-49 but lower student's score lies in both class intervals 60-79 and 80- 89. This frequency distribution of scores was indicated that the most of the students were satisfied in private schools at district level.
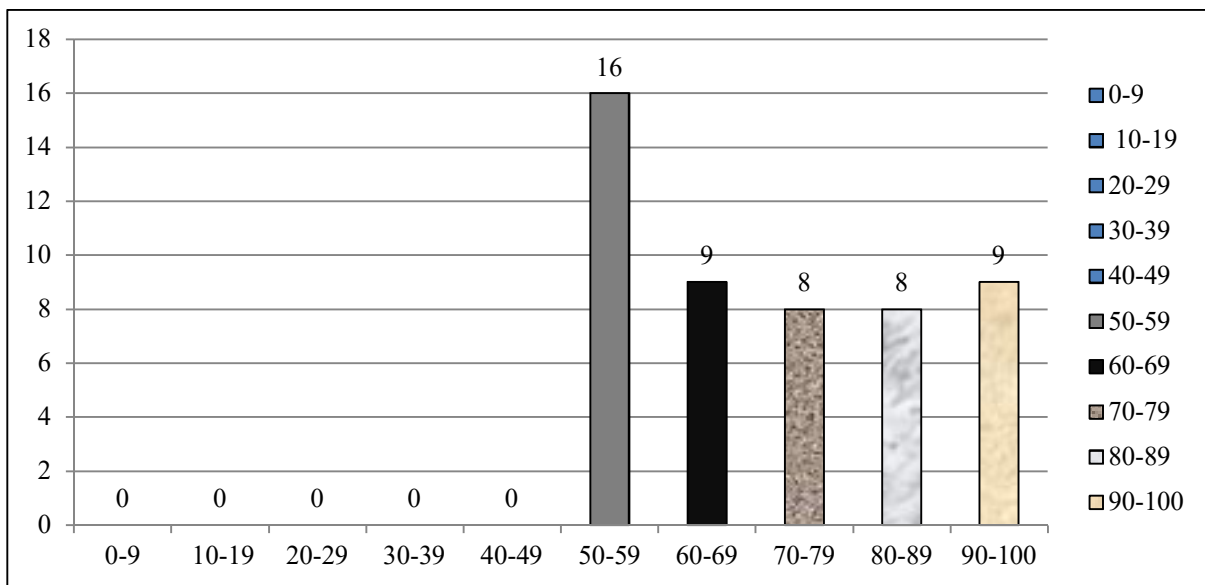

Figure 14: *Scores in Science of Private Schools Students*

Figure 14 shows that the mode of score of private schools was class interval 40-49. It indicated that the most of the students in private schools at district level were satisfied in science achievement. Table also shows that the mode of score of private schools students was class intervals 0-9, 10-19, 20-29, 30-39 and 60- 69 respectively. It has indicated that the students in private at district level were not completely satisfied with the achievement in science. Similarly, the mode of score of private schools students was class intervals 50-59, 70-79, 80-89 and 90-100

respectively. It also shows that the some of the students in private schools at district level were satisfied in science achievement.

4.17 Comparison of Scores obtained in Science Achievement test between Public and Private Schools

The third part of the objectives was to compare the achievement scores of boys and girls students in public and private schools in district level with respect by gender. The data obtained from the administration of achievement test was analyzed in the following headings.

4.17.1 Comparison of Scores obtained in Science Achievement test between Public and Private Schools at District Level

The mean, standard deviation, variance, t-test, and corresponding z-test of the achievement scores of students of public and private schools is represented in the following table and figure.

Table 23: *Comparison of Scores obtained in Science Achievement test between Public and Private School at District Level*

S.N	Name of School	Sample Size	Average Scores	$\bar{x}$	σ	σ^2	z-value
Public Schools							
1	School (PS$_1$)	10	68.5				
2	School (PS$_2$)	10	62.5	58.08	7.51	56.40	
3	School (PS$_3$)	10	60.3				
4	School (PS$_4$)	10	48				

5	School (PS$_5$)	10	51.1				
	Private Schools						0.72
1	School (PVS$_1$)	10	59.3				
2	School (PVS$_2$)	10	72.1				
3	School (PVS$_3$)	10	87.4	71.4	9.10	82.81	
4	School (PVS$_4$)	10	68.3				
5	School (PVS$_5$)	10	69.9				

(0.72 <0.27) insignificant at 0.05 level of significance

Table 23 shows that the mean score of students in science were 58.08 and 71.4 at public and private schools respectively. The corresponding values of standard deviation were 7.51 and 9.10 and whereas their variances were 56.40 and 82.81 respectively.

Table also shows that the calculated z-value 0.72 which was smaller than standard z-vale 2.58 at 0.05 level of significance differences. Therefore, there was insignificance difference in the achievement of students of public and private schools. This means, that private schools students ware better than that of public schools students.
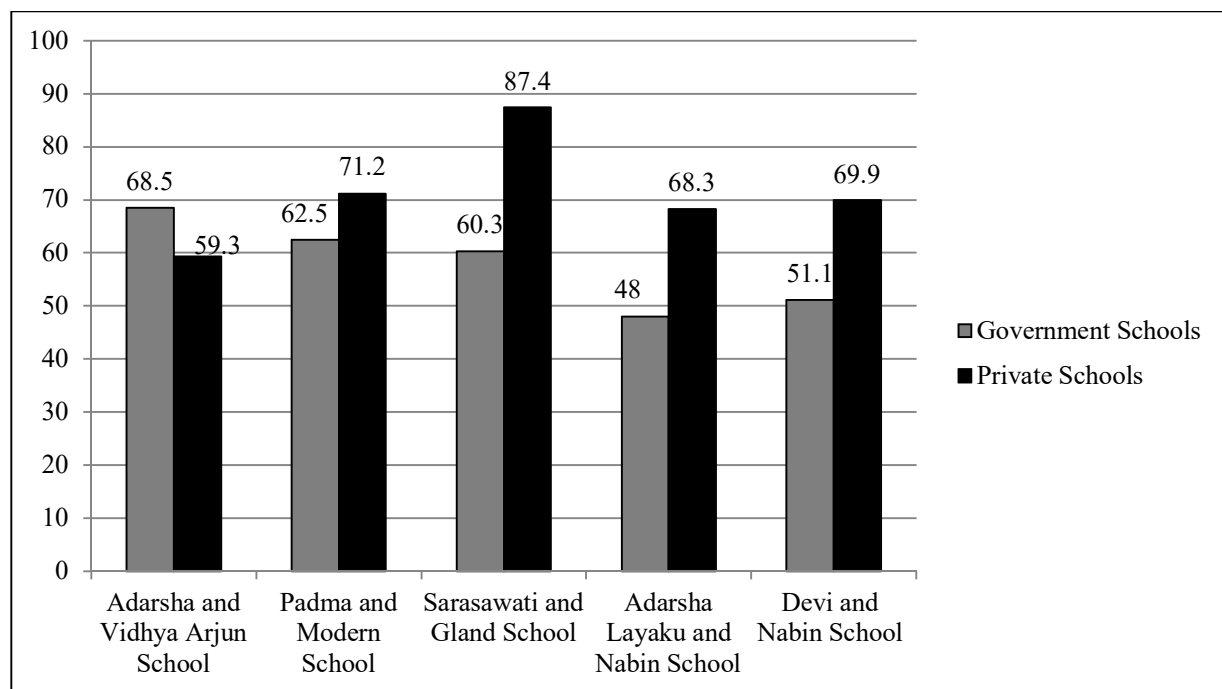
Figure 15: *Scores Obtained in Science Achievement test between Public and Community School at District Level*

Figure 15 shows that the comparison of scores obtained in science achievement test of public and private school students. It also shows that the score obtained in science achievement test of private schools was better than that of public schools.

4.17.2 Comparison of Scores obtained in Science Achievement test between Top Scorer Public and Top Scorer Private Schools

The mean, standard deviation, variance and corresponding t-test values of the achievement scores obtained in the science achievement test between top scores public and top scorer private schools. It is represented in the following table and figure below.

Table 24: *Comparison of Scores obtained on Science Achievement test between Top Scorer*

Public and Top Scorer Private Schools

Types of Schools	Name of Schools	Sample Size	$\bar{x}$	σ	σ^2	t-value
Public School	PS_1	10	68.5	14.39	207.07	0.02
Private School	PVS_1	10	87.4	7.49	55.20	

(df = 19)   (0.02<2.03) Insignificant at 0.05 level of significance.

Table 24 shows that the comparative analysis of the scores of top scorer public schools i.e. Adarsha Higher secondary school and top scorer private school i.e. Gland Stone Academy Secondary School. Mean scorer obtained by the students of Adarsha Higher secondary school was 68.5 and that of Gland Stone Academy Secondary School was 87.4. The standard deviation and variance of scorer obtained by the students of Adarsha Higher Secondary School were 14.39 and 207.07 respectively. Similarly, the standard deviation and variance of scorer obtained by the students of Gland Stone Academic Secondary School were 7.49 and 55.2 respectively.

The calculated t-value 0.02 was less than that of standard t-value 2.03 at 0.05 level of significance using two tailed t-test. It shows that, there was no significance difference in science achievement test between the top scorer public i.e. Adarsha Higher

Secondary School and top scorer private school i.e. Gland Stone Academic Secondary School.
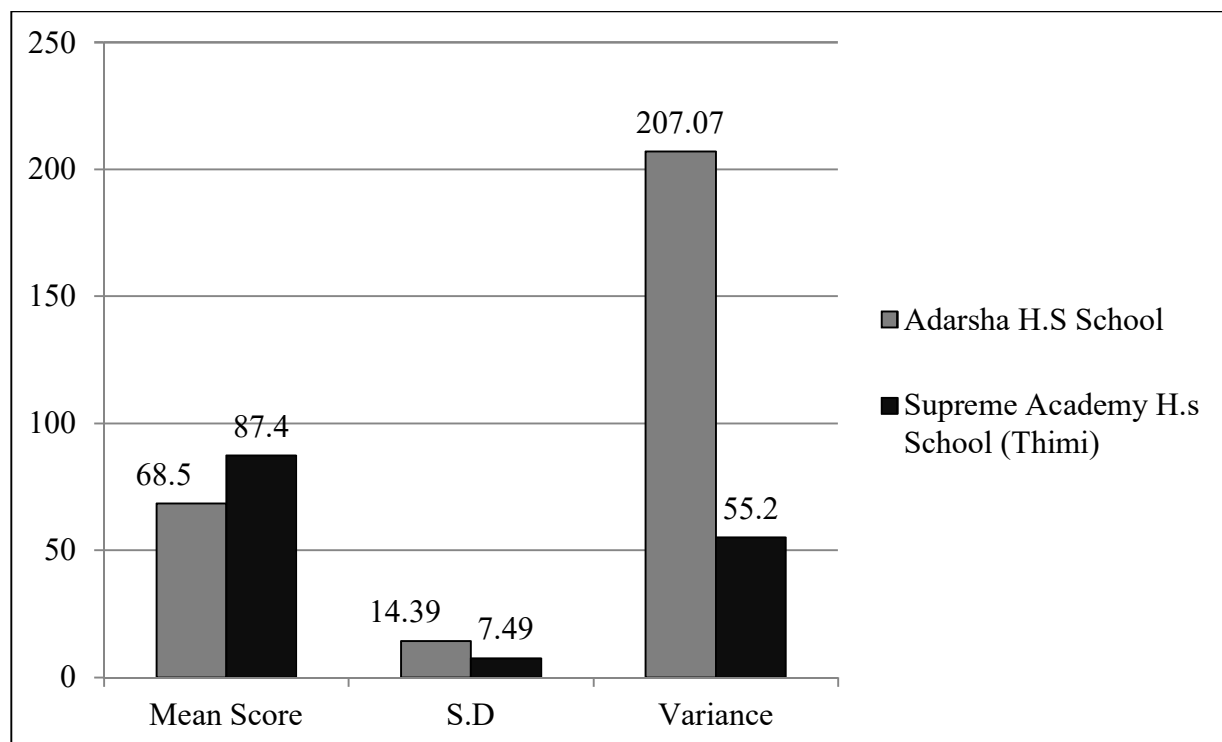
Figure 16: *Mean Scorer Standard Deviation and Variance of Top Scorer Public and Private*

Schools

Figure 16 shows that the comparison of scorer obtained in science achievement test between top scorer public and top scorer private school students. It indicated that the score obtained in science achievement test of private school was better than that of public school.

4.17.3 Comparison of Scorer obtained in Science Achievement test between the Lowest Scorer Public and the Lowest Scorer Private Schools

The mean, standard deviation, variance and corresponding t-values of the achievement scores obtained in the science achievement test between lowest scorer public and lowest scourer private schools. It is represented in the following table and figure.

Table 25: *Comparison of Scorer obtained in Science Achievement test between the Lowest*

Scorer Public and the Lowest Scorer Private Schools

Types of Schools	Name of Schools	Sample Size	$\bar{x}$	σ	σ^2	t-value	ts
Public School	(PS₁)	10	48	1.84	3.38	0.15	2.03
Private School	(PVS₁)	10	68.3	13.54	183.33		

(df=19)   (0.15<2.03) In significant at 0.05 level of significance

Table 25 shows that the comparative analysis of scores obtained in the science achievement test between the lowest scorer public school i.e. Adarsha Higher Secondary Schools (Layaku) and lowest private school i.e. Supreme Higher Secondary School. Mean score obtained by the students from Adarsha Higher Secondary School was 48 and Supreme Higher Secondary School (Thimi) 68.3 respectively. The standard deviation and variance of scorer obtained by the students of Adarsha Higher Secondary School were 1.84 and 3.38 respectively Similarly, the standard deviation and variance of scorer obtained by the students of Supreme Higher School were 13.54 and 183.33 respectively.

Table also shows that the calculated t-value was 0.15 which was smaller than that of standard t-value 2.03 at 0.05 level of significance different using two tailed t-test. It indicated that, there was no significance in student's achievement in science between lowest scorers public school i.e. Adarsha Higher Secondary School and lowest scorers private school i.e. Suprem Higher Secondary School.
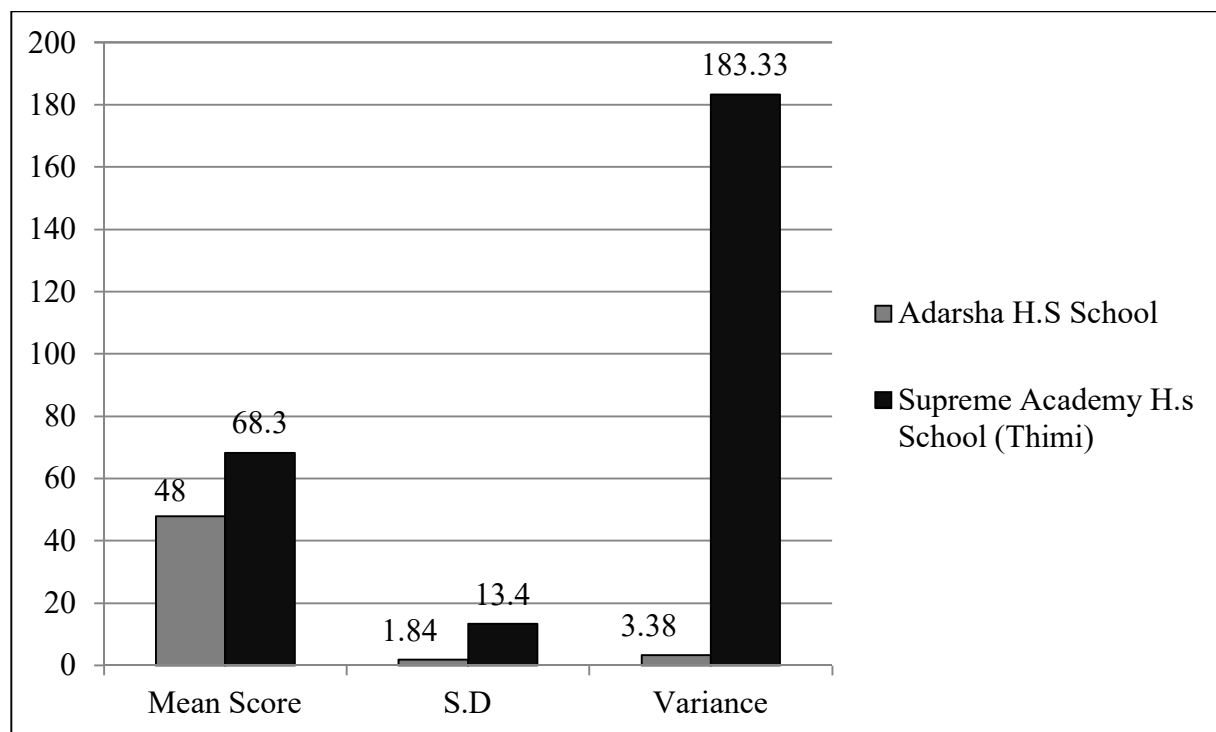
Figure 17: *Scorer, Standard Deviation and Variance of Lowest Scorer Public and Lowest Scorer*

Community School

Figure 17 shows that the comparison of scorer obtained achievement test between lowest scorer public and private school student. It also shows that the score obtained in science achievement test of private school was better than public school.

4.17.4 Comparison of Scores obtained by Boys Students in Science Achievement test between Public and Private Schools

The mean, standard deviation, variance and corresponding z-test of the achievement scores of boys students of public and private school. It is represented in the following table and figure.

Table 26: *Comparison of Scores obtained by Boys Students in Science Achievement test between Public and Private Schools*

S.N.	Name of School	Sample Size	Average Scores	$\bar{x}$	σ	σ^2	z-value
Public Schools							
1	School (PS$_1$)	10	68.6				
2	School (PS$_2$)	10	59.4				
3	School (PS$_3$)	10	51.6	55.88	7.26	52.70	
4	School (PS$_4$)	10	49.4				
5	School (PS$_5$)	10	50.4				
Private Schools							0.66
1	School (PVS$_1$)	10	55.4				
2	School (PVS$_2$)	10	75.6				
3	School (PVS$_3$)	10	91.2	73.68	11.37	129.27	
4	School (PVS$_4$)	10	72.2				
5	School (PVS$_5$)	10	74				

(0.66 <2.58)   insignificance at 0.05 level of significant

Table 26 shows that the average means score of boys in science were 55.88 and 73.68 and in public and private schools respectively. The corresponding standard deviation were 7.26 and 11.26 and 11.37 and whereas their variance were 52.70 and 129.27 respectively.

Table also shows that the calculated z-value 0.66 which was less than the standard z-value 2.58 at 0.05 level of significant using two tailed t-test. Therefore, there was insignificance difference in the achievement of boys students of public and private schools.

Figure 18: *Average Mean, Scorer, Standard Deviation and Variances of Boys Students*

Achievement in Science of Public and Private Schools

Figure 18 shows that the comparison of scores obtained boys students in science achievement test between public and private schools. It indicated that the scores obtained boys students in science achievement test of private schools was better academic performance than public schools.

4.17.5 Comparison of Scores obtained by Girls Students in Science Achievement test between Public and Private Schools

The mean, standard deviations, variance and corresponding z-values of the achievement scores of girls students of public and private schools. It is represented in the following table and figure below.

Table 27: *Comparison of Scores obtained by Girls Students in Science Achievement test between Public and Private School*

S.N.	Name of School	Sample Size	Average Scores	$\bar{x}$	σ	σ^2	z-value
Public Schools							
1	School (PS₁)	10	68.4				
2	School (PS₂)	10	65.4				
3	School (PS₃)	10	69	55.88	7.26	52.70	
4	School (PS₄)	10	46.6				
5	School (PS₅)	10	51.8				
Private Schools							0.69
1	School (PVS₁)	10	63.2				
2	School (PVS₂)	10	68.6				
3	School (PVS₃)	10	89.6	70.32	70.80	96.64	
4	School (PVS₄)	10	64.4				
5	School (PVS₅)	10	65.8				

(0.69 < 2.58) insignificant at 0.05 level of significance)

Table 27 shows that the average achievement scores of girls in science were 60.24 and 70.32 in public and private schools respectively. The corresponding standard deviation were 9.24 and 9.80 and whereas their variance were 85.37 and 96.64 respectively. The calculated z-value 0.69 which was less than the standard z- value 2.58 at 0.05 level of significance using two tailed t-test. Therefore, there was insignificant difference in the achievement of girls students of public and private schools.
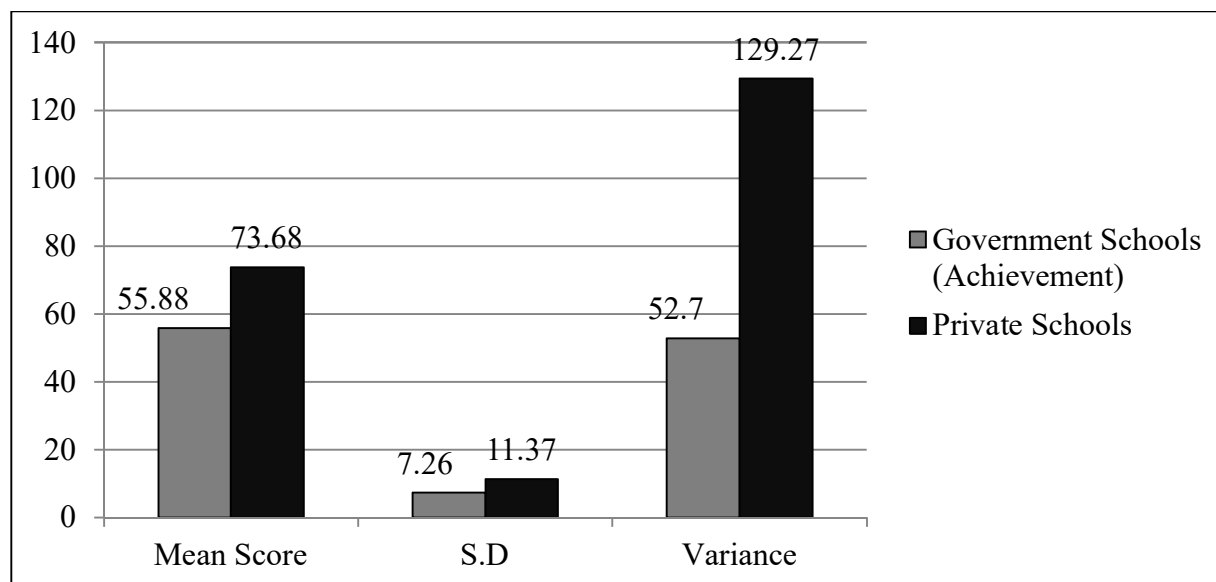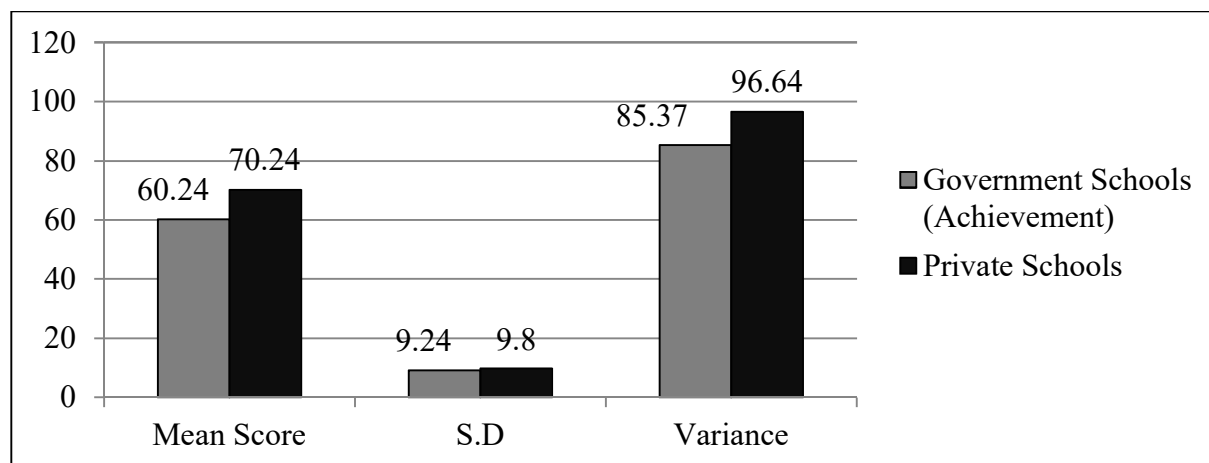
Figure 19: *Average Mean Scores Standard Division and Variance of Girls Students Achievement in Science of Publics and Private Schools*

Figure 19 shows that the comparison of scores obtained girls students in science achievement test between public and private schools. It indicates that the scores obtained girls students in science achievement test of private schools was better academic performance than public schools.

4.17.6 Comparison of Scores obtained in Science Achievement test between Boy Students of Top Scorer Public and Top Scorer Private Schools

The mean, standard deviation, variance and corresponding t-value of the achievement scores obtained in the science achievement test between boy students of top scorer public and top scorer private schools. It is represented in following table and figure below.

Table 28: *Comparison of Scores obtained in Science Achievement test between Boy Students of Top Scorer Public and Top Scorer Private Schools*

S.N.	Types of School	Name of School	Sample Size	$\bar{x}$	σ	σ^2	t-value
1	Public school	(PS$_1$)	10	68.6	11.53	132.94	0.23
2	Private School	(PVS$_1$)	10	91.2	6.01	36.12	

(df=19)   (0.23<2.03) In significant at 0.05 level of significance

Table 28 shows that the comparative analysis of the scores obtained by boy students between top scorer public school i.e. Adarsh Higher Secondary School and top scorer private school. i.e.Gland Stone Academy Secondary School (Thimi). Mean score obtained by the students from Adarsh Higher Secondary School was 68.6 and that of Gland Stone Academy Secondary School was 91.2 respectively. The standard deviation and variance of scores obtained by the students of Adarsh Higher Secondary School were 11.53 and 132.92 and the standard deviation and variance of the scores obtained by the students of Gland Stone Academy Secondary School were 6.01 and 36.12 respectively.

The calculate t-value 0.23 which was less than that of standard t-value 2.03 at 0.05 level of significance using two tailed t-test. Therefore, there was insignificant difference between the score of top scorer public school and top scorer private school.
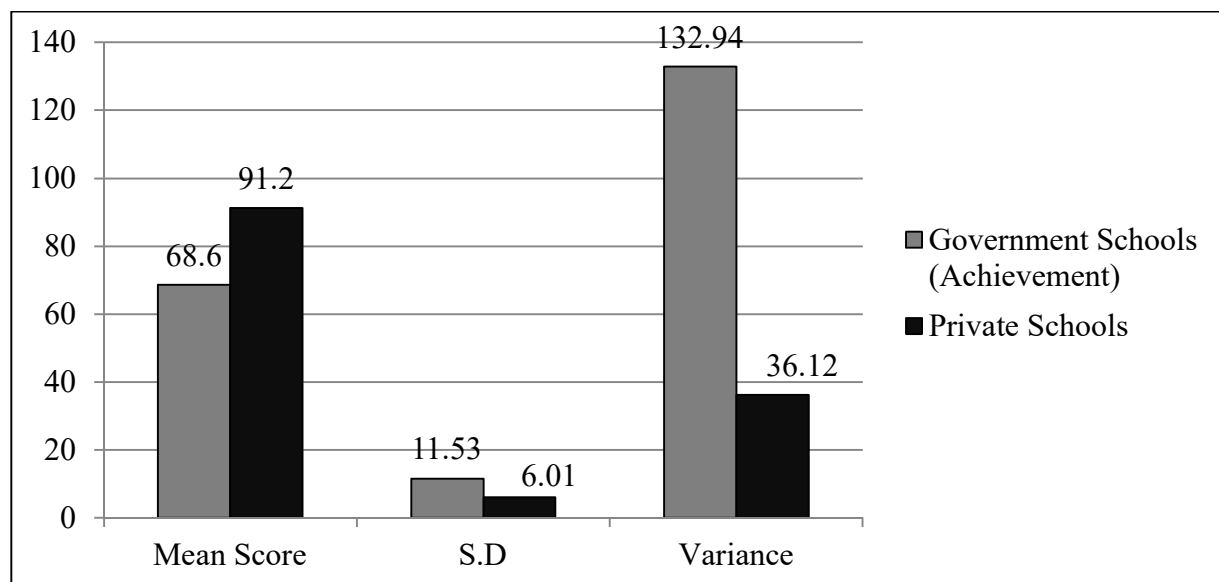

Figure 20: *Mean Scores, Standard Deviation and Variance of Boy Students Achievement in Science between Top Scorer Public School and Private School*

Figure 20 shows that the comparison of score obtained in science achievement test between boys students of top scorer public and top scorer private schools. It indicates that the scores obtained in science achievement test between boy students of top scorer private schools was better performance than top scorer public schools.

4.17.7 Comparison of Scores obtained in Science Achievement Test between Girl Students of Top Scorer Public and Top Scorer Private Schools

The mean, standard deviation, variance and corresponding t-value of the achievement scores obtained in the science achievement test between girl students of top scorer public and private school. It is represented in the following table and figure below.

Table 29: *Comparison of Scores obtained in Science Achievement Test between Girl Students of Top Scorer Public and Top Scorer Private School*

S.N.	Types of School	Name of School	Sample Size	$\bar{x}$	σ	σ^2	t-value
1	Public school	(PS$_1$)	10	69	16.22	263.08	0.10
2	Private School	(PVS$_1$)	10	89.6	9.02	81.36	

(df= 19)   (0.10<2.03) In significant at 6.05 level of significance

Table 29 shows that the comparative analysis of the scores obtained by girl students between top scorer public school i.e. Saraswati Biddygarima Navadurgasthan School and top scorer private school i.e. Gland Stone Academy Secondary School. Mean score obtained by the students from Saraswati Vidhyagrima Navadurgasthan School was 69 and that of Gland Ston Academy Secondary School was 89.6 respectively. The standard deviation and variance of scores obtained by the student of Saraswati Vidhyagrima Navadurgasthan School were 16.22 and

263.08 and the standard deviation and variance of the scores obtained by the students of Gland Stone Academy School were 9.02 and 81.36 respectively.

The calculated t-value 0.10 which was smaller than that of standard t-value 2.03 at 0.05 level of significance using two tailed t-test. Therefore, there was no significance difference between the score of top scorer public and top scorer private schools.

Figure 21: *Mean Scorer, Standard Deviation and Variances of Girls Students Achievement in Science between Top Scorer Public School and Private Schools*

Figure 21 shows that the comparison of score obtained in science achievement test between girls students of top scorer public and top scorer private schools. It indicates that the score obtained in science achievement test between girl students of top scorer private schools was better academic performance than top scorer public schools.

4.17.8 Comparison of Scores obtained by Boys Students in Science Achievement test between Lowest Scorer Public and Lowest Scorer Private School

The mean, standard deviation, variance and corresponding t-value of the achievement scorer obtained by boys students in the science achievement test between lowest scorer public and private school. It is represented in the following table and figure below.

Table 30: *Comparison of Scores obtained by Boys Students in Science Achievement test between*

Lowest Scorer Public and Lowest Scorer Private School

S.N	Types of School	Name of School	Sample Size	$\bar{x}$	σ	σ^2	t-value
1	Public school	(PS$_1$)	10	49.4	1.2	1.44	0.07
2	Private School	(PVS$_1$)	10	55.4	5.00	25	

(df = 9)   (i.e. 0.07 < 2.26) Insignificant at 0.05 level of significance

Table 30 shows that the comparative analysis of the scores obtained by boy students of the lowest scorer public school i.e. Adarsh Higher Secondary School (layakhu) and the lowest scorer private school i.e. Vidhya Arjun English Boarding School. Mean score obtained by the students from Adarsh Higher Secondary School was 49.4 and Vidhya English Boarding School was 55.4 respectively. The standard deviation and variance of scorer obtained by the students of Adarsh Higher Secondary School were 1.2 and 1.44 and the standard deviation and variance of scorer obtained by the students of Vidhya Arjun English Boarding school were 5.00 and 25 respectively.

The calculated t-value 0.07 which was smaller than the standard t-values 2.26 at 0.05 level of significance difference. It shows that, there was insignificant difference in boy student's achievement in science between lowest scorer public and private schools
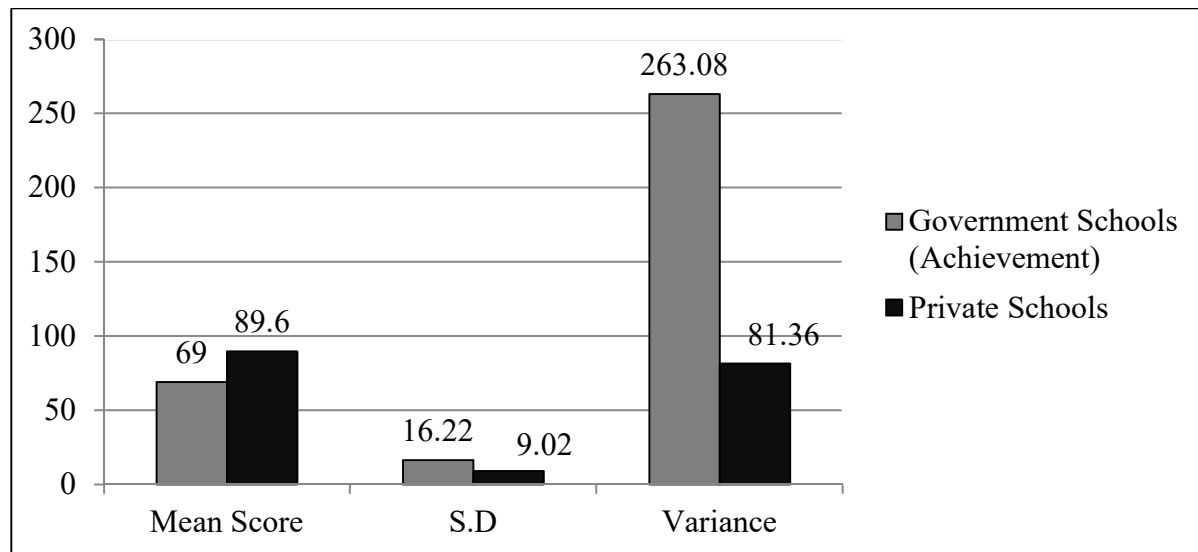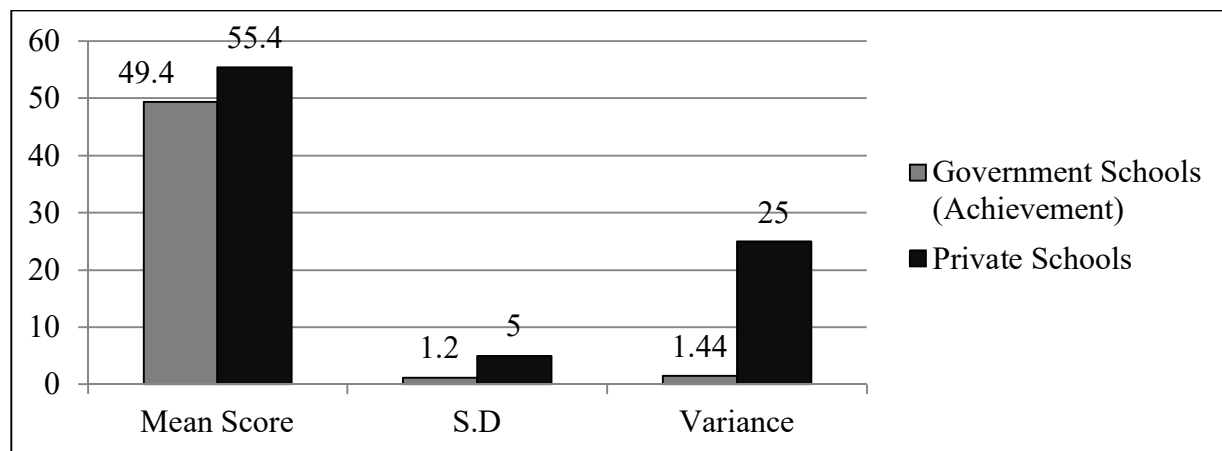
Figure 22: *Mean Scorer, Standard Deviation and Variance of Boys Students Achievement in Science between lowest Scorer Public School and Private School*

Figure 22 shows that the comparison of score obtained by boy's student in science achievement test between lower scorer public and lower scorer private schools. It also shows that the score obtained in science achievement test between boy's students of lower scorer private schools was better academic performance than lower scorer public schools.

4.17.9 Comparison of Scorer obtained by Girls Students in Science Achievement test between Lowest Scorer Publics School and Lowest Scorer Private School

The mean, standard deviation variance and corresponding t-value of the achievement scorer by girl students in the science achievement test between lowest scorer public and private school. It is represented in the following table and figure below.

Table 31: *Comparison of Scorer obtained by Girls Students in Science Achievement test between Lowest Scorer Public School and Lowest Scorer Private School*

S.N.	Types of School	Name of School	Sample Size	$\bar{x}$	σ	σ^2	t-value
1	Public school	(PS$_1$)	10	46.6	2.99	8.94	1.49
2	Private School	(PVS$_1$)	10	63.2	11.73	137.59	

(1.49 <2.10) Insignificant at 0.05 level of significance

Table 31 shows that the comparative analysis of the scores obtained by girl students of the slowest scorer public school i.e. Adarsh Higher Secondary School and the lowest scorer private school. The Vidhya Arjun English Boarding School. The mean scorer obtained by the students from Adarsh Higher Secondary School was 46.6 and the Vidhya Arjun English Boarding School were 63.2 respectively. The standard deviation and variance of scores obtained by the students of Adarsh Higher Secondary School were 2.99 and 8.94 and the standard

deviation and variance of scores obtained by the students of Vidhya Arjun English Boarding School were 11.73 and 137.59 respectively.

The calculated t-value 1.49 which was smaller than the standard t-value 2.10 at 0.05 level of significance using two tailed t-test. It also shows that, there was insignificant difference in girl students achievement in science between the lowest scorer public school i.e. Adarsha Higher Secondary School and the lowest scorer private school i.e. Vidhya Arjun English Boarding School.
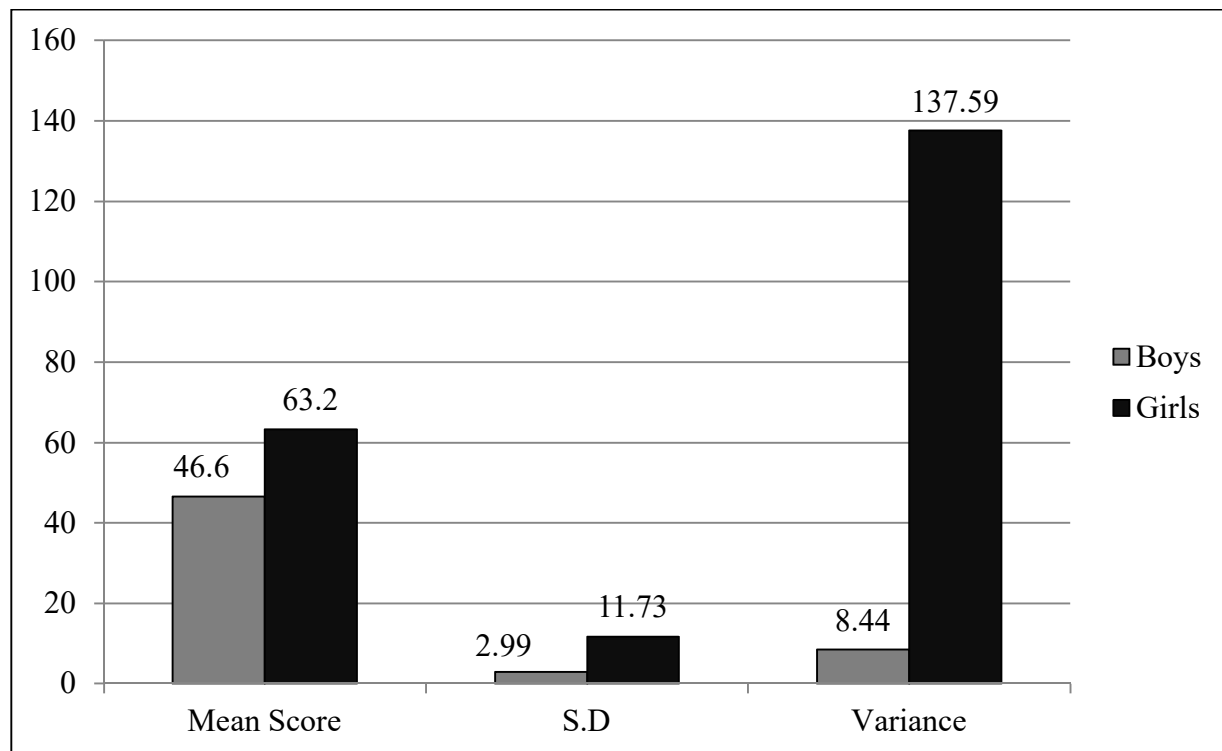

Figure 23: *Mean Scores, Standard Deviation and Variance of Girls Students Achievements on Science between the Lowest Scorer Public School and Private School*

Figure 23 shows that the comparison of score obtained by girl's students in science achievement test between lower scorers public and lower scorers' private schools. It also shows

that the score obtained in science achievement test between girl students of lower scorer private school was better academic performance than lower scorer public schools.

4.17.10 Comparison of the Scores obtained in Science Achievement test between Boys and Girls at Public Schools

The mean, standard deviation, variance and corresponding z-values of the achievement scores of boys and girls students of public schools is presented in the following table and figure.

Table 32: *Comparison of the Scores obtained in Science Achievement test between Boys and Girls at Public Schools*

S.N.	Name of School	Sex	Sample Size	Average Score	$\bar{x}$	σ	σ^2	z-value
			Public Schools					
1	School (PS$_1$	Boys	10	68.6	55.88	7.27	52.85	0.23
2	School (PS$_2$)		10	59.4				
3	School (PS$_3$)		10	51.6				
4	School (PS$_4$)		10	49.4				
5	School (PS$_5$)		10	50.4				
1	School (PS$_1$)	Girls	10	68.4	60.28	9.26	85.74	
2	School (PS$_2$)		10	65.6				
3	School (PS$_3$)		10	69				

| 4 | School (PS$_4$) | | 10 | 46.6 | | | | |
| 5 | School (PS$_5$) | | 10 | 51.8 | | | | |

(0.23 <2.58)   Insignificant at 0.05 level of significance

Table 32 shows that the comparative analysis of scores obtained in the science achievement test at public schools in terms of gender. Average mean score of boys and girls students in science were 55.88 and 60.28 respectively. The corresponding standard deviation were 7.27 and 9.26 and whereas their variances were 52.85 and 85.74 respectively.

The calculated z-value 0.23 which was less than standard z- value 2.58 at 0.05 level of significance difference using two tailed z- test. Therefore, there was no significant difference in the achievement of boy and girl students of public schools at district level.

Figure 24: *Mean Scores, Standard Deviation and Variance of Girls Students Achievements on Science in Public School*

Figure 24 shows that the comparison of score obtained in science achievement test between boys and girls students at public schools. It indicates that the score obtained in science achievement test of girls was better academic performance than boys at public schools.

4.17.11 Comparison of Scorer obtained in Science Achievement test between Boys and Girls Students at Private Schools

The mean, standard deviation, variance and corresponding z-value of the achievement scores of boys and girls students of private schools is presented in the following table and figure below.

Table 33: *Comparison of Scorer obtained in Science Achievement test between Boys and Girls Students at Private Schools*

S.N.	Name of School	Sex	Sample Size	Average Score	$\bar{x}$	σ	σ^2	z-value
Private Schools								
1	School (PVS$_1$)		10	55.4				
2	School (PVS$_2$)		10	75.6				
3	School (PVS$_3$)	Boys	10	91.2	73.68	11.37	129.27	
4	School (PVS$_4$)		10	72.2				
5	School (PVS$_5$)		10	74				0.11
1	School (PVS$_1$)		10	63.2	70.84	9.35	87.42	
2	School (PVS$_2$)		10	68.6				
3	School (PVS$_3$)	Girls	10	89.2				
4	School (PVS$_4$)		10	67.4				
5	School (PVS$_5$)		10	65.8				

(0.11) <2.58) insignificant at 0.05 level of significance

Table 33 shows that the mean score of boy and girl students in private school in science were 73.68 and 70.84 respectively. The corresponding standard deviations were 11.37 and 9.35 and whereas their variances were 129.27 and 87.42 respectively.

The calculated z-value 0.11 which was less than standard z- value 2.58 at 0.05 level of significance difference using two tailed z-test. Therefore, there was no significant difference in achievement of boy and girl students of private schools at district level.
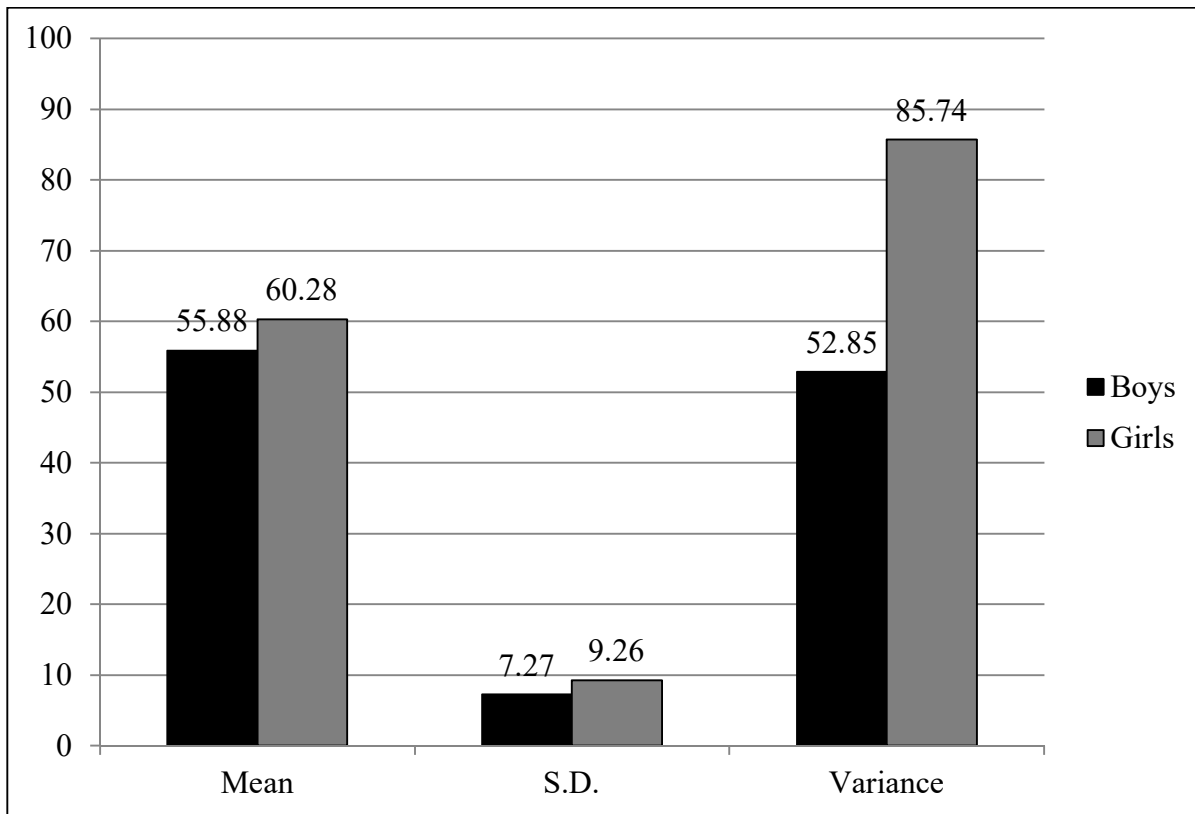

Figure 25: *Mean Scores, Standard Deviation and Variances of Boys and Girl Students Achievements in Science at Private Schools*

Figure 25 shows that the comparison of the score obtained in science achievement test between boys and girls at private schools. It indicates that the score obtained in science achievement test of boys was better academic performance than of girls at private schools.

4.17.12 Comparison of Scores obtained in Science Achievement test between Boys and girls Students at Public and Private Schools

The mean, standard deviation, variance and corresponding z-value of the achievement scores of boys and girls students of district level is presented in the following table and figure below.

Table 34: *Comparison of Scores obtained in Science Achievements test between boys and Girls Students at Public and Private Schools*

S.N	Name of School	Boy students					Girl Students					z-value
		S.S	A.S	$\bar{x}$	σ	σ^2	S.S	A.S	$\bar{x}$	σ	σ^2	
1	School (PS₁)	10	68.6				10	68.4				
2	School (PS₂)	10	59.4				10	65.6				
3	School (PS₃)	10	51.6				10	69				
4	School (PS₄)	10	49.4				10	46.6				
5	School (PS₅)	10	50.4	64.78	13.05	170.30	10	51.8	65.54	10.70	114.49	0.022
6	School (PVS₁)	10	55.4				10	63.2				
7	School (PVS₂)	10	75.6				10	68.6				
8	School (PVS₃)	10	91.2				10	89.2				
9	School (PVS₄)	10	72.2				10	67.2				
10	School (PVS₅)	10	74				10	65.8				

(0.022) <2.58) Insignificant at 0.05 level of significance

Table 33 shows that the comparative analysis of scores obtained in the science achievement test in terms of gender. Average mean scores of boys and girls students in science were 64.78 and 65.54 respectively at district level. The corresponding standard deviation was13.05 and 10.70 and whereas their variances was 170.30 and 114.49 respectively.

The calculated z-value 0.022 which was less than standard z-value 2.58 at 0.05 level of significance using two tailed t-test. Therefore, there was no insignificant difference in the achievement of boy and girl students in science at district level.

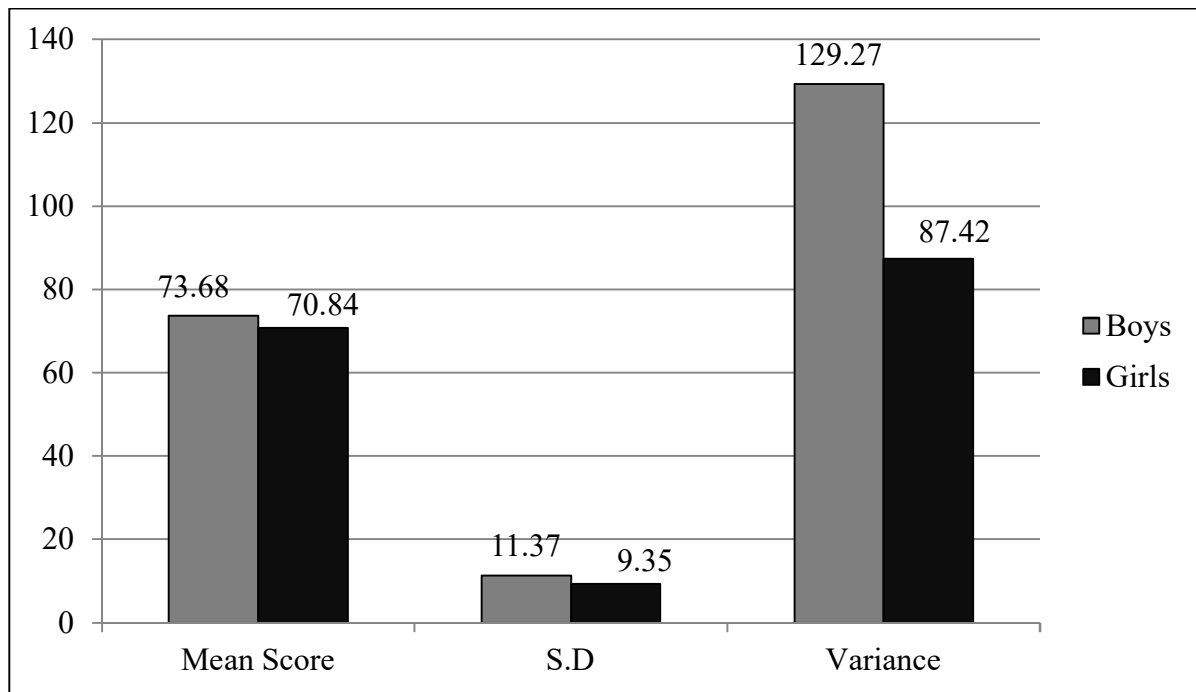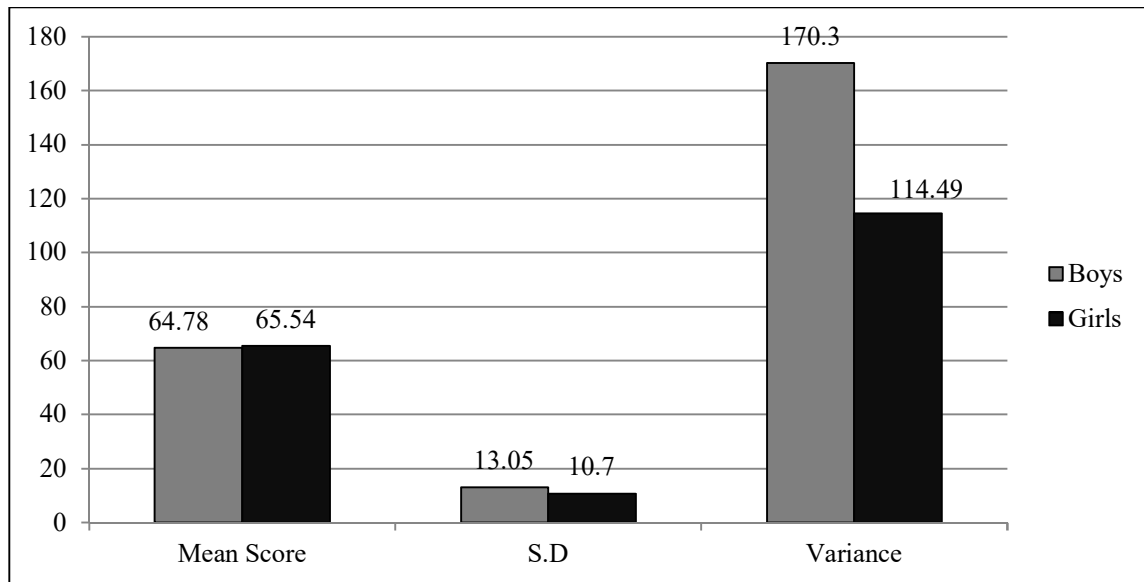Figure 26: *Mean Score, Standard Deviation and Variances of Boys and Girls Students Achievement in Science*

Figure 26 shows that the comparison of score obtained in science achievement test between boy and girl students. It also shows that the score obtained in science achievement test of boys was better academic performance than girls.

CHAPTER V

Qualitative Analysis of Teacher's Interviews

Qualitative analysis of this study was based on the fourth part of the objectives is to explore the teachers perception (Interviews) towards the different questions at district level. These questions were related to the curriculum, specification grid, test items, students achievement score, bloom taxonomy of educational objectives, cognitive domain, implementation condition of district level science curriculum and how to overall science classes are going on Nepal. The other aspect of this study had selected two types of schools within the public and private schools. Twenty six teacher's interview questionnaires was constructed and ten teachers was selected from both types of schools and there were altogether ten teachers whom researcher knew and asked the views about their district level science subject in two types of schools

1. What is the curriculum?

Most of the public school science teachers were responded that the curriculum is the detail plan for teaching learning process. It is the widened plan for the proper achievement of expected goals. It helps us to make teaching learning activities systematic, purposeful and direct teachers to make their teaching learning activities effective.

Most of the private school science teachers answered that the curriculum is related to the experience of the pupil which is planned and directed by the school and teachers to attain the objectives of education. Some teacher said that the curriculum is the means and materials with which students will interact for the purpose of achieving intended educational outcomes.

2. Do you have a district level science curriculum?

i) Yes ☑   ii) No

If yes, what is the purpose of using it?

Yes, most of the public school science teacher's view was purposed of using it. It helped me to create objectives of lesson as well as techniques to teach lesson and some of the science teachers were said to designed curriculum materials and make plan for teachers.

Yes, all the private school science teachers were responded that to gives the basis framework for what to do, how to do, when to do, how to know and how to achieved the goals.

3. What is specification grid? And who use it?

All the public school's science teachers responded that the specification grid is a kind of frame for formation of questions for the exam which help to make question from all skills, listening, speaking, reading and writing and used by teachers. And all the private school's science teachers said that the specification grid is an important educational tool which consist the guidance for the marks distribution in fact. It is used by teachers.

4. Do you use specification grid for making a set of questions?

Yes, all the science teachers responded they used specification grid for making a set of questions.

5. What are the advantages and disadvantages of specification grid?

All the science teachers in both types of schools responded that the specification grid has both advantage and disadvantage. They are as follows:

Advantage

a) It gives the outline for making appropriate questions according to curriculum.

b) It helps to make level at students studying in classroom.

Disadvantages

    a) Questions are beyond time without specification gird so, students cannot complete those questions answer in time.

    b) It takes more time and effort for making questions.

    c) It is not to know the writing power at students.

6.   What are the uses of specification grid?

    All the science teachers in both types of schools said that the use of specification grid is to form test items for all skills. Like, both subjective and objective questions and some of the science teachers in both types of schools said that to achieve of educational goals.

7. Actually, the specification grid helps to make the questions papers.

    i) Yes ☑   ii) No ☐

    If yes, how does it?

    Yes, all the science teacher's opinion was the specification grid helped to guide teachers to make both subjective questions: short and long answer questions and objective questions, fill in the blanks, true, false, match the following and multiple choice.

8.   What are the test items?

    All the science teachers of public schools said that the test items is a kind of assessment which evaluation students progress and categorize student's with fail and pass and the passed students get opportunity to upgrade in higher level.

All the science teachers of private schools responded that the test items is the set of questions or a series of questions which are asked in exam and to test the and student's ability, skill and knowledge.

9. Do you use the different types of test items for the formation of questions?

   i) Yes ☑   ii) No ☐

   If yes, how does it?

   All the science teachers in the both type of schools responded that they have used the both subjective and objectives test items. Like, essay questions, long answer questions and fill in the blanks, true/false and match the following etc. respectively.

10. What are the advantages and disadvantages of test items?

   All the science teachers in the both types of schools responded that the advantages and disadvantages of the test item are given below:

Advantages

   a) Test finds strength and weakness of students.
   b) It upgrades students.
   c) It helps to measure different abilities of the students.
   d) To know the academic condition of students.

11. What are the uses of test item?

Almost, all the science teachers in the both type of schools said that the test items are used to categorize the level of students and help them to progress more for better result in future and some of the science teacher in the both type of schools responded that the test items are use to measure the student's different abilities and they help to evaluate the student's abilities to write to organize the knowledge and they covered all the topics and fundamental facts.

12. Actually, the quality full test items help to bring the improvement of students learning?

   i) Yes ☑   ii) No ☐

   If yes, how does bring it?

   Yes, All the science teachers in both types of schools view was to provide the students feed-back for their improvement and it makes students familiar about their academic status not only this, the quality full test items can measure the students knowledge, skill and abilities about the subject matter in depth and help to treat there.

13. What is the meaning of achievement score obtained by students?

   All the science teachers in the both type of schools responded that the achievement score is the symbol of learning achievement or number of learning achievement by the students and provided by the teacher and it also denotes the student's ability, knowledge level of taught subject.

14. What is the purpose of score?

Almost, all the science teachers in the both types of schools said that the purpose of score is to find out the student's level in classroom and some of the science teachers view about the purpose of score is to find out the current status and program in study of students.

15. What are the uses of score?

All the science teachers in the both types of schools responded that the purpose for using the score is to find out the level of students, categorize good and slow learners to improve in study and it also helps to know the deep ability of students.

16. What are the advantages and disadvantages of score?

All the science teachers in the both types of schools said that they have to face both advantages and disadvantages. They are as follows.

Advantages

a) To find strength and weakness of students and to upgrade students.

b) To describe the efficiency of learner.

c) It helps to encourage the learner when obtained good marks.

Disadvantages

a) Students may be de-motivated because of their low score.

b) Depending on certain question, which determines the ability of the learner is not reliable.

17. How do students score maximum in the examination?

Almost, all the science teachers in the both types of schools responded that the students score maximum in the examination by taking tuition class, by laboring hard daily, taking help from parents learning, being regular to school, being obedient students.

Some of the science teachers in the both types of schools said that used of demonstration method, child centered method, experiment methods and objective of curriculum oriented.

18. What is the relation between the specification grid and curriculum?

All the science teachers in the both type of schools responded that the specification grid is a frame or tools for the construction of questions and it covered all units which are prepared on the basis of curriculum and curriculum is the broad plan which helped teacher to make\ effective teaching learning activities and it is systematic, meaningful and effective.

19. What is the relation between the score and test items?

Most of the science teachers in the both types of schools said that the score is the symbol of learning achievement or number of learning achievement by students which is provided by teachers and test item is a set of questions which are in exam.

Some of the science teachers in the both types of schools responded that the score is the marks that students have secured from the test and test items which help students to secure marks by solving questions of test.

20. Give the meaning of Bloom's taxonomy of educational objectives?

All the science teachers in both types of schools responded that the bloom's taxonomy of educational objective means helped to make the different questions with the basis of different level and it has included the different domains like, cognitive, affective and psychomotor.

21. What is the different level of cognitive domain?

All the science teachers in the both types of schools said that the different levels of cognitive domain are given below:

a) Knowledge

b) Comprehension

c) Application

d) Analysis

e) Synthesis

f) Evaluation

22. What are the advantages and disadvantages of cognitive domain?

All the science teachers in the both types of schools responded that the advantages and disadvantages of cognitive domain are given below.

Advantages and disadvantages

a) It also helps to provide idea for making different level test item.

b) It consumes time.

c) It creates confusion for making different level test items.

23. Are you facing any problems while implementing the curriculum? What are these problems?

Yes, All the science teachers in the both types of schools responded that they had not sufficient facilities and could not obtain sufficient equipment, text books which are the related of subject matter.

24. What kind of teaching methods are usually used? Which teaching method do you select? Why?

All the science teachers in the both types of schools responded that they used the students centered method, demonstration method, experimental method, and practice based methods etc. They had been preparing practice based methods. Because, it could help students to learn by cling.

25. How do you think about overall science classes are going on Nepal? How do you start science teaching in classroom?

All the science teachers in the both types of schools responded that overall science classes are going on very poor in Nepal. Because, they have not sufficient materials, equipment, access of different technology and access of textbook in the context of Nepal. and also there is lack of subject teachers. They had been starting science classes from the use of practice based method. They had been starting the class by motivating students.

Table 35: *Comparison of Public and Private Schools on the Basis of Teacher's Interview Questions*

S.N.	Features/Characters	School A (Public)				School B (Private)			
		Good	V. Good	Poor	V. Poor	Good	V. Good	Poor	V. Poor
1.	Definition of curriculum	✗	✓	✗	✗	✗	✗	✓	✗
2.	Curriculum Design	✓	✗	✗	✗	✓	✗	✗	✗
3.	Activity of District level science curriculum	✗	✗	✗	✗	✗	✓	✗	✗
4.	Specification grid	✓	✗	✗	✗	✗	✗	✓	✗
5.	Follow of Specification grid	✗	✓	✗	✗	✗	✗	✓	✗
6.	Quality full test items	✗	✓	✗	✗	✓	✗	✗	✗
7.	Score	✓	✗	✗	✗	✗	✓	✗	✗

8.	Bloom taxonomy	✗	✓	✗	✗	✗	✗	✓	✗
9.	Teaching method	✓	✗	✗	✗	✓	✗	✗	✗
10.	Science classes	✓	✗	✗	✗	✗	✓	✗	✗
11.	Teacher's availability	✓	✗	✗	✗	✗	✓	✗	✗

Table 35 shows that the comparison between the public and private schools on the basis of teachers' interview questions.

The public school science teachers responded correctly definition about the curriculum design, specification grid, scorers, teaching methods, science classes and teacher availability. Similarly, the private school science teachers said correctly definition about the curriculum design, teaching method and quality full test items. The private school science teacher's responded poor about the definition of curriculum, follow of specification grid and blooms taxonomy.

Table also shows that the public school science teachers responded very good about the definition of curriculum, flow of specification grid, quality full test items and similarly private schools science teachers responded very correctly about the activity of district level science curriculum, science classes and teachers availability. Similarly, public school teachers responded poor about the activity of district level science. It indicated that the comparative above all of these features were perfectly implemented of public schools teachers than private school teachers.

5.1 Analysis of Total Marks in Questions Paper

Table 36: *Analysis of Total Marks in Questions Paper*

Ability level	Grid	Total marks in	Percentage	Difference (S.G.-Q.M.)

		questions		
Knowledge	30	22	28	30-22 = 8
Understanding	40	29	46.66	40-34 = 6
Application	20	12	13.33	20-12 = 8
Higher ability	10	8	12	10-8 = 2
Total	100	76	99.8	

The table 36 shows that the different level in different specification grid, marks and percentage of the test items. The specification grid demands 30% knowledge, 40% understanding, 20% application and 10% higher ability levels. The different ability levels of knowledge, understanding application and higher ability shows the different specification grid and marks i.e. 8, 6, 8 and 2 respectively and percentage i.e. 28.9, 44.7, 15.7 and 10.5 respectively. It also shows that the district level test items of marks and percentage in the year of 2072 B.S. were not exactly matched with the demand of specification grid.

Analysis of knowledge Level question in physics

In Q.N. 1 (a) of group 'A', 1 mark is given for the question. (Define a physical quantity). In Q.N. (b) of group 'A', 1 mark is given for the question. (Define acceleration). In Q.N.2 (a) of group 'A' 1 mark is given for the question, (What is efficiency). In Q.N. 3 (a) of group 'A' 1 mark is given for the question. (Define 1 watt power). In Q.N. 4 (a) of group 'A', 1 mark is given for the question. (Write any two natures of the image so formed). In Q.N. 3 (a) of group 'A', 1 mark is given for question.(what is echo). Similarly, In Q.N.5 (a) of group 'A', 1 mark is given for the question. (What is molecular magnet).

Analysis of understanding Level questions in physics

In Q.N. 1 (a) of group 'A', 2 marks is given for the question. (Write any differences between mass and weight). In Q.N. (a) of group 'A', 1 mark is given for the questions. (Write

formula to calculate velocity ratio). In Q.N. 2 (b) of group 'A', 1 mark is given for the question. (Mention anyone use of atmospheric pressure). In Q.N. 3 (b) of group 'A',

2 marks is given for the question. (Write any two differences between clinical thermometer and simple thermometer). Similarly, in Q.N. 4 (a) of group 'A', 2 marks is given for the question. (Complete the given rays of diagram). In Q.N. 5 (b) of group 'A', 1 mark is given for the question. (Mention two defects of simple cell).

Analysis of application Level questions in physics

In Q.N. 1 (b) of group 'A', 2 marks is given for the question. (When brake in applied on a car with uniform it retards by $1m/s^2$ and stops after 5 seconds, Calculate its initial velocity). In Q.N. 3 (a) of group 'A', 2 marks are given for the question. (If a man of mass 70 kg clinics a hill of height 900 m in 30 minutes, calculate his power). Similarly, in Q.N. 5 (a) of group 'A', 2 marks is given for the question. (Show the arrangement of molecular magnets in magnetic substance and a magnet with neat and clean diagram).

Analysis of higher ability Level questions in physics

In Q.N. 2 (b) of group 'A', 2 marks is given for the questions. (Why does egg float on the solution of salt and water). In Q.N. (a) of group 'A', 2 marks is given for the question. (What do you mean by the frequency of a sound in 70 Hz). Similarly, in Q.N. 5 (b) of group 'A', 1 mark is given for the questions. (Write the full form of MCB).

Analysis of knowledge Level questions in chemistry

In Q.N. 6 (a) of group 'B', 1 mark is given for the questions. (What are subatomic particles). In Q.N. 7 (a) of group 'A', 1 mark is given for the question. (What do you mean by paper chromatography). In Q.N. 7 (b) of group 'B', 1+ 1 a mark is given for the questions.

(Which metal is extracted from argentite ore). (Which metal steel is made). Similarly, in Q.N. 8 (a) of group 'B', 0.5 + 0.5 marks is given for the questions. (What is P^H value of a neutral substance? and name the salt which is used in plastering the fractured bone).

Analysis of understanding Level questions in chemistry

In Q.N. 7 (a) of group 'B', 1 mark is given for the question. (What types of mixture are separated by fractional distillation). In Q.N. 7 (b) of group 'B', 1 mark is given for the question. (Write any two uses of that metal). In Q.N. 8 (a) of group 'B', 2 marks is given for the question. (Write any two differences between acid and base). In Q.N. 8 (b) of group 'B', 2 marks is given for the question. (Write a way of removing temporary hardness and permanent hardness of water).

Analysis of application Level questions in chemistry

In Q.N. 6 (a) of group 'B', 2 marks is given for the question. (Draw an atomic model of chlorine). In Q.N. 6 (b) of group 'B', 2 marks is given for the question. (Write the balanced formula equation of given chemical reaction, hydrogen + oxygen → water).

Analysis of Knowledge Level questions in biology

In Q.N. 10 (a) of group 'C', 1 mark is given for the question. (What is epithelial tissue). In Q.N. 10 (b) of group 'C', 1 mark is given for the question. (What is system). In Q.N. 11 (a) of group 'C', 1 mark is given for the question. (What is sexual reproduction). In Q.N. 11 (a) of group 'C', 2 marks is given for the question. (Write name of four chambers of the heart).

Analysis of understanding Level question in biology

In Q.N. 9 (b) of group 'C', 2 marks is given for the question. (Write any two differences between monocotyledonous seed and dicotyledonous seed). In Q.N. 10 (b) of group 'C', 1mark

is given for the question. (Mention any two examples of system). In Q.N. 11 (a) of group C, 1 mark is given for the questions. (Write the type of a sexual reproduction in amoeba and tapeworm). Similarly, in Q.N. 11 (b) of group 'C', 1 mark is given for the question. (Write a function of blood).

Analysis of application Level questions in biology

In Q.N. 9 (a) of group 'C', 2 marks is given for the question. (Draw a neat and labeled diagram of bacteriophase).

Analysis of higher ability Level questions in biology

In Q.N. 9 (a) of group 'C', 1 mark is given for the question. (Why is fungi called saprophytic plant). In Q.N. 10 (a) of group 'C', 2 marks is given for the question. (If the trip of stem of a plant is cut, what happen, why).

Analysis of knowledge Level questions in geology and astronomy

In Q.N. 12 (b) of group 'D', 0.5 marks is given for the question. (What is mansoon).

Analysis of understanding Level questions in geology and astronomy

In Q.N. 12 (a) of group 'D', 0.5 marks is given for the question. (Write any two uses of minerals). In Q.N. 12 (b) of group 'D', 1 mark is given for the question. (Write the hypothesis of George Wofan about the origin of the earth).

Analysis of higher ability Level questions in geology and astronomy

In Q.N. 12 (b) of group 'D', 0.5 marks is given for the question. (What is time period of synodic month).

Analysis of knowledge Level question in environment science

In Q.N. 15 (a) of group 'E', 1 mark is given for the question. (What is sustainable development). In Q.N. 15 (b) of group 'E', 1+ 2 marks is given for the questions. (What is biodiversity? Write it's any two types).

Analysis of understanding Level questions in environment science

In Q.N. 13 (a) of group 'E', 3 marks is given for the question. (Write any three causes of deforestation). In Q.N. 10 (b) of group 'E', 2 marks is given for the question. (Write any two importance of national park).

But in Q.N. 14 (a) and (b) of group 'E', 2 +3 mark is given for the questions. (Write any two problems facing by our country due to climate change and also write any three ways that could be applied for the reduction of loss from earthquake). Similarly, in Q.N. 15 (a) group 'E', 1 mark is given for the question. (How can conserved the sustainable development).

5.2 Analysis of Errors of D.L.E Science Test Papers of 2072 B.S.

Some of the errors were shown in group A, B, C, D and E, D.L.E. science test papers of 2072 B.S.

Group 'A' (Physics)

At Q.N.1 (a) and (b) of group 'A', the sum of marks given to the question was wrong 1+2+1+2=6 but, there was given only 5 marks.

Group 'B' (Chemistry)

At group 'B', error was shows in higher ability cognitive level because of there was not asked the question about the higher ability level with the demands of specification grid. It was a great error. and other cognitive levels questions were asked in group 'B'.

Group 'C' (Biology)

At Q.N. 9 (b) of group 'C', spelling of photocotyledonon was given "motocotyledonous". So, the spelling of monocotyledonous was wrong.

Group 'D' (Geology and Astronomy)

At group 'D', error was shows in application cognitive level because of the questions were not asked there about the application level with the demands of specification grid. But, other cognitive levels questions were asked in group 'D'. It was a great error and was not separated the marks with each questions. Like 1.5+2+1.5 = 5

Group 'E' (Environment Science)

At group 'E', error was shows in application and higher ability cognitive levels because of the questions were not asked about application and higher ability levels with the demands of specification grid. But, other cognitive levels questions were asked in group 'E'.

5.3   Triangulation of Data between Quantitative and Qualitative Research Approach

Table no. 23 shows that the comparison of scores obtained in science achievement test between the private and public school. The mean score of private and public school was i.e. 71.4 and i.e. 58.08 respectively. It also shows that there was significant difference in the achievement of students of public and private school. It indicates the science achievement score of private school was better than that of public schools.

Similarly, in qualitative research approach shows that the public school science teacher's performance was better than that of private school. It can be proved by the interview questions about the related of definition of curriculum, specification grid, scores and test items etc.

CHAPTER VI

Findings, Conclusion and Recommendations

This chapter presents the findings of the study, conclusion, suggestion and recommendation to analysis of test items and scores of district level science examination.

6.1 Findings of the Study

The district level test items and scores of 100 students were analyzed by using mean, average mean, variance, standard deviation, t-test and z-test on the basis of analysis and interpretation of data obtained from the achievement test items of district level examination.

- It is found that there has been gap between weightage of specification grid and different cognitive level of test items in district level examination (DLE) science test in 2072 and 2073 B.S. set 'A', set 'B'.

- It is found that the specification grid demands 30% of the test items from knowledge level but in the year 2072 and 2073 B.S. The set 'A' and set 'B' of test items included 28% and 37.33% of the knowledge level test items respectively.

- It is found that the specification grid demands 40% of the test items from understanding level but in the year 2072 and 2073 B.S. The set 'A' and set 'B' of the test paper included 46.66% and 34.66% of the understanding level test items respectively.

- It is found that the specification grid demands 20% of the test items from the application level but in the year 2072 and 2073 B.S. The set 'A' and set 'B' of the test items included 13.33% and 22.66% of the application level test items respectively.

- It is found that the specification grid demands 10% of the test items from the higher ability level but in the year 2072 and 2073 B.S. The set 'A' and 'B' of the test items included 12% and 5.33% of the higher ability level test items respectively.

- It is found that the comparison among specification grid on the set 'A' and set 'B' of science test items of district level examination. (2072 and 2073 B.S), the set 'A' of test items included 28% knowledge, 46.66% of understanding, 13.33% of application and 12% marks of higher ability level of the test paper. Similarly, the set 'B' of test items included 37.33% of knowledge, 34.66% of understanding, 22.66% of applications and 5.33% mark of higher ability of test paper respectively. It indicated that, there is large gap between the set 'A' and set 'B' of test items with the specification grid.

- It is found that the comparison between the grid and average percentage marks of different cognitive level of science test paper on set 'A' and set 'B' (2072 and 2073 B.S.). There is variation between the science test paper and specification grid in two sets (A and B).

- The achievement scores of the studied of private schools was comparatively better than public schools.

- There was no significant difference between the science achievement scores of district level public schools boys and girls.

- There was no significant difference between the science achievement scores of district level private schools boys and girls.

- The calculated z-value 0.72 which was larger than standard z- vale 2.58 at 0.05 level of significance differences. Therefore, there significant difference in student's achievement in science between public and private schools.

- The calculated t-value 0.02 which was less than standard t-value 2.03 at 0.05 level of significant. There was no significant difference in students achievement in science between top scorer public school i.e. Adarsh Higher Secondary School, Sanothimi and top scorer private school i.e. Gland Stone Academy, Thimi.

- The calculated t-value 0.15 which was less than standard t- value 2.03. There was no significant differences in student's achievement in science between lowest scorer public school i.e. Adarsha Higher Secondary School (Layaku) and lowest scorer private school i.e. Supreme Academy Higher School, Thimi.

- The calculated z- value 0.66 which was less than the standard z-value 2.58 at 0.05 level of significance difference. Therefore, there was insignificant differences in the science achievement of boys students between public schools and private schools.

- The calculated z-value 0.69 which was less than the standard z-value 2.58 at 0.05 level of significant difference. Therefore, there were insignificant difference in the science achievement of girl's students between public schools and private school.

- The calculated t-value 0.23 which was smaller than the standard t-value 2.03 at 0.05 level of significance difference. Therefore, there was no significant difference in boy's achievement in science between top scorer public school, i.e. Adarsha Higher Secondary School and top scorer private school i.e. Gland Stone Academy, Thimi.

- The calculated t-value 0.10 which was less than the standard t-value 2.03 at 0.05 level of significance difference. Therefore, there was no significant difference in girl's achievement in science between top scorer public school i.e. Saraswati Vidhyagrima Navadurgasthan School and top scorer private school i.e. Gland Stone Academy School, Thimi.

- The calculate t-value 0.07 which was less than the standard t-value 2.26 at 0.05 level of significance difference. Therefore, there There was no significant difference in Boy's achievement in science between lowest scorer public school i.e. Adarsha Higher Secondary School (Layaku) and lowest scorer private school. i.e. Vidhya Arjun English Boarding School.

- The calculated t-value 1.49 which was smaller than the t-value 2.10 at 0.05 level of significance difference. Therefore, there was no significant difference in girl's achievement in science between lowest score public school i.e. Adarsha Higher Secondary School (Layakhu) and lower scorer private school i.e. Vidhya Arjun English Boarding School.

- The calculated z-value 0.23 which was less than the standard z-value 2.58 at 0.05 level of significance difference. Therefore, there was no significant difference in the science achievement test between the boys and girls students at public schools.

- The calculated z-value 0.11 which was smaller than the standard z-value 2.58 at 0.05 level of significance difference. Therefore, there was no significant difference in the science achievement test between the boys and girls students at private schools.

- The calculated z-value 0.022 which was less than the standard z-value 2.58 at 0.05 level of significance difference. Therefore, there was no significant difference in science achievement test between the boys and girls students at public and private schools.

- All the public school science teachers responded that the good definition of curriculum and the private school science teachers said that the poor definition of curriculum.

- All the science teachers in both types of schools responded that they used the district level science curriculum.

- All the science teachers in both type of the schools defined of specification grid and test item. It was used by teachers.

- All the science teachers in both types of the schools view were to use the specification grid for making test items.

- All the science teachers in both types of the schools said that the good advantages and disadvantages of specification grid and test items.

- Most of the science teachers in both types of the schools responded that they used of specification grid and test items for categorize the level and know about the progress of students. And some of the science teachers in both types of the schools said that they used test items and specification grid for to get better result in future of students.

- Exactly, all the science teachers in both types of the schools responded that the quality full test items bring improvement of the students.

- All the science teachers in both types of the schools responded that the good meaning of achievement score, purpose of score, use of score and advantage and disadvantages of score and some of the science teachers said that the students achieved higher score in examination by taking regular class, hard laborites daily, and tuition classes and practice etc.

- All the science teachers in both types of schools said that the good relation between specification grid and curriculum, scores and test items.

- All the science teachers in public types of schools positively responded about the taxonomy of educational objective. But all the science teachers in private schools did not positively responded about the taxonomy of educational objectives.

- All the science teachers in both types of schools correctly responded about the different cognitive domain.

- Most of the private schools science teachers responded that they were not used the different cognitive domain for the prepared of test items and some of the private schools science teachers responded that they used the different cognitive domain for the prepared of test items. But, all the public schools science teachers responded that they used different cognitive domain for the prepared of test items.

- All the private school's science teachers poorly responded about the domain of Bloom's taxonomy than public schools.

- All the science teachers in both types of schools said that were facing of many problems while implementing the curriculum in the context of Nepal..

- All the science teachers in both types of schools responded that they were used of different method for science teaching. Like, students centered method, demonstration method   experimental method and practice based methods.

- All the science teachers in both types of schools responded that the overall science classes are going on Nepal is very poor because of there is not sufficient equipment.

- Both types of schools were satisfied by the use of district level science curriculum and specification grid.

- All the public schools were good follower of specification grid and all the private schools were poor follower of specification grid.

- Both types of schools improved of the quality full test items.

- All the public schools were not satisfied in class scores but all private schools were satisfied in class scores.

- All the public schools implemented Bloom's taxonomy very well. But all the private schools were poor implemented of Bloom's taxonomy.

- Both types of schools were satisfied for teaching methods.

- Both types of schools were satisfied for science classes.

- All the public schools were not fully satisfied for teacher's availability, but all the private schools were satisfied for teacher's availability.

- This study shows that there were some mistakes on weightage of marks in test materials.

- This study shows that there was small gap between weightier of specification grid and different cognitive level of test items in DLE science test of 2072 B.S.

6.2 Conclusion

From the analysis of this study, it can be concluded that the most of the test items were based on the understanding level. The demands of specification grid 30% knowledge, 20% application and 10% higher ability levels of test items were not fulfilled in the year of 2072 B.S. It means, application and higher ability levels of test items were less included in all groups.

It was found that the weightage of understanding level test items were more than that of the knowledge level, application level and higher ability level as compared of specification grid. If the weightage of knowledge, application and higher ability levels of test items were increased the failure rate may decreased. It is clear that all groups of DLE science test items of 2072 B.S. were nearly based on the specification grid.

It's not only this, from the analysis of collected data, it can be concluded that the student's achievement in science at district level of private schools was significantly better than public schools in Bhaktapur district. Because of various factors like, student's behavior, educational environment at schools, parent's education, home environment, regular attainted in

school, laborites, use of different teaching methods etc. have affected the student's achievement in science at district level. Both the boys and girls performed in science achievement test equally of these types of schools. There was no significant difference between the achievement of top scorer public school and top scorer private schools in science. Some concluded were derived from this study, student's achievement in science was better among private schools as compared to public schools at district level. There was significance difference in the science achievement of students at district level of public and private schools. It was found that from the teacher interview questions there public school science teachers were responded that the satisfactory answer than the private school science teachers.

6.3 Recommendations

After analysis, finding and conclusion of the present study on district level of test items and students achievement score in science. The researcher would like to suggest some recommendations. so, as to improve the performance of students in science achievement.

- This study was limited to 'Bhaktapur district'. Similar research should be carried out in different district.

- This study was limited at 5/5 public and private schools. Similar research should be carried out in wider area to generalize the findings in broader context.

- The achievement score of public schools was lower than the private schools students. Therefore, the concerned authorities, educational policy makers, parent and teachers, school management should play special attention to governmental education and design a better plan to promote their educational standard.

- Student's achievement level in science was very low. Therefore, science teachers, school management committee, district education office, ministry of education, school

administration and parents should give special attention in the teaching and learning of science in schools.

- Trained and qualified teachers should appoint at both public and private school as far as possible.

- Both public and private schools should conduct regular educational tour, science fair and science exhibition in order to activate students learning of science.

- DLE science test items of all groups should developed be according to the specification.

- All DLE science test items of the same year should be prepared by removing the errors.

- The weightage of marks should determine according to the demand of specification grid.

- All DLE science test items of the same year should be made parallel type i.e. having same content validity and difficulty level.

- All groups of DLE test items should be compared at the time of setting.

- The effectiveness of teacher training should be judged and the concerned authorities should take necessary steps to carry out monitoring of the effectiveness of teaching by the trained teachers.

- Schools should be provided with separate science room with necessary laboratory facilities, equipment, laboratory manuals, appropriate environment etc. Inside them, the materials provided should be used in the appropriate time.

- Refresher training should be organized for science teachers at regular interval to all the district level science teachers.

- The selection of management committee member should be systematic and fair such right man in right place.

- School management committee should make effort to trap local resources and mobilized them for the development of schools.

APPENDIX A

Open Structured Interview Questions for Teachers

Name of the School:

Name of the teacher:

Level:

1. What is the curriculum?

………………………………………………………………………………………………

………………………………………………………………………………………………

…………………………………………………………………………………………..

2. Do you have a district level science curriculum?

i) Yes ☑   ii) No ☐

If yes, what is the purpose of using it?

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………………………………………………………………………………………………

…………………………………………………………………………………………..

3. What is specification grid? How to apply it?

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4. Do you apply specification grid for making a set of questions?

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5. What are the advantages and disadvantages of specification grid?

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6. What is the application of specification grid?

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………

7. Actually, the specification grid helps to make the questions papers.

i) Yes ☑   ii) No ☐

If yes, how does it?

………

………

………

8. What are test items?

………

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………

9. Do you use different types of test items for the formation of questions?

i) Yes ☑   ii) No ☐

If yes, how does it?

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10. What are the advantages and disadvantages of test items?

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11. What are the uses of test items?

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12. Actually, the quality full test items help to bring the improvement of students learning?

i) Yes ☑   ii) No ☐

If yes, how does bring it?

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13. What is the meaning of achievement score obtained by students?

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14. What is the purpose of score?

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15. What are the uses of analyzing the scores?

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16. What are the advantages and disadvantages of score?

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17. How do students score maximum in the examination?

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18. What is the relation between the specification grid and curriculum?

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19. What is the relation between the score and test items?

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20. Give the meaning of Bloom's taxonomy of educational objectives.

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21. What are the different levels of cognitive domain?

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22. Please, say some action verbs relating to each domain.

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23. What are the advantages and disadvantages of cognitive domain?

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24. Are you facing any problems while implementing the science curriculum? What are these

problems?

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25. What kind of science teaching methods do you usually use? Which methods of teaching

do you prepare? Why?

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………………………………………………………………………………………………

26. How do you think about overall science classes are going on Nepal? How do you start

science teaching in classroom?

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Analysis of D.L.E. Test Item (2072)

Knowledge Level Questions

Branch of Science	Question Number	Questions	Score	Total Marks
Physics	1 (a)	Define a physical quantity.	1	7
	1 (b)	Define acceleration	1	
	2 (a)	What is efficiency?	1	
	3 (a)	Define 1 watt power.	1	
	4 (a)	Write any two natures of the image so formed.	1	
	4 (b)	What is an echo?	1	
	5 (a)	What is molecular magnet?	1	
Chemistry	6 (a)	What are subatomic particles?	1	5
	7 (a)	What do you mean by paper chromatography?	1	
	7 (b)	Which metal is extracted from argentite ore?	1	
		Which metal steel is made?	1	
	8 (a)	What is the P^H value of a neutral substance?	0.5	
		Name the salt which is used is plastering the fractured bone?	0.5	

	10 (a)	What is epithelial tissue?	1	
Biology	10 (b)	What is system?	1	5
	11 (a)	What is sexual reproduction?	1	
	11 (b)	Write name of four chambers of the heart.	2	
Geology and Astronomy	12 (b)	What is monsoon?	1	1
Environment Science	15 (a)	What is sustainable development?	1	4
	15 (b)	What is biodiversity? Write its any two types.	2+2=3	

Understanding Level Questions

Branch of Science	Question Number	Questions	Score	Total Marks
Physics	1 (a)	Write any two differences between mass and weight.	2	9
	2 (a)	Write formula to calculate velocity ratio.	1	
	2 (b)	Mention anyone use of atmospheric pressure.	1	
	3 (b)	Write any two differences between clinical thermometer and simple thermometer.	2	
	4 (a)	Complete the given any diagram	2	
	5 (b)	Mention the defects of simple cell.	1	
Chemistry	7 (a)	What types of mixtures are separated by practical distillation?	1	6

	7 (b)	Write any two uses of that metal.	1	
	8 (a)	Write any two differences between acid and base.	2	
	8 (b)	Write a way of removing temporary and permanent hardness of water.	2	
Biology	9 (b)	Write any two differences monocotyledonous seed and dicotyledonous seed.	2	5
	10 (b)	Mention a two example of system.	1	
	11 (a)	Write the types of asexual reproduction in amoeba and tapeworm.	1	
	11 (b)	Write a function of blood.	1	
Geology and Astronomy	12 (a)	Write any two uses of minerals.	1.5	3
	12 (b)	Write the hypothesis of George so far about the origin of the earth.	1.5	
Environment Science	13 (a)	Write any three causes of deforestation.	3	11
	13 (b)	Write any two importance's of national park.	2	
	14 (a)	Write any two problems facing by own country due to climate change.	2	
	14 (b)	Write any three ways that could be applied for the reduction of loss from earthquake.	3	
	15 (a)	How can it be conserved?	1	

Application Level

Branch of Science	Question Number	Questions	Score	Total Marks
Physics	1 (b)	When break is applied on a car with uniform velocity it retards by $1m/s^2$ and stops often 5 seconds. Calculate its initial velocity.	2	6
	3 (a)	If a man of mass 70 kg climbs a hill of height 900m in 30mins. Calculate his power.	2	
	5 (a)	Show the arrangement of molecular magnetic in magnetic substances and a magnet with neat and clean diagram.	2	
Chemistry	6 (a)	Draw an atomic model of chorine.	2	4
	6 (b)	Write the balanced formula equation of given chemical equation. Hydrogen + Oxygen $\rightarrow$ Water	2	
Biology	9 (a)	Draw a neat and labeled diagram of bacteriophase virus.	2	2
Geology and Astronomy	12 (a)	-	-	-
	12 (b)	-	-	-
Environment Science	13 (a)	-	-	-
	13 (b)	-	-	

	14 (a)	-	-	
	14 (b)	-	-	
	15 (a)	-	-	
	15 (b)	-	-	

Higher Ability Level

Branch of Science	Question Number	Questions	Score	Total Marks
Physics	2 (b)	Why does egg float on the solution of salt and water.	2	4
	4 (b)	What do you mean by the frequency of a sound in 70 Hz	1	
	5 (b)	Write the full form of MCB	1	
Chemistry	6 (a)	-	-	-
	6 (b)	-	-	
	7 (a)	-	-	
	7 (b)	-	-	
	8 (a)	-	-	
	8 (b)	-	-	
Biology	9 (a)	Why is fungi called saprophytic plant?	1	3
	10 (a)	FF the tip of item of a plant is cut, what happen, why?	2	
Geology and Astronomy	12 (a)	-	-	1
	12 (b)	What is time period of synodic month?	1	

Environment	13 (a)	-		-	-
Science	13 (b)	-		-	
	14 (a)	-		-	
	14 (b)	-		-	
	15 (a)	-		-	
	15 (b)	-		-	

APPENDIX C

Statistical Formula Used for Data Analysis

I. Mean $= \dfrac{\sum x}{N}$

II. S.D. $= \dfrac{\sum (x - \bar{x})^2}{N}$

        Where, x = achieved score by the students

             $\bar{x}$ = average mean score of the students

             N = Numbers of students

III. T-score (t) $= \dfrac{\bar{x}_1 - \bar{x}_2}{\sqrt{\dfrac{\sigma_1^2}{N_1} + \dfrac{\sigma_2^2}{N_2}}}$

IV. S.E.$_D$ or $\sigma D = \sqrt{\dfrac{\sigma_1^2}{N_1} + \dfrac{\sigma_2^2}{N_2}}$

Where, $\bar{x}_1$ and $\bar{x}_2$ = Average mean score of the first and second sample schools

        σ_1^2 and σ_2^2 = Variances of first and second sample schools

        S.E.$_D$ or σD = Standard error of difference between mean

        N_1 and N_2 = Number of total students in first and second sample schools.

V. $Z = \dfrac{M_1 - M_2}{\sigma_D}$

Where, M_1 = Mean of the first sample schools

        M_2 = Mean of the second sample schools

APPENDIX D

Schools Name and Symbols

Public School	Symbols	Private Schools	Symbols
Adarsh Higher Secondary School	PS_1	Vidhya Arjun English Boarding School	PVS_1
Shree Padma Higher Secondary School	PS_2	Modern Boarding Higher Secondary School	PVS_2
Saraswati Vidyagrima Navadurgasthan	PS_3	Gland Stone Academy Secondary School	PVS_3
Adarsh Higher Secondary School (Layaku)	PS_4	Supreme Academy Higher Secondary School	PVS_4
Devi Higher Secondary School	PS_5	Nabin English School	PVS_5

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