2018

Nature of Physics Teaching at Secondary Level in Bangladesh

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M.Phil Dissertation

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June 2018

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June 2018

Dedicated
To

My Respected father
Iman Ali Sheikh
Mother Mst. Shazeron Nesa
My better half Monira Ferdous
Loving daughter Usrat Amin
and
Son Md. Muhtasim Zarif

Certificate

This is to certify that the dissertation entitled **"Nature of Physics Teaching at Secondary Level in Bangladesh"** is an original research work of **Md. Aminul Haque** under my supervision for the award of the Degree of M.Phil. From the Institute of Education and Research, University of Rajshahi. So far as I know, no other person was associated with the completion of the study or nobody has done a research on the same topic as yet.

I have gone through the draft and final version of the dissertation and it appears to me that it is worthy of submission to the Institute of Education and Research, University of Rajshahi as a fulfillment of the requirements for the award of the degree of M.Phil.

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Declaration

I do hereby declare that the dissertation entitled **"Nature of Physics Teaching at Secondary Level in Bangladesh"** submitted as a fulfillment of the requirements for the award of the degree of Master of Philosophy, at the Institute of Education and Research, University of Rajshahi, is exclusively the outcome of my own research work done under the supervision of **Dr. Md. Rezaul Karim,** Professor, Department of Statistics, University of Rajshahi.

I further declare that this dissertation has not been submitted in part or in full to any other academic institute or organization for the award of any degree or for receiving financial grant.

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Acknowledgements

First and foremost, I stretch special thanks to the Almighty for giving me the grace, wisdom and good health to complete this thesis. I am also indebted to my honorable supervisor, **Dr. Md. Rezaul Karim,** Professor, Department of Statistics, University of Rajshahi for his active guidance and useful comments on the draft of the thesis. I am grateful to him for his continuing support in writing and finalizing the thesis. I would like to assert my gratefulness to all academic and non-academic staff of the Institute of Education and Research, Rajshahi University, for their assistance and support in doing my research work. I am also indebted to Md. Azizul Haque and Md. Abdul Hannan, researchers of IER of Rajshahi University.

I wish to express my thanks to the honorable Director of **Higher Secondary Teachers Tanning Institute, Rajshahi** for taking trouble and facing inconveniences created due to my absence from Institution.

Finally, I would like to express my gratitude to my loving wife for her help and encouragement, her unalloyed love, support and understanding and to my children for their endurance day and night for they always gave me the confidence to work very hard while I was studying in Rajshahi University.

Md. Aminul Haque

Abstract

This study investigates and describes the nature of secondary physics teaching and learning in Bangladesh. Here the body of literature on nature of physics teaching has been studied, and it has been discussed how classroom situations in secondary physics classes can be turned into a friendly environment for learning physics. The situations under discussion have been proposed by secondary teachers, during in-service teachers training, as situations from day to day physics teaching could highlight the nature of physics teaching. Secondary schools of all Upazila of Rajshahi district have been purposively selected for the study. Quantitative and qualitative methods were used for gathering research data. Primary and secondary sources have been used for the study. Quantitative data were obtained from the surveys of 81secondary schools, 81 Head teachers, 93 physics teachers and 500 students of class IX-X from secondary schools of Rajshahi District in Bangladesh. Qualitative data, on the other hand, were gathered from the analysis of questionnaire and interviews from Head teachers, physics teachers and students of class IX-X from Rajshahi District in Bangladesh. Quantitative data were coded and analyzed using the SPSS 16.0 statistical package to produce descriptive statistics. Qualitative data also were transcribed and categorized into emerging themes. Some selected variables and their relationship with χ^2test are shown in the table for head teachers, physics teachers and students. This study investigated 81 schools and evaluated the statement on the basis of using a five points rating scale indicating 1= Poor, 2= Weak, 3= Fair, 4= Good, 5= Very good. The percentages of the occurrences of these points are tabulated and explained. The tabular form of categorical data is graphically represented by correspondence analysis. Graphical display permits more rapid interpretation and understanding of the data. The rows and columns of a table interpreted the similarities and differences between rows, the similarities and differences between columns and the association between rows and columns. Correspondence analysis uses χ^2/n, which is termed as

inertia or total inertia, rather than χ^2 value of contingency table. This graph can be used to investigate the graphical relationship among different categories. From the study it is observed that a countable number of qualified, well trained, devoted and highly motivated physics teachers are needed in Bangladesh. Teachers have no sufficient training on teaching methods and techniques. Teachers are not accustomed to the modern methods and techniques of teaching physics. School authorities are not always willing to buy teaching aids and do not encourage teachers to use them. The trained teachers are not accountable to anybody or to any authority regarding their use of the teaching methods and techniques. In many schools, there are no systems of professional development. The curriculum of physics is not perfect for class IX-X and is faulty in many ways. Also, there is no stable syllabus from class six to class eight. Physics started from class IX-X students with heavy load. Existing textbook of physics is insufficient for teaching physics at secondary level in Bangladesh. Many teachers of class ten avoid taking physics practical class in the schools and do not encourage students in problem-solving classes. Group work is necessary for students in the classroom. Students do not feel comfortable in studying science and physics in the classes.

The study suggests that classroom interaction seemed to be mostly teacher-centered and tended not to support inquiry-based teaching and learning which is noted for promoting conceptual change and enhancing performance. It is recommended among other things that physics teachers should be exposed to efficient pedagogies of teaching and presenting information to learners. The traditional way of teaching where teacher decides on what goes on in the classroom has limited space in the 21st century science classrooms, particularly physics. Finally, a number of realistic recommendations are suggested for improving the quality of physics teaching and learning in Bangladesh.

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1.1 Introduction

At present, there has been growing public anxiety about the teaching and learning of physics at secondary schools in Bangladesh. A large number of students seem to learn very little physics at school, learning tends to be by rote and students find learning of physics to be difficult (Jegede, 2011). The quality of physics teaching and learning has also been questioned over time by parents, physics educators, and the general public and even by the government (Adepoju, 2013). Physics teaching in Bangladeshi schools has been criticized because of the poor performance of Bangladeshi students in physics subjects relative to their counterparts in other countries. There have few factors been identified to be responsible for these poor performances in physics from the various studies conducted in Bangladesh. These include the lack of motivation for most teachers, poor infrastructural facilities, lack of adequate teaching aids and teaching instruments, lack of separate laboratory for physics, lack of teaching skills and competence by physics teachers, and lack of opportunities for professional development for physics teachers. Poor classroom organization, lack of management techniques and poorly co-coordinated student activities also reduced the quality of physics teaching and learning (Akale, 2006). The shortage of funds for equipment and materials for fruitful practical work; especially in view of large class size in most schools is a problem (Ivowi, 2006). The low percentage of students who pass examinations to dissatisfaction with the syllabus, teachers' qualifications, workload, experience and disposition and the ineffective style of delivery of subject matter paint a gloomy description of physics teaching in Bangladesh. Teaching methods could result in a poor state of learning and students' achievement in physics (Adeyemi, 2010). Teachers' content knowledge has an effect on both the content and the processes of instruction, thus influencing both what and how they teach (Haimes, 2008). Research efforts have proposed various suggestions and recommendations for improving the quality of physics teaching and learning in Bangladeshi classrooms. However, despite these various suggestions for improvement, the nature of physics teaching and learning and students' achievement in secondary physics continue to

decline (Ikeobi, 2005). The non-involvement of all the key stakeholders in physics education in Bangladesh including teachers, students, school principals, education officers, teacher educators, curriculum planners, parent associations, professional bodies, and educational leaders in examiner the actual situation of physics teaching and learning could be a factor. There is, therefore, the need to involve key stakeholders to reveal a realistic and ideal picture through which recommendations could be made in the context of physics education in Bangladesh. It is needed to improve the nature of physics teaching for citizens so that they can develop scientific literacy to cope with the demands of physics and technology growth which have been very important in every nation in this 21st century.

1.1.1 Definition of Physics

Physics is the scientific study of forces such as heat, light, sound, pressure, gravity, and electricity, and the way that they affect objects. The word 'physics' comes from the Greek 'knowledge of nature,' and in general, the field aims to analyze and understand the natural phenomena of the universe. Physics holds scientific laws, which are statements describing phenomena that have been repeatedly tested and confirmed. This is actually an important part of physics. Physicists perform and repeat experiments to formulate these laws and explain how our universe works. These laws (such as gravity and Newton's laws of motion) are so thoroughly tested that they are accepted as 'truths,' and they can be used to help us predict how other things will behave. Because physics explains natural phenomena in the universe, it's often considered to be the most fundamental science. It provides a basis for all other sciences- without physics, there couldn't have been biology, chemistry, or anything else. Physics has been around for a very long time. Researcher considers the Ancient Greeks to be the 'founders' of early physics, as they pushed for a better understanding of the natural world around them. This includes some major players like Socrates, Plato, and Aristotle with whom Researcher are likely to be familiar. Modern physics came centuries later, with folks like Copernicus, Galileo, and Newton during the 1500s and 1600s. There were many critical scientific breakthroughs during this time as people discovered more and more about our universe. In fact, much of the knowledge the researcher take for granted was discovered during this Scientific Revolution. For example, Copernicus was the first to demonstrate that the earth

revolves around the sun, not the other way around. Galileo described many fundamental physical concepts, but he also made many astronomical discoveries, such as sunspots and planetary satellites, by perfecting the telescope. He is probably most famous for his three laws of motion and the law of universal gravitation.

1.1.2 Physics and its Nature

The fact that liquid water abruptly changes into solid ice at a certain temperature, the production of lightning and the thunder that follows it in a storm, the beautiful hexagonal symmetry of small snowflakes; all these, and a limitless list of other phenomena, fall within the province of the science of physics. The science, in general, is the observation and exploration of the world around us with a view to identifying some underlying order or pattern in what Researcher find. Physics is that part of science which deals primarily with the inanimate world and which furthermore is concerned with trying to identify the most fundamental and unifying principles. The physics is separate from biology; the second separates it from chemistry, which, at least in its theoretical aspects, builds on some specific areas of physics but can ignore some other things. Mathematics, of course, although indispensable to the practice of physics, is an entirely different field of study.

One way of obtaining some insight into the nature of physics is to look at the story of how physics has developed from its beginning till now. Its main purpose is not to offer a chronological survey for its own sake, but just to illustrate how the consistent aim of physics is to relate our knowledge of phenomena to a minimal number of general principles.

1.1.3 History of Physics Education

Aristotle wrote what is considered now as the first textbook of physics. Aristotle's ideas were taught unchanged until the Late Middle Ages, when scientists started making discoveries that didn't fit them. For example, Copernicus' discovery contradicted Aristotle's idea of an Earth-centric universe. Aristotle's ideas about motion weren't displaced until the end of the 17th century, when Newton published his ideas. Today's physics students keep thinking of physics concepts in Aristotelian terms, despite being taught only Newtonian concepts. Physics is taught in high

schools, colleges and graduate schools. In the US, it has traditionally not been introduced until junior or senior year (i.e. 12th grade), and then only as an elective or optional science course, which the majority of American high school students have not taken. Recently in the past years, many students have been taking it in their sophomore year. Physics first is a popular and relatively new movement in American high schools. In schools with this curriculum, 9th grade students take a course with introductory physics education. This is meant to enrich students' understanding of physics, and allow for more details to be taught in subsequent high school biology, and chemistry classes; it also aims to increase the number of students who go on to take 12th grade physics or AP Physics (both of which are generally electives in American high schools.) But many scientists and educators argue that freshmen do not have an adequate background in mathematics to be able to fully comprehend a complete physics curriculum, and that therefore the quality of physics education is lost. While physics requires knowledge of vectors and some basic trigonometry, many students in the Physics First program take the course in conjunction with Geometry. They suggest that instead of students first take biology and chemistry which are less mathematics-intensive so that by the time they are in their junior year, they can be advanced enough in mathematics with either an Algebra 2 or pre-calculus education to be able to fully grasp the concepts presented in physics. Some argue this even further, saying that at least calculus should be a prerequisite for physics.

1.1.4 Importance of Physics Education at secondary level in Bangladesh

Physics is one of the most fundamental natural sciences. It involves the study of universal laws, and the behaviors and relationships among a wide range of physical phenomena. Through the learning of physics, students will acquire conceptual and procedural knowledge relevant to their daily life. In addition to the relevance and intrinsic beauty of physics, a study of physics also helps students to develop an understanding of the practical applications of physics to a wide variety of other fields. With a solid foundation in physics, students should be able to appreciate the intrinsic beauty and quantitative nature of physical phenomena, and the role of physics in many important developments in engineering, medicine, economics and other scientific and technological fields. Furthermore, learning about the contributions, issues and problems related to innovations in physics will help students to develop a

holistic view of the relation of science, technology and society. The emergence of a highly competitive and integrated economy, rapid scientific and technological innovations, and a growing knowledge base will continue to have a profound impact on our lives. In order to meet the challenges posed by these changes, Physics, like other science electives, will provide a platform for developing scientific literacy and for building up essential scientific knowledge and skills for life-long learning in science and technology.

1.1.5 Curriculum of physics at secondary school

As the curriculum objectives give emphasis on the acquisition of scientific and manipulative skills, so the curriculum materials do. The Physics textbook contents are dominated by the knowledge- based views of science education. The physics textbooks of secondary education are written based on the curriculum objectives. Thus, the learning outcomes through textbook content affect both teaching and learning process. Physics and chemistry are compulsory subjects for science students at secondary level and they have to choose two other subject options. There are several science subjects for them to choose from, such as biology, computer education, higher mathematics, agriculture study etc. Among the prescribed subjects of science curriculum of secondary education, Physics takes a very important place. As the revised curriculum (NCTB, 1996) suggests, Physics is a subject which is capable of acquainting students with daily life science and motivating them about the advancement of technologies in the present world. Furthermore, in developing scientific attitudes and repairing superstitious mindset of learners, the subject has a vital role to play. Besides, the secondary Physics is aimed at providing a sound knowledge base of the students for further study at higher education level. The NCTB prescribes the textbook `Secondary Physics' in order to spell out the curriculum objectives and suggests the book as a means for implementing the curriculum document in the classroom reality.

1.1.6 Theoretical Content

The Physics textbook contains 25 chapters for theoretical content presenting various topics as described in the curriculum of 1996. It has a section for practical contents. The book is composed of newsprint papers. Each chapter on theoretical Physics has

started with a brief introduction, content description, and an assessment exercise. The texts are composed and arranged in two columns. This is possibly, for making the reading easier for the learners. But the presentation patterns have been deformed on some occasions.

1.1.7 Practical Content

The section of practical Physics contains 11 prescribed `experiments'. This chapter has been started with a brief introduction on the role of practical. It includes a description of the `objectives' of practical works, preparation for the laboratory work, principles related to practical, characteristics and writing procedures of laboratory notebooks, description of terms related to practical work, terminologies, conceptions, and so on. Then the chapter describes each of the 11 experiments in terms of topic, number, procedure, conditions, calculation procedures and other relevant aspects.

1.1.8 Practical Works

The physics practical works are concerned with performing selected experiments in the laboratories from the eleven prescribed practical works in the textbook. There is no opportunity for teachers and students to design practical work or experiment by themselves in which students are allowed to do an independent project or experimental work. The curriculum does not contain aims and objectives for the practical works. Though the text book states objectives, they are more about knowing and following some principles, procedures and techniques of experimenting. This encourages students and teachers to go about the experiment with only a vague idea of the purpose of the experiment. As a result, students perform practical activities mechanically without understanding the relationship between the various parts of the experiment. As in other science subjects, there are separate classes for teaching theoretical contents and teaching practical experiments in physics. The class for teaching theories and concepts is called the theoretical class or classroom teaching, while the class for teaching practical experiments is named the demonstration class. The demonstration and the practical classes are done in the laboratory and the theoretical classes are taught in classrooms. As for other science subjects, physics practical work is assessed in the test examination in Grade X and also in the SSC examination. Of the 100 marks, 75 are allocated for assessing the theoretical contents and 25 for assessing the practical components.

1.1.9 Physics teachers in secondary schools in Bangladesh

Good education requires good teachers. The teacher is the most important element in improving the quality of education for enhancing the quality of secondary education Teachers' education requires new directions and new academic programmers. Teaching is such a profession that needs proper preparation. Training facilities are to be created both at home and abroad. In most secondary schools in Bangladesh, there is only one physics teacher on an average. There are few teachers who teach physics at the secondary level with a background in physics. Most of the teachers who teach secondary school physics have completed their Master of Science (M.Sc.) in some other subjects and have studied physics as a subsidiary subject in their Bachelor of Science (B.Sc.) with Honors course. Some other secondary school physics teachers have studied physics as an optional subject in their Bachelor of Science course (B.Sc.). A few secondary school physics teachers have studied Master of Arts and Bachelor of Arts in Physics.

1.2 Statement of the Problem

Physics is the study of matter and energy and how they affect each other. It is also referred to as the study of natural phenomena in its fundamental state. However, the perception of both teachers and students in physics classroom learning environment influence the achievement of students in physics education. The fact that a lot of factors are responsible for students' underachievement in physics is not new to researchers but amongst those factors could be teachers and students' perception of physics classroom learning environment. Recent studies indicate that there is a substantial impact of the classroom learning environment on students' achievement in physics learning. Teachers and students' perception of the learning environment is very important in the achievement of students in physics and knowing the students' perception will help the teacher in shaping their students' class perception and relatively their achievement in physics. Classroom learning environment refers to a setting or space where teachers and learners interact with each other and use variety of tools and information resources with each other in their pursuit of learning activities. The nature of classroom environment and psycho-social interaction can make a difference in how the students' learn and achieve their goals. However both teachers

and students perceive physics classroom learning environment in different ways. Hence, learning is a process which produces series of changes in behavior or it is more or less a change in behavior that results from activities, training or observation. It is a change in behavior that confirms learning. However, there has been a wide range of problems with the available class room learning environment in the secondary schools in Bangladesh which prevents effective learning from taking place. Some of the problems associated with classroom arrangement including the tall students obstructing the view of the short ones at the back to see the chalk board, inadequate chairs and tables etc. can cause discomfort for students. Another problem is the poor classroom with little or no ventilation. Due to the composition of physics education, most physics teachers believe it should be done practically and theoretically to allow effective understanding of the topic by students. Over the years, the problem of under achievement of science students in physics has been a general problem. Factors such as lack of adequate laboratory equipment, ineffectiveness and lack of teaching proficiency of teachers, lack of qualified teachers and school factors have been identified as major causes of underachievement of science students in physics. Despite all these efforts the poor performances of students still exist. However, little emphasis has been laid on the effect of teachers' perception of physics classroom learning environment and students' perception of physics classroom learning environment. The study explores the effect of teachers' perception and students' perception of physics classroom learning environment on their academic achievement in secondary schools in Bangladesh.

1.3 Rationale of the Research

The purpose of this research is to analyze the nature of teaching physics at the secondary level in Bangladesh. According to the research results of science educators in developed countries, physics plays an important role in teaching and learning science efficiently. Everybody in the educated society of our country knows that the nature of teaching physics is a general problem. There are many causes behind this. The study will explore the nature of teaching physics. So far as the researcher knows, the research work on physics is yet to be done more. Research work on this field is not adequate compared with that of other fields of education though no one can step a single step without physics. Maximum subjects of science group are dependent on

physics. Physics is also seen by many as an analogy. But, it is implicitly assumed to be the analogy that never breaks down. Our experience of the world has failed to reveal any physical phenomenon that cannot be described physically. That is not to say there are not things for which a description is wholly inappropriate or pointless. Rather, there has yet to be found any system in nature so unusual that it cannot be fitted into one of the straitjackets that physics provides. This leads us to our first glimpse of the mysterious foundation of modern science. It uses and trusts the language of physics as an infallible guide to the way the world works without a satisfactory understanding of what physics actually is and why the world dances to a physical tune. It would be hoped that after completion of the study, the researcher would be able to chalk out the weaknesses of the teaching of physics and give time befitting recommendations in the context of our country so as to make the subject more interesting to teachers and students and develop the mechanism of teaching physics at the secondary level successfully.

1.4 Objectives of the Study

1.4.1 General Objectives of the Study

The general objective of the study is to identify the teaching and learning condition of physics at secondary schools.

1.4.2 Specific Objectives of the Study

Specific objectives of this study are

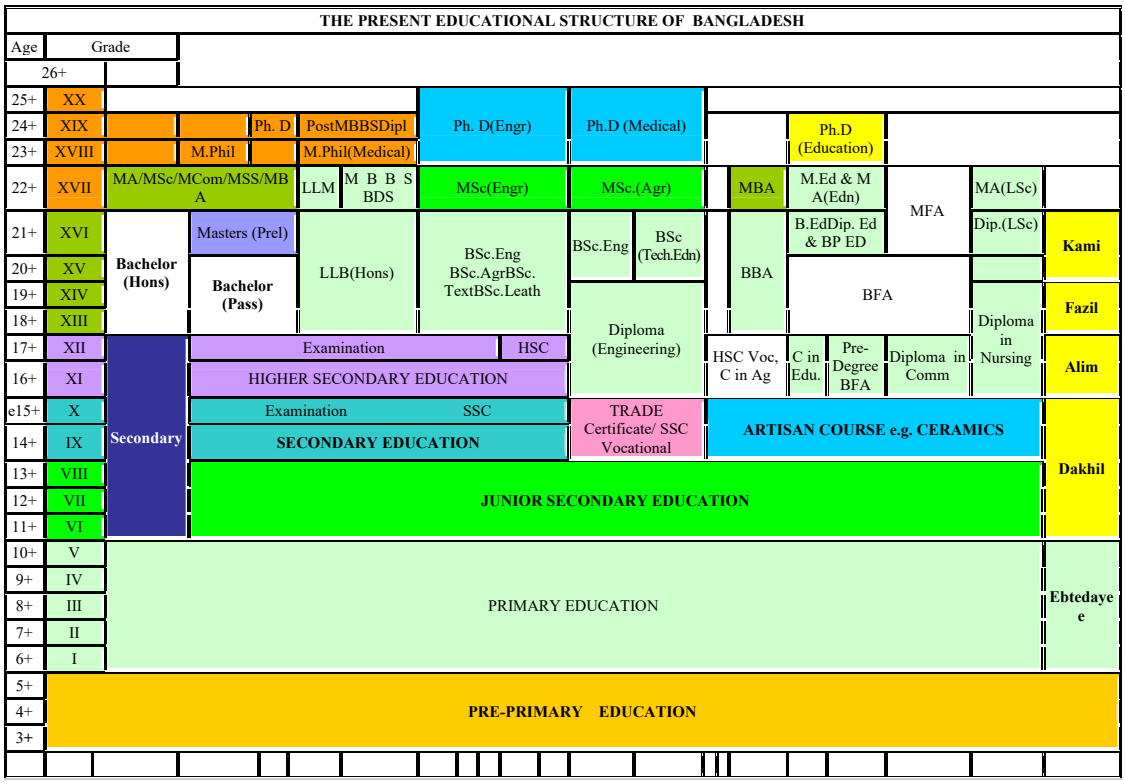
- To explore the nature of physics teaching in the classroom
- To explore the problems of physics teachers at the secondary level
- To explore the problems of students in the classroom in teaching physics at the secondary level
- To explore the academic atmosphere in the secondary Schools

1.5 The Present Education System in Bangladesh

The present education system of Bangladesh may be broadly divided into three major stages, viz primary, secondary and tertiary education. Primary level institutions impart primary education basically. Junior secondary/secondary and higher secondary level institutions impart secondary education. Degree pass, degree honors, masters and other higher-level institutions or equivalent sections of other related institutions impart

tertiary education. The education system is operationally categorized into two streams: primary education (Grade I-V) managed by the Ministry of Primary and Mass Education (MOPME)) and the other system is the post-primary education which covers all other levels from junior secondary to higher education under the administration of the Ministry of Education (MOE). The post-primary stream of education is further classified into four types in terms of curriculum: general education, madrasah education, technical-vocational education and professional education

Figure 1.1: The Present Educational Structure of Bangladesh



Source: BANBEIS 2009 (Bangladesh Bureau of Educational Information and Statistics, 2016)

1.5.1 General Education

a) Primary Education

The first level of education comprises 5 years of formal schooling (class / grades I - V). Education, at this stage, normally begins at 6+ years of age up to 11 years. Primary education is generally imparted in primary schools. Nevertheless, other types of institutions like kindergartens and junior sections attached to English medium schools are also imparting it.

b) Secondary Education

The second level of education comprises 7 (3+2+2) years of formal schooling. The first 3 years (grades VI-VIII) is referred to as junior secondary; the next 2 years (grades IX -X) is secondary while the last 2 years (grades XI - XII) is called higher secondary.

There is diversification of courses after three years of schooling in junior secondary level. Vocational and technical courses are offered in vocational and trade institutes/schools. Moreover, there are high schools where SSC (vocational) courses have been introduced. In secondary education, there are three streams of courses such as Humanities, Science and Business Education, which start at class IX, where the students are free to choose their course(s) of studies. High schools are managed either by government or private individuals or organizations. Most of the privately managed secondary schools provide co-education. However, there are many single sex institutions in secondary level education. The academic programmes terminate at the end of class X when students are to appear at the public examination called S.S.C. (Secondary School Certificate). The Boards of Intermediate and Secondary Educations (BISE) conduct the S.S.C. examination. There are seven such Boards at different places in Bangladesh namely: Dhaka, Rajshahi, Jashore, Comilla, Chattogram, Sylhet, and Barisal. The secondary education is designed to prepare the students to enter into the higher secondary stage. In higher secondary stage, the course is of two-year duration (XI - XII) which is being offered by Intermediate Colleges or by intermediate section of degree or masters colleges.

c) Tertiary Education

i) College

The third stage of education comprises2-6 years of formal schooling. The minimum requirement for admission to higher education is the higher secondary certificate (H.S.C). HSC holders are qualified to enroll in 3-year degree pass courses while for honors they may enroll in 4-year bachelor degree courses in degree level colleges or in the universities. After successful completion of a pass/honors/bachelors degree course, one can enroll in the master's degree course. Master's degree courses are of one year for bachelor degree holders and 2 years for pass degree holders. For those

aspiring to take up M.Phil and Ph.D. in selected disciplines or areas of specialization, the duration is of 2 years for M.Phil and 3-4 years for Ph.D after completion of master's degree. Higher education is being offered in the universities and post HSC level colleges and institutes of diversified studies in professional, technical, technological and other special types of education.

ii) University

There are 101 universities in Bangladesh, Out of these, 40 universities are in the public sector, while the other 52 are in the private sector. Out of 21 public sector universities, 19 universities provide regular classroom instruction facilities and service (University Grant Commission, 2018).Bangladesh Open University (BOU) conducts non-campus distance education programme especially in the field of teacher education and offers Bachelor of Education (B.Ed.) and Master of Education (M.Ed.) degrees. BOU conducts 18 formal courses and 19 non-formal courses. Bangladesh National University mainly functions as an affiliating university for degree and post-graduate degree level education at different colleges and institutions in different field of studies. But in case of fine arts this university also offers Pre-Degree BFA Course (which is equivalent to HSC). After successful completion of the specified courses, it conducts final examinations and awards degrees, diplomas and certificates to the successful candidates. The degrees are B.A., B.S.S., B.Sc., B.Com. (Pass & Honors), BFA(Pass), M.A., M.Sc., M.S.S, M.Com and MFA. Moreover, this university also offers LL.B., and other degrees. Bangladesh National University offers part-time training to university teachers. There is only one medical university namely, "Bangabandhu Sheikh Mujib Medical University", which, like other public universities, offers courses through a different system where FCPS Degree is offered in medical education; diploma courses are offered in 12 disciplines. MD degree in 15 subjects and MS courses on 8 subjects are also offered.

1.5.2 Madrasah Education

The old scheme of madrasah education was introduced in 1780 with the establishment of Calcutta Madrasah. In madrasah education, one can learn Islamic education along with the general education as complementary to each other in the system of education. The madrasah education system has been continuing with some modifications

according to the demand of the time, and many madrasahs grew up in this sub-continent. The government has been providing government grants to the teachers and employees of the non-government madrasahs like other non-government education institutions (schools and colleges). There are five levels in the madrasah education system, namely:

a. Primary Level or Ebtedayee Education

This is equivalent to primary level of general education. The first level of madrasah education comprises5 years of schooling (grades I - V). Normally, the children of 6 years of age begin in class 1 and finish class V at the age of 11 years. Ebtedayee education is imparted in independent Ebtedayee madrasahs and Ebtedayee sections of dakhil, alim, fazil and kamil madrasahs. It is also imparted in some of the private quami - kharizi madrasahs.

b. Secondary level

The secondary level of madrasah education comprises 7 (5+2) years of formal schooling. It takes five years in dakhil stage (S.S.C. level) from grade VI - X while the last 2 years in alim (higher secondary) stage. Dakhil level education is imparted in dakhil madrasahs and in dakhil level of alim, fazil and kamil madrasahs. Alim is equivalent to higher secondary certificate education imparted in alim madrasahs and in alim level of fazil and kamil madrasahs. There is diversification of courses after three years of schooling in secondary level of education from grade IX of dakhil stage to grade XI of alim stage. There are streams of courses such as humanities, science and business education, where students are free to choose their courses of studies. Private individuals or private bodies manage all madrasahs of this level. Most of these madrasahs provide co-education. However, there are some single gender madrasahs in this level of madrasah education. There are two public examinations namely; dakhil and alim after the completion of 10 years of schooling and twelve years of education, respectively. The Bangladesh Madrasah Education Board (BMEB) provides these two certificates.

c. Tertiary level of Madrasah Education.

This level comprises 4 (2+2) years of formal education. The minimum requirement for admission to higher level of madrasah education is the alim (equivalent to HSC)

certificates. Alim pass students are qualified to enroll in 2-year fazil education. This level of education is imparted in fazil madrasah and in fazil level of kamil madrasahs. After successful completion of fazil degree one can enroll in 2 years of kamil level education. There are four streams of courses in kamil level education; streams are hadis, tafsir, fiqh and adab. Bangladesh Madrasah Education Board conducts these two fazil and kamil examinations and awards certificates. After successful completion of the specified courses one can appear at these examinations. Out of the total kamil madrasah the government manages only three madrasahs and others are managed by either individuals or by private bodies. However, there are few girls' madrasahs for girl students. The Bangladesh Madrasahs Education Board has the following functions as to madrasahs education: grants affiliations to different levels of madrasahs from ebtedayee to kamil; prescribes syllabi and curricula; conducts public examinations (dakhil to kamil) and scholarship examinations. Besides the public system of madrasah education there are a good number of private madrasahs for the Muslim students, namely: hafizia, qiratia, quami and nizamiah. Most of these madrasahs are residential. These types of madrasahs are sometimes called kharizi as these are beyond the purview of the general system of education. Recently, these quami madrasahs have been organized under the umbrella of a private board known as 'Befaqul Madaris or Quami Madrasah Board which constitutes curricula and syllabi of quami madrasahs, conducts examinations and awards certificates and degrees.

1.5.3 Technical - Vocational

For the students whose interest is not strictly academic may find technical-vocational programme more interesting and more valuable for their future. Government tries to ensure that the course curriculum should be relevant to students' interest and aspirations while at the same time it should address the needs of the job market.

a. Primary level

There is no technical-vocational institution in primary level of education Ebtedayee in the first level (Primary level) of madrasah education which has no scope for technical-vocational education. Accordingly, technical - vocational education in Bangladesh is designed in three phases under two major levels of secondary and tertiary level of education.

b. Secondary level

Vocational courses start from secondary level. The certificate courses prepare skilled workers in different vocations starting from ninth grade after completion of three years of schooling in secondary school. At this level the courses are diversified in different vocations spread over 1 to 2 years duration. Recently, 2 year duration vocational courses have been introduced at the higher secondary level in government managed vocational training institute (renamed as Technical School & College). Diploma courses prepare the diploma engineers at the polytechnic institutes. This course spreads over 4 year duration after the secondary school certification examination. There is a technical education board called Bangladesh Technical Education Board (BTEB), which grants affiliation to the technical institutes. It conducts examinations of the students completing different courses in different vocational and technical education, and awards certificates to the successful candidates.

1.5.4 Professional Education

The College of Textile Technology and College of Leather Technology offer four - year degree courses in Textile Engineering and Leather Technology respectively after completing Higher Secondary Education. The minimum requirement to be admitted to teachers training colleges (TTCs) for Bachelor of Education, Bachelor of Physical Education in Physical Education College is graduation degree. Generally, in-service teachers undertake this professional training course along with some unemployed graduates. Professional education is also imparted in Medical Colleges, Dental Colleges, Nursing College, Homeopathic Colleges, and Law Colleges etc.

1.6 Definitions of Key terms

Some key concepts which should be clear to understand the inner meaning of the research are given in below:

1.6.1 Nature

It’s about the philosophical and practical understanding of the processes and reasoning of science, including its nature as a very human endeavor. It’s about knowing that there is no one scientific method, but that there are many scientific methodologies and that what makes an idea scientific is the goal of maximum explanatory and predictive power

combined with exquisite feasibility. In this study nature means system or environment of teaching physics at secondary level in Bangladesh.

1.6.2 Teaching

It is important to understand that at least two things are essential for effective teaching. The first is knowledge of subject content and processes; the second is general pedagogical knowledge, which is to say an understanding of teaching. Knowledge of a subject is what you might get out of a degree in a particular discipline; pedagogical knowledge might come from teacher training in the form of postgraduate qualifications or an education degree. Here Teaching means the act, practice, occupation or profession of a teacher.

1.6.3 Physics

Physics means a compulsory subject for science students of class IX-X at secondary level in Bangladesh.

1.6.4 Secondary Level

Secondary education is any education that follows a primary education. High school is usually referred to as the secondary education. In this study secondary level will focus only the class IX—X though it covers from class VI—X in our curriculum.

1.6.5 Secondary School physics Teachers

The teachers who teach physics in Grades IX and X.

1.6.6 Practical work

Practical work includes the physics experiments or demonstrations. Selected for the science students to do or observe at laboratory sessions in Grades IX and X.

1.6.7 Demonstration method

A process of directly and practically presenting facts or concepts or theories in classroom. In this method, teachers use a variety of teaching aids and verbal statements.

1.6.8 Lecture method

Teachers present the lessons only through verbal statements.

1.6.9 Quality Education

Quality Education means competent teacher, appropriate teaching learning process, effective content, suitable learning environment and quality student.

1.7 Limitations of the Study

- The study is confined to a few selected schools in nine Upzilla under the district of Rajshahi.
- The study is limited to the class IX and X physics students.
- The study is concentrated on a selected number of problems such as difficulty and suitability level of the lessons, implementation of student's activities, execution of exercises, problems of context and teaching methods, attitude of teachers towards physics teaching and some personal and demographic variables of the teacher.
- In this study the researcher considers the government and non-government secondary schools only.
- The research will also study the attitudes, trends and the motivation of the secondary physics teachers as well as students.

Chapter Two
Literature Review

2.1 Introduction

The main purpose of the literature review is to identify the hiatus or gap in the field of the proposed research. The publications related to the proposed study are very few in number. This Chapter reviews related literatures to find out the gaps of the researches done by other researchers and scholars. Some reviews of literatures with their views and objectives have been mentioned below.

2.2 Review of the Relevant Research

Literature review contributed a complete framework for manufacturing the substantial element of the study as well as a standard for comparing the results with other findings. It contains three major parts

(1) Identifying the knowledge gap of the study

(2) Growing rational concept of framework as well as road map for the research work.

(3) For placing source of data, information, from the secondary source.

There is little literature available in Nature of physics teaching. In this study some of them have been recorded and analyzed from international as well as national perspective also.

Hussain, Shafqat & Ahmed, Sarfraz (2011)

In their study **"**The Effectiveness of Teaching Physics through Project Method on Academic Achievement of Students at Secondary Level -A Case Study" they examine the effect of teaching Physics through project method on academic achievement of secondary school students in the subject of Physics. In this study, an achievement test (pre-test/post-test) covering eight chapters were used as measuring instrument. Depending upon pre academic achievement test scores, eighty (80) science students of 10th class were divided into two equal groups named as experimental group and control group. The experimental group was taught through project method and the

control group was taught by traditional lecture method. Both the groups were taught for a period of six weeks (40 minutes period per day). The Post test was administered at the end of treatments. The marks obtained in Pretest and Post-test of both groups served as data of this study. The analysis of data revealed that on the whole, experimental group showed better performance than controlled group. Furthermore the experimental group performed significantly better than control group in learning domain (knowledge, comprehension, and application and skill developments). The results of this study indicated that teaching Physics through Project method was more effective than that through traditional lecture method at secondary level.

Qadeer, Abdul Soomro, Nasim, Muhammad Qaisrani & Ahmed, Manzoor Uqaili (2011)

In their study "Measuring Students' Attitudes towards Learning Physics: Experimental Research" they use 5Es (Engagement, Exploration, Explanation, Elaboration and Evaluation) Learning Cycle Model facilitating students learning in Science. The present study aimed to measure students' ability in the use of Scientific Process Skills through 5Es Learning Cycle Model and Traditional Teaching Method of teaching Physics. The study was experimental in nature. The Pretest- Post tests only group design was used. The sample of the research consisted of 40 tenth graders among which experimental and control groups were made randomly. The Experimental Group was taught by 5Es Learning Cycle Model while the Traditional Teaching Method was introduced in the Control Group. The result showed that the students in the experimental group made more progress to change their attitude in learning physics than the control groups. It is recommended that the teacher may incorporate 5Es learning cycle model in teaching physics at Secondary level and physics teachers may interweave existing content of Physics with 5Es model.

Zheng Zhu & David Geelan (2013)

The study, "Chinese Secondary Physics Teachers' Beliefs and Instructional Decisions in Relation to Inquiry-based Teaching" reports case studies of five Chinese secondary physics teachers "beliefs and instructional decisions in relation to inquiry-based teaching (IBT). It is part of a larger study intended to explore Chinese secondary physics teachers' beliefs and the ways in which their beliefs influence their classroom

practices in the context of the current Chinese science curricular reforms around inquiry-based teaching. Here curriculum is the main issue for teaching physics. The study employed in-depth semi-structured interviews, classroom observations, informal conversations and field notes to explore teachers' beliefs and instructional practices. A range of beliefs, the five teachers held about the nature of science and physics teaching and learning and inquiry-based teaching exerted a complex set of influences on teachers‟ instructional decisions. Their perceptions of "what counts" as effective teaching seemed to be the predominant influence. They were pressed for time and were under high pressure to prepare students for the College Entrance Examination. The researcher pointed out the curriculum but not focuses the nature of teaching physics.

Vilaython Thongloon (2011)

In his thesis "The Role of Practical Work in Physics Education in Lao PDR" is to get a better understanding of the role of practical work in physics education in the Lao People's Democratic Republic (Lao PDR). The Lao PDR is one of the least developed countries in the world with a weak base for science, and poor market opportunities for science graduates. A combination of qualitative and quantitative methods was used in the study in order to assure reliability of the results. Data were collected through questionnaires, interviews, video-recordings, and my own ethnographic experiences of working in the Lao educational system for more than thirty years. The study was informed and results were analyzed with help of curriculum perspective and Cultural-Historical Activity Theory (CHAT). The findings show that Lao physics education curriculum at all levels is dominated by very traditional forms of teaching with an almost total absence of practical work. However, few institutions have functioning equipment and skilled teachers for organizing practical activities. Therefore, the majority of Lao students come to university and even can finish university without experience of practical work in physics. This shows the gap that exists between intended and implemented curricula. Based on the research results, it is possible to suggest that a systemic approach is needed to stimulate the development of a new practical work culture in schools and universities.

Mallari, Voltaire Mistades (2007)

Nations that have set global economic standards have invested, and continue to invest, a substantial portion of their human and financial resources into science and technology, including education and training, research and development, technology acquisition and adaptation, and the development of physical infrastructures to support science and technology. The experience of industrialized nations has shown that a critical mass of scientists, researchers, engineers, and technicians will propel a country towards the next stage of modernization. By nurturing a "culture of science", this socio-economic breakthrough could be achieved with a citizenry equipped with the knowledge, skills, values, and attitudes made keener by quality education in science and technology. Here describes the attitudes towards Physics and learning Physics of secondary school teachers who underwent a six-week in-service training program at the De La Salle University – Manila during the months of April and May, 2007. The training program was designed to upgrade their conceptual understanding of Physics and their skills and competencies in teaching Physics. Using the data obtained from the Colorado Learning Attitudes about Science Survey (CLASS), this study presents a profile of the attitudes and beliefs held by the secondary school teachers but not the situation teaching and learning Physics.

Taiwo Oludare Ogunmade (2005)

This study described the quality of secondary science teaching and learning in Lagos State, Nigeria. Quantitative and qualitative methods were used for gathering research data. Quantitative data were obtained from the surveys of 78 junior secondary science teachers and 500 junior secondary students from three Local Education Districts of Lagos State. Qualitative data on the other hand, were gathered from analysis of national and state curriculum documents and from focus groups of science teachers, school principals, parent association representatives, education officers, teacher educators, representatives of the professional association for science teachers and representatives of examination bodies in Lagos State, Nigeria. Other key stakeholders including scientists in a government establishment and those working in industry were also interviewed. Quantitative data were coded and analyzed using the SPSS 13.0

statistical package to produce descriptive statistics. Triangulation of data from various sources was used to reveal pictures of actual science teaching and learning and an ideal science for junior secondary schools in Lagos State, Nigeria. Findings from this study indicate a gap between actual science teaching and learning and an ideal school science with regards to curriculum, pedagogy and learning, class sizes and resource allocation, teacher knowledge and skills, attitude and professional development, and community support. Condition of physics teaching is absence of this thesis.

Omiola, M. A. (2012)

The purpose of this study was to find out the effect of developed video instructional package on the performance of Senior Secondary School students in Physics in Florin Metropolis. The study also investigated the influence of gender and ability levels on the performance of students taught with developed video instructional package. The quasi-experimental design, which involved the pre-test, post-test, non-randomized, non-equivalent control group design, was employed for the study. Research sample was drawn from two randomly selected secondary schools. One fresh class each from the sampled schools was also randomly selected for the study. Students from the sampled class were further stratified along gender and ability levels. The instruments used for collecting data were Physics Performance Test (PPT) and developed video instructional package as a treatment. Physics performance test was pilot tested for reliability using the test-retest method of three weeks interval and Pearson Product Correlation analysis revealed a reliability coefficient value of 0.76. It was revealed that the gender of student was not a factor in the performance of students when they were taught using developed video instructional package.

Olufunminiyi, Akinyemi Akinbobola & Afolabi, Folashade (2010)

This study analyzes the science process skills in West African senior secondary school certificate physics practical examinations in Nigeria for a period of 10 years (1998-2007). Ex-post facto design was adopted for the study. The 5 prominent science process skills identified from the study are: manipulating (17%), calculating (14%), recording (14%), observing (12%) and communicating (11%). The results also show high percentage rate of basic (lower order) science process skills (63%) as compared

to the integrated (higher order) science process skills (37%). It is recommended that the examination bodies in Nigeria should include more integrated science process skills into the senior secondary school physics practical examinations to enable the students to be prone to creativity, problem solving, reflective thinking, originality and invention which are vital ingredients for science and technological development of any nation. There have no description about teaching and learning physics at secondary level.

Shaila, Mst. Banu (2011)

This qualitative study focused on four secondary school physics teachers in Bangladesh using semi-structured interviews and observations to explore their understanding about the relationship between practical work and developing students "conceptual knowledge of physics". Recent studies indicate that practical work helps secondary science students learn the concepts and theories of physics easily and effectively. However, the secondary school physics teachers in Bangladesh in this study did not provide students with practical work during classroom teaching. Rather, they provided practical work in separate practical classes. Although the teachers believed that practical work made their teaching and also students" learning easier and effective, they did not offer frequent practical demonstrations in teaching the contents of physics. The major findings of the study include that teachers used mostly Tran's missive pedagogy to assist students to understand physics concepts and theories. Even though there are clear and specific instructions for the teachers to do demonstrations in the secondary physics curriculum, there were constraints on teachers and on students trying to conduct practical work. Constraints included a lack of sufficient equipment. Teachers and students in non-government schools faced comparatively more difficulties than those in government schools. This study implies a need to provide government and non-government schools with necessary equipment for doing practical work; to appoint sufficient teachers with higher studies and training that includes practical work in physics; to create positions for laboratory assistants; to set up classrooms with a smaller number of students; and to develop awareness of the value of practical work in school administration and physics teachers there not discuss about classroom environment.

Redish, Edward F (1999)

Individual teachers of college level physics sometimes develop deep insights into how their students learn and what elements of classroom instruction are valuable in facilitating the learning process. Yet these insights rarely persist beyond the individual instructor. Educational methods seem to cycle from one fad to another, rarely cumulating increasingly powerful knowledge in the way scientists expect understanding to grow. In this paper Researcher explore the character of our understanding of the physical world and of teaching about it. The critical factor is using “the culture of science” the set of processes that allow us to build knowledge based community consensus knowledge base. In the thesis there have no issue about classroom condition of teaching physics.

Volkmann, Mark J. (2005)

The purpose of this study was to understand how the professor, teaching assistant, and students experienced inquiry-based science instruction in an undergraduate physics course designed for elementary education majors. During the teaching of a 6-week electricity unit, the professor faced several challenges: knowing when and how to tell the scientifically accurate answer, deciding when and how to introduce scientific terminology, and doing inquiry vs. testing. The professor and the teaching assistant also experienced some tension. Their orientations to science teaching differed in terms of their science learning goals, beliefs about teaching and learning, and beliefs about assessment. The students experienced frustration with the inquiry approach related to their views of learning, their need as learners to get the right answer, and the disconnection they felt between the inquiry approach and the assessment used in the course. During the course they were also building their views of inquiry and their visions of themselves as future teachers. Researcher analyzes the conflicts experienced by professors, teaching assistant and students in terms of three orientations to science teaching: didactic, discovery, and guided inquiry. Finally, researchers discuss implications for building a guided inquiry orientation in science content courses for future teachers.

Monther Bsharh Alswelmyeen, Abeer Rashed Al olimmat (2013)

This study aims to determine the level of the understanding of the nature of Science for physics Teachers and its relation with experience and Academic qualifications. The application of test was applied on a sample chosen randomly from (52) physics teachers in Jordan.

The study results revealed a low level of understanding of the nature of science in physics teachers and the lack of significant differences in understanding the level of the nature of science as a whole due to the variable of teaching experience, and also found statistically significant differences in the assumptions of science and for the longest teaching experience. The study also showed statistically significant differences in determining the level of understanding of the nature of science, due to the academic qualification and in favor of a higher qualification. The study recommended the need for the inclusion of issues and attitudes, appropriate educational programs in pre-service teacher preparation, and holding training sessions for them during their service, in order to enable them to understand the nature of science, and finally emphasis on the role of educational supervision in this area.

Yandila, Cephas David. Patience, Magdeline Nkumba & Kazoozu Mokaruvapa (2009)

The study suggests the reduction of physics topics and objectives in each of the three physics syllabi. The two-year duration of the programme should be increased to three years to ensure that the content is covered adequately. The students should be placed into Pure, Double and Single Science on the basis of their performance in Form 3 examinations. Most physics teachers considered it realistic to expect students to acquire the four process skills of: (i) using and organizing techniques, apparatus and materials, (ii) observing, measuring and recording, (iii) handling experimental observations and data and (iv) planning investigations in two years. The commonly employed teaching methods included class discussion, group discussion and class presentation, practical work (individual/group), questioning (question/answer), assignment (class and home work), and worksheet-guidelines for performing experiments. Some physics teachers favored the assessment system in which students' final course grade is based on the ratio of 20% continuous assessment to 80% final examinations. Though most physics teachers are computer literate, their departments

are not adequately equipped with functional computers for use in word processing and record keeping. Most physics teachers were of the opinion that it was possible for students to do projects in two years. Most physics teachers said that their physics laboratories were inadequately equipped with facilities to enable students to carry out individual practical work. They lacked trained technicians to assist teachers in setting up and running practical sessions but not discus about nature of teaching physics.

Khajornsak, Buaraphan (2003)

In the framework of teaching the natural sciences, "laboratory" is a general name for activities based on observations, tests, and experiments done by students. It is hard to imagine learning to do science, or learning about science, without doing laboratory or fieldwork. In this paper, a historical overview of the place, purposes, and goals of the laboratory in physics teaching is presented, together with perspectives for its future related to the most recent results of research in physics education, mainly those concerning the constructivist and social constructivist learning approaches. Based on these approaches Researcher try to validate the belief that microcomputer-based laboratories (MBLs) areone of the most promising perspectives in physics laboratory teaching, based on both theoretical and empirical grounds but not in teaching and learning of physics subject.

Lavonen, Jari. Jauhiainen, Johanna. Koponen, Ismo T. & Kaarle Kurki-Suonio (2004)

The basis of this paper concerns an one-and-a-half year in-service training program (In-service Training for Physics Teachers; 40 ECTS credits) for physics teachers (Grades 7–12, n = 98) designed to enhance both their subject knowledge and pedagogical content knowledge. The role of laboratory experiments in physics education in particular was discussed during lectures, seminars, and through an e-mail list. This discussion centered on the epistemic role of experiments in the teaching of physics. Working in permanent small groups was also central to the training program. Following the active phase of the project, a survey was organized to clarify the teachers' beliefs about the role of experiments. The teachers' descriptions showed that approximately 20% had improved their use of experiments in conjunction with the goals of the In-service Training for Physics Teachers program but not in teaching physics.

Kabir (2011)

Showed that the enrolment of science stream students both at the secondary school certificate (SSC) and higher secondary certificate (HSC) level is remarkably decreasing. On the contrary, business studies stream students are notably increasing at both the above levels. Humanities students show no noticeable change at the SSC level; rather Researcher detects a noticeable decrease at the HSC level. The success rates in recent years are increasing remarkably both in the SSC and HSC examinations. Girls' participation in the entire three streams is noticeably increasing day by day, but girls' success rates are lagging compared to their boys counterpart during the years from 2001 to 2008 both in the SSC and HSC exams. According to the evaluation of the headmasters regarding the 30 competencies of the science teachers performing their duties and professionalism as provided, science teachers perform fifteen competencies sometimes, five perform often, five perform sometimes and often and the rest five perform sometimes and rare. The teachers seem to be heterogeneous in regard to performing the 30 competencies. Students' entrance to secondary education with weak primary education is the main reason that discourages the students to study science remarked by most of the headmasters. Moreover, lack of laboratory facilities and modern science equipment's, unconsciousness of the guardians, absence of extra benefit for the science students in the job market etc. are also the reasons for the declining of the enrolment in science stream. Science teachers were evaluated through the structured as well as open-ended questionnaires. Reliability coefficient of career advancement program is found to be 0.63 which is positive and substantial and indicates that the science teachers had advantages of different professional advanced programs like Radio/TV programs concerning science, association with debate and discussion on science topics and science hobby clubs, editing science magazines etc. Reliability coefficient of the school environment is found to be 0.80 which is positive and high and shows that the school environment is substantially related to the excellence in science education. Reliability coefficient of interest in professional and competency of science teachers is found to be 0.56 which is positive and moderate and confirms that science teachers' interest in their profession has a direct relationship to the competency of science teachers. Majority of the students responded that deciding the group in class IX is influenced by the school teachers.

Feroz (2011)

In his research he was attempting to study the challenges and prospects of Geography teaching at the secondary level of education in Bangladesh and to suggest some ways out. Through the study was based on the status and challenges of Geography teaching in Bangladesh, in the course of the study the researcher has tried to identify needs for teaching Geography in schools as well as needs for Geography teachers for professional development. This study employed questionnaires survey, face-to-face interview, document analysis and observations to collect data. Sample size was 240 (Students: 200, Geography teachers: 20, Head teachers: 20). Random sampling procedure was used to select the respondents from students of class IX-X. All the Geography teachers, head teachers were selected from each study schools. The study showed that secondary school geography teachers in Bangladesh faces many challenges i.e. did not have separate post for geography teachers, separate geography class room (Since the subject have practical classes so they need separate classroom), available teaching aids, teachers with geography background, poor curriculum and teaching materials, lack of subject based training and position of subject at daily class routine.

Humayun (2010)

The research work “Problem of Basic Education of the Disadvantaged children in the Urban Areas of Bangladesh: A study on Rajshahi City” is an explorative research work that is based on the information collected from the underprivileged children in Rajshahi city. The sample technique of the research is stratified random sampling and in it 3 types (ongoing students and their guardians, dropout students and their guardians and students’ institutions) of respondents have been selected purposively. The researcher has to undertake six more specific objectives to acquire the target. Identification of disadvantaged children has been noted. This research has been conducted over the children who are deprived of economic facilities. They go to school during their work time. Disadvantaged children are the most vulnerable group of people among the population. After exploring and analyzing data from different sources, the researcher has found three types of disadvantaged children (Street children, Domestic child workers, children in hazardous work) in this study area. Socio-Economic condition of disadvantaged children is demonstrated. Educational

institution for disadvantage children has been taken into regard these two programs are playing a very effective role in eradicating illiteracy and achieving MDG. According to the characteristics both the systems are non-formal education institutions. A number of Government and Non-government organizations are working for the welfare of the disadvantaged children in Rajshahi as well as Bangladesh, particularly the organization and institutions like Baby Home Shishu Home, Shishu Paribar, Shishu Sadan etc. The researcher has found that economic, social, personal problems, illiteracy of guardians are the main obstacles for disadvantaged children in having basic education. Collective efforts of parents, teachers, policy makers of the society and the government can stop the problem as found in the overall study. The researcher brings out some suggestions and recommendations with the problems identified but it is not related in science education or physics teaching at secondary level in Bangladesh.

The researcher has found that none has done a comprehensive research on the proposed study.

Chapter Three
Research Methodology

3.1 Methods of Research

The nature of study has been found as the exploratory considering its functional output. It is also descriptive in its literature reviewing strategies. Researcher has always tried to explore the problems and its time befitting solutions. So, it is a qualitative study. For this qualitative study data are collected from qualitative and quantitative approaches.

For getting accurate data survey method has been adopted in this study.

Table 3.1: Research co-ordination matrixes

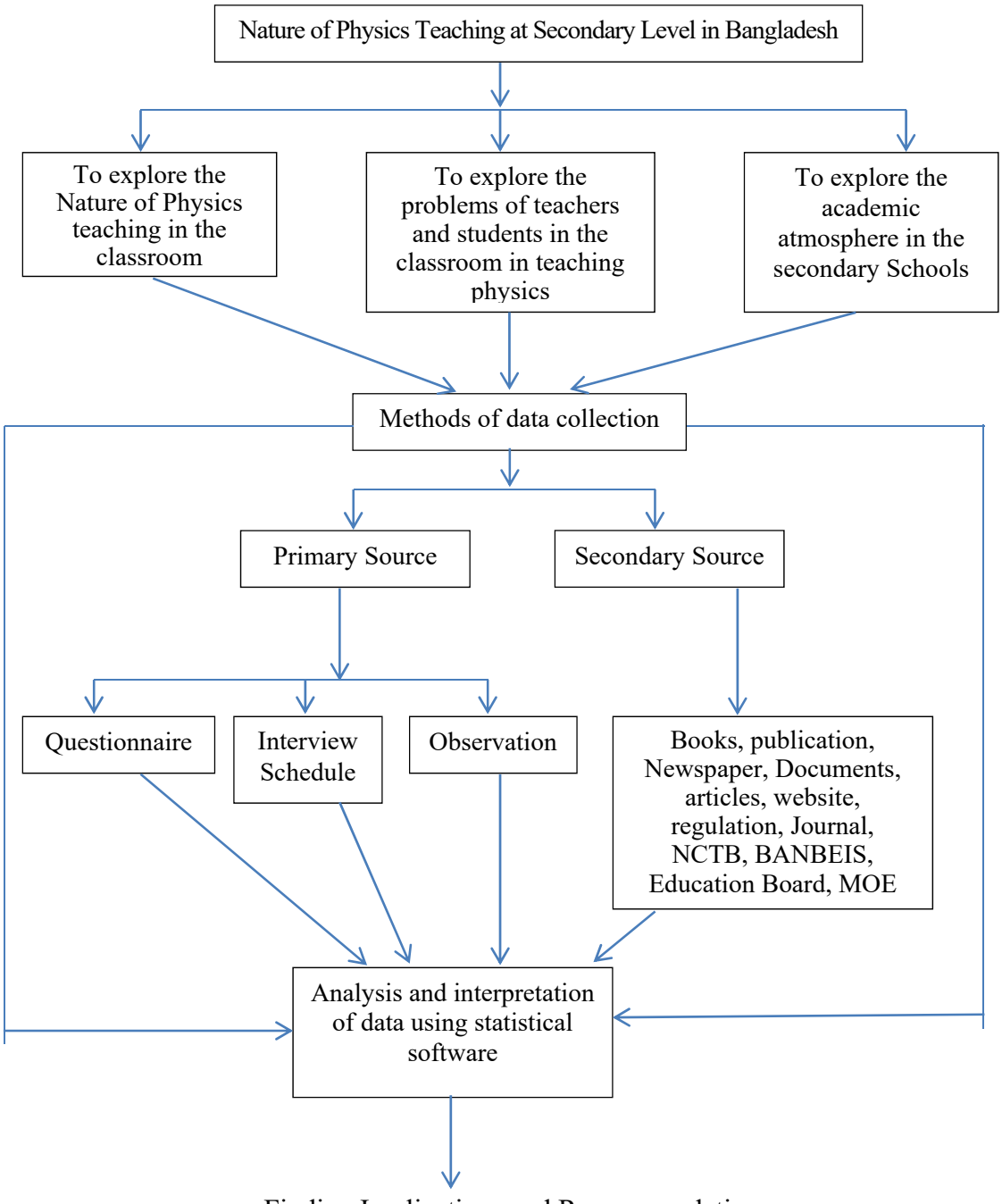
Research Objective	Types of data	Tools of data	Source of data	Methods of data collection	Indicated person
To explore the nature of physics teaching in the class room	Quantitative	Observation	Primary source	Observation with observation check list Appendix IV	Classroom
To explore the problems of physics teachers at secondary level	Quantitative	Interview and questionnaire	Primary source	Questionnaire with Appendix II	Physics teachers
To explore the problems of students in the classroom in teaching physics at the secondary level	Quantitative	Interview and questionnaire	Primary source	Questionnaire with Appendix III	Students
To explore the academic atmosphere in the secondary schools	Quantitative	Interview and questionnaire	Primary source	Questionnaire with Appendix I	Head teachers

3.1.1 Conceptual Frame work

Conceptual framework puts focus on the study in which the researcher‘s personal observations are transformed into a systematic inquiry by reviewing the work of other scholars on the topic and thereby building a theoretical rationale and framework to guide the study. Therefore, it focuses on clear designs of study; decisions about where to go, what to look for, and how to move to real world and these observations become

more specific. For this reason, the conceptual framework of study, system of concepts, assumptions, expectations, beliefs and theories that support and inform research is a key part of design.

3.1.2 Frame Work of the Research



3.2 Sources of data

The required data of the study have been collected from the primary, internal and secondary sources.

3.2.1 Primary source

Primary data have been collected from 81 secondary schools through (open and close ended) questionnaires and interviews of the respondents who are Head teachers physics teachers and students of class IX-X.

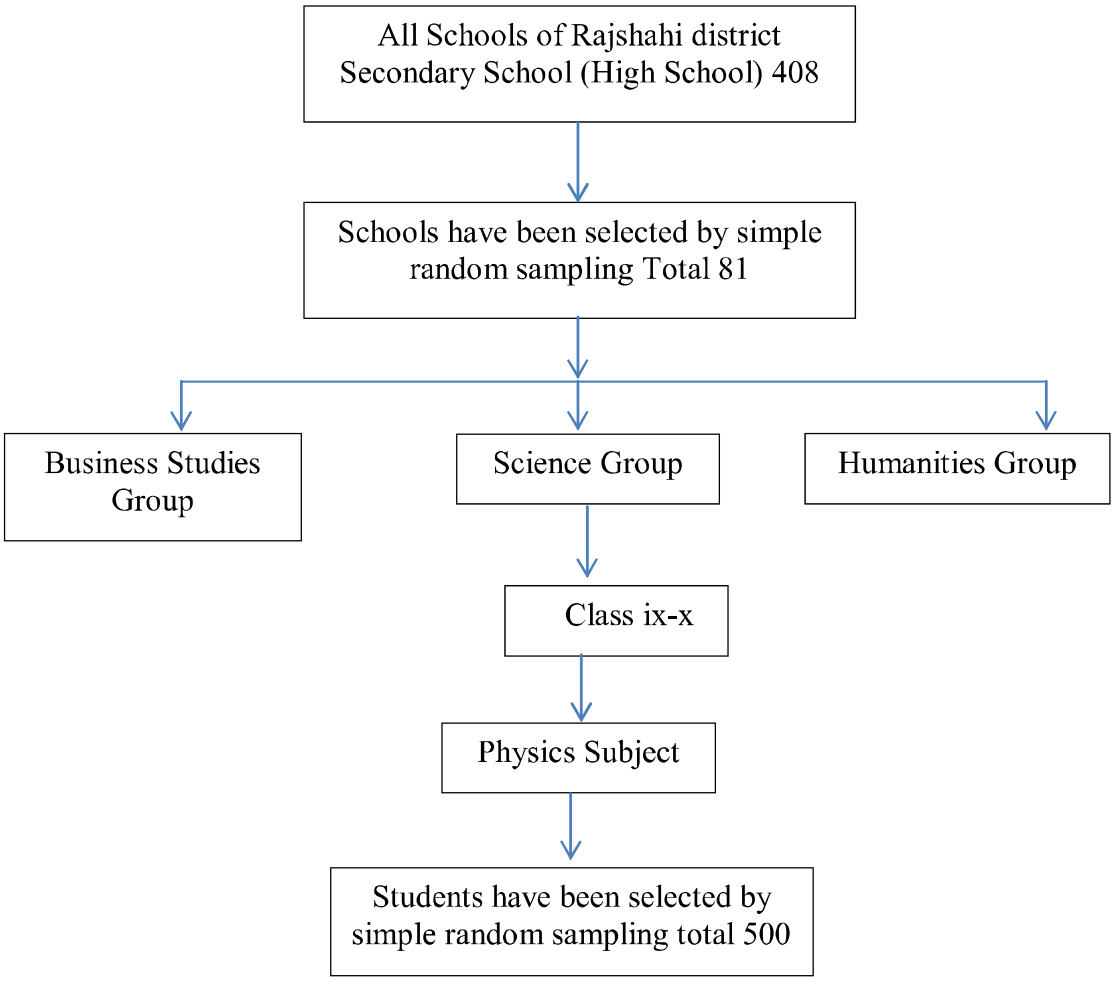
3.2.2 Secondary source

The secondary data and information have been collected from relevant government publications including Acts, Ordinances and Programs and from various official Documents. Moreover, the relevant Books, Journals, Articles, Reports, Publications, Literature, Newspapers and Dissertations etc. available in the IER library, as well as the central library of Rajshahi University and IER library of Dhaka University also have been used as secondary sources.

3.3 Area and sampling Technique

The subject of the study includes all the students of class IX-X Head teachers and physics teachers of secondary level in Bangladesh. In Bangladesh there are a number of schools in every district and the condition of teaching and learning physics is approximately the same all over in our country. But the sample was selected only from one district, Rajshahi. It was not possible for the researcher to take sample from all over the country due to limited time and budget. The district of Rajshahi has been selected as the study area of the research. Rajshahi is called an education city and there is a good number of Secondary Educational Institutions in Rajshahi compared to other districts of Bangladesh. Besides, Rajshahi is easily accessible and well-communicable by bus and other vehicles. So, it may be hoped that data collection would be suitable and adequate data may be found here for this study.

Study area and sampling Techniques given bellow:



3.3.1 List of Institution of Rajshahi District

Table 3.2: Statistics of Institution of Rajshahi District

Serial No	Upazila	Institution				
		High School	Junior School	School and College	Madrasa	College
1	Bagha	39	6	2	10	9
2	Bagmara	66	26	3	52	20
3	Boalia	44	3	6	7	21
4	Charghat	46	13	0	11	12
5	Durgapur	29	13	1	19	9
6	Godagary	56	2	4	29	8
7	Mohonpur	32	12	0	21	15
8	Paba	33	17	3	23	13
9	Puthia	20	25	1	16	12
10	Tanore	43	14	3	28	14
		408	131	23	216	133

Source: District Education Office, Rajshahi

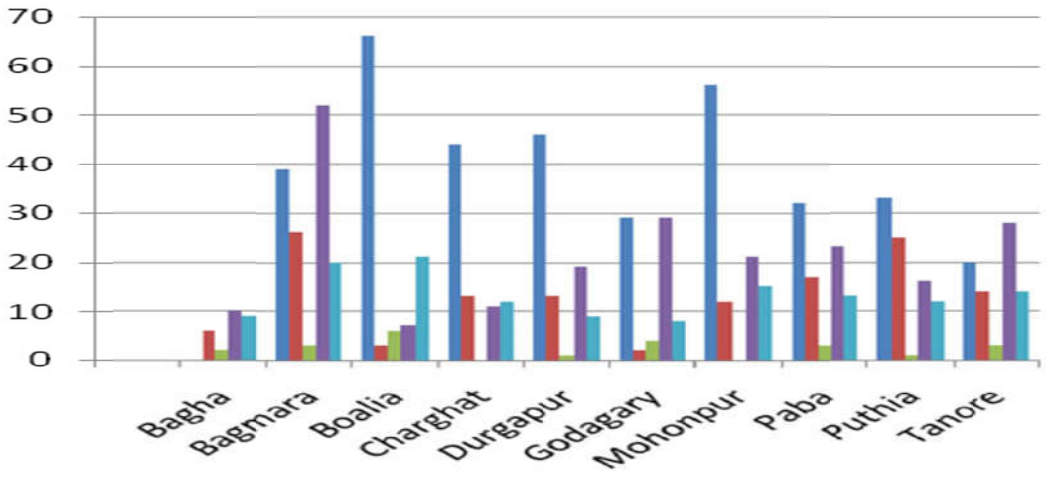


Figure 3.1: Statistics of Institution of Rajshahi District

3.3.2 List of the Visited Schools from each Upazila

Table 3.3: List of the Visited Schools from each Upazila

Name of Upazila	Total school	Selected school
Boalia	44	11
Bagha	39	7
Bagmara	66	12
Charghat	46	9
Durgapur	29	6
Godagari	56	9
Mohonpur	32	6
Paba	33	7
Puthia	20	5
Tanore	43	9

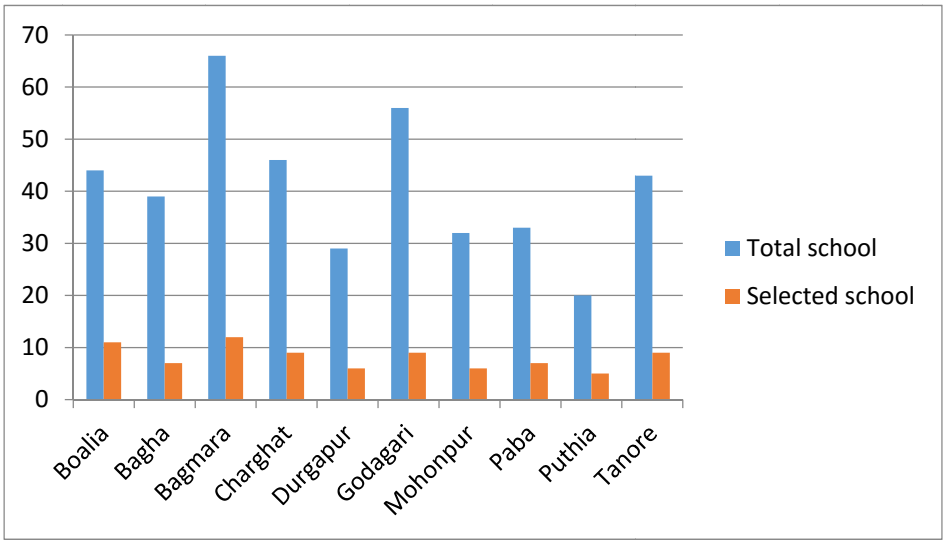


Figure 3.2: List of the Visited Schools from each Upazila

3.3.3 List of the Visited Schools

Table 3.4: List of the Visited Schools

Name and address of the schools	No. of Respondents			Location of the school
	No. of Head teacher	No. of Physics teacher	No. of students of class ix-x	
Boalia				
1. Rajshahi Collegiate School	1	1	10	Metropolitan
2. Gov. Girl's High School	1	1	15	Metropolitan
3. Gov. Labratory High school	1	1	15	Metropolitan
4. Gov. P.N Girl's High School	1	1	11	Metropolitan
5. Mirzapur High School	1	1	3	Metropolitan
6. Hamidpur Naodapara High School	1	2	7	Metropolitan
7. Shahid Nazmul Haque Girls High School	1	1	8	Metropolitan
8. Naodapara Girls High School	1	1	6	Metropolitan
9. Rajshahi University School	1	1	10	Metropolitan
10. Housing Estate Girls High School	1	1	4	Metropolitan
11. B.C.S I.R Laboratory High School	1	1	5	Metropolitan
Bagha				
12. Rahamatull Girls School	1	1	5	Upazila Sadar
13. Keshabpur High school and College	1	1	7	Village
14. Kishorpur High school	1	2	4	Village
15. Islami academy High school and college	1	1	5	Upazila Sadar
16. Alaipur High School	1	1	8	Village
17. Bagha high school	1	2	5	Upazila Sadar
18. Monigram High school	1	2	10	Village
Bagmara				
19. Damnash Perdamnash High chool	1	1	7	Village
20. Maria High School	1	1	5	Village
21. Taherpur Riverview Girls High school	1	1	3	Municipality
22. Taherpur High school	1	1	8	Municipality
23. Gobindopara High school	1	1	6	Village
24. Bhawanigonj Govt. High school	1	1	7	Municipality
25. Bhawanigonj Govt. Girls High school	1	1	7	Municipality
26. Machmail Girls high school	1	1	6	Village
27. Machmail Bhomokhi high school	1	1	6	Village
28. Dakhin Jamalpur High school	1	1	5	Village
29. Sankerpur Adorsha High school	1	2	5	Village
30. Achinghat girls high school	1	1	5	Village
Charghat				
31. Sardah Govt. Pilot High school	1	1	10	Upazila Sadar
32. Mumgli Anupompur Adarsha High school.	1	1	4	Village
33.Bonkishore High school	1	1	5	Village
34. Khordo Gobidopur High school	1	1	2	Village
35. Holidagachi Dimukhi High school	1	1	5	Upazila Sadar
36. Moktarpur High school	1	1	6	Village
37.Uttar Moratpur High school	1	2	5	Upazila Sadar
38. Meramatpur Ershad Ali High school	1	2	4	Upazila Sadar
39. Charghat Pilot High school	1	1	6	Upazila Sadar

Durgapur				
40.Tebela High school	1	1	7	Village
41.Durgapur Girls High school	1	1	7	Upazila Sadar
42. Dharmpur High school	1	1	3	Upazila Sadar
43. Durgapur Pilot High school	1	1	3	Upazila Sadar
44. Maria High school	1	1	5	Village
45. Pana Nawar Dimukhi High school	1	1	8	Village
Godagari				
46. Aloktala High school	1	1	7	Village
47. Horin Biska High school	1	1	6	Village
48. Laskar Hati High school	1	1	4	Village
49. Rajabari Hat High school	1	1	6	Upazila Sadar
50. Bhatopara Girls High school.	1	1	7	Village
51. Mohishal Bari Al Isla Islami Academy	1	1	6	Village
52. Basudevpur High school	1	1	7	Village
53. Sheikherpara High school	1	1	5	Village
54. Sonadighi High school	1	1	5	Village
Mohanpur				
55. Mohanpur Govt. High school	1	1	9	Upazila Sadar
56. Jahanabad High school	1	1	9	Village
57. Karisha High school	1	2	8	Village
58. Dhopaghata A.K High school	1	1	8	Village
59. Basanta Keder High school	1	1	5	Village
60. Dhuroil High school	1	1	5	Village
Paba				
61. Kapasia High school	1	1	5	Municipality
62. Bagdhani High school	1	2	5	Upazila Sadar
63. Bil Nepalparachashi Rahim Box Academy	1	2	5	Village
64. M.R.K. High school	1	1	5	Village
65. Rajshahi chinikal High school	1	1	6	Village
66. Baya High school and College	1	1	5	Upazila Sadar
67. Shympur High school	1	1	1	Upazila Sadar
Puthia				
68. Jamira High school	1	1	10	Village
69. Biraldahsyed Karom Ali Shah High school	1	2	5	Village
70. Jhalmalia High school	1	1	5	Upazila Sadar
71.Shahid Nader Ali Girls school	1	1	5	Village
72. Biraldah Girls High school	1	1	5	Village
Tanore				
73. Lalpur High school	1	1	7	Village
74.Mirzapur High school	1	1	7	Village
75. Kaligonjhat High school	1	1	6	Village
76. Dr. Abubaker High school	1	1	6	Village
77. Akcha High school	1	1	6	Village
78. Talanda GirlsHigh school	1	1	5	Upazila Sadar
79. Hatishal High school	1	1	5	Village
80. Chapra High school	1	1	5	Upazila Sadar
81. Tanore Paurashova High school	1	1	5	Upazila Sadar
Total	**81**	**93**	**500**	**674**

3.4 Population

All the government and non-government secondary school Head teacher's students of class IX-X and teachers who were engaged in teaching and learning physics at class IX-X of Rajshahi district are the population for this study.

3.5 Sample Size

The table below shows the sample size of the study.

Table 3.5: Sample Size of the Study

Location of school	Institute	No of head teacher	No of physics teacher	No of student of class IX-X	Total
Boalia	11	11	12	94	117
Bagha	7	7	10	44	61
Bagmara	12	12	13	70	95
Charghat	9	9	11	47	67
Durgapur	6	6	6	33	45
Godagari	9	9	9	53	71
Mohonpur	6	6	7	44	57
Paba	7	7	9	32	48
Puthia	5	5	6	30	41
Tanore	9	9	10	53	72
Total	81	81	93	500	674

In the above table, the clear picture of 3 categories of respondents has been depicted. The total number of respondents from the 3 categories is 674.

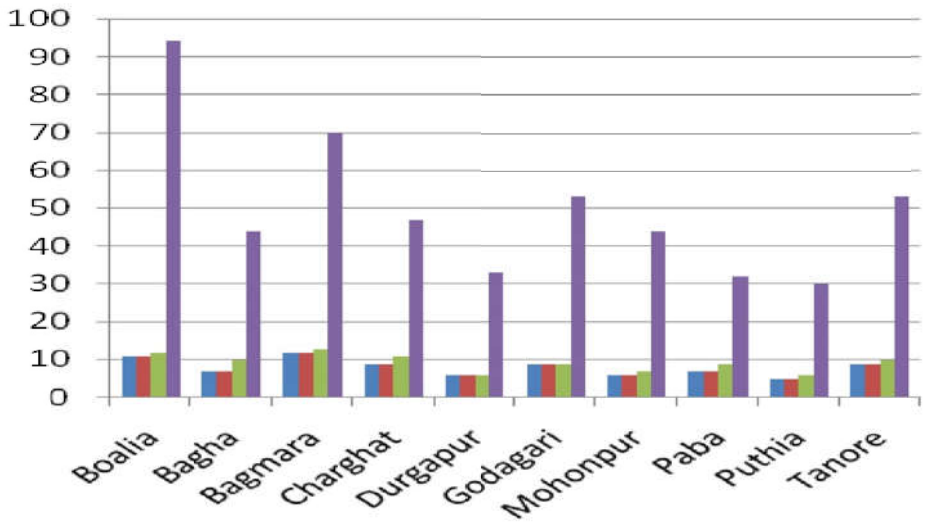


Figure 3.3: Sample Size of the Study

3.6 Research Tools or Instrument

Two types of instrument approach were adopted for gathering data. The following were the instruments:

i) Questionnaire (Head teacher's, Physics teachers' and students of class IX-X)

ii) Classroom Observation Checklist

Both type of questionnaire are self-developed questionnaire.

Questionnaire for Students

The questionnaire for students contains 71 questions in total. To conduct the questionnaire survey the researcher took prior permission from the Head teacher of the respective school. The physics teachers concerned were also contacted earlier. Physics teacher just introduced the researcher with the students in the class and highlighted the objective of his presence in the class. However, with a prepared check list and other materials for taking notes, the researcher seated himself in the back of the class silently so that the students might not sense his presence there. After the class being over and in absence of physics teacher, he distributed questionnaires among the students asking them to answer to the questions of the questionnaires. In case of failure of their understanding any question he made it clear even using Bangla.

Questionnaire for Teacher

To conduct the interview with the physics teachers the researcher prepared a separate question consisting of 59 statements related to teaching and learning physics at secondary level, teachers' performance, their qualification and training, result, syllabus curriculum, administrative factors, etc. The questionnaire for interviewing the physics teachers has some parts. Part-one includes the name and address of the institution, name of the physics teacher, educational qualification and training, date and cell phone no. Part two consists of 59 statements asking for replies from the physics teachers. The researcher got the questionnaires back from each of the teachers on different days. However after getting back the questionnaires from the teacher's researcher has assessed it and put the results in the form of table and chart in this thesis paper.

Head Teacher's Interview

During interview with the Head Teachers (HTs), researcher noted down the comments of the HTs. Conducting Interview was quite a difficult task as he had to pay repeated visits to the concerned institutions. It is true that the Head teacher of a school is a responsible person. To conduct the interview with the Head teachers, the researcher prepared a separate question related to teaching and learning physics at secondary level teachers' performance, their qualification and training, result, syllabus curriculum, administrative factors etc. The questionnaire for interviewing the Head teachers has some parts. Part one includes the name and address of the institution, name of the Head teacher, educational qualification and training, date and cell phone no.

Classroom Observation

To find out the practical happenings and activities in the classroom the researcher adopted non-controlled non-participant observation method. The researcher selected this method so that he could observe the teacher-student interaction, teachers' method of teaching, students' participation in the class and their interaction with the class teacher, using the important skills in teaching and learning physics. Before going to observe classroom activities the researcher prepared a checklist which has two parts- part one is for common information such as name of the institutes, name of the teacher, number of total students, number of present students, topic and class time. During classroom observation the researcher has observed and noted down physical facilities in the classroom such as table, bench, electricity, audio-video facilities, classroom size, cleanliness etc. However, to observe the classrooms of the study schools the researcher took prior permission from the head teachers of the schools. He was also confirmed about the physics classes and about the presence of the physics teachers earlier. Accordingly, on the day of appointment and in time the researcher went to the respective school and seated himself in the back bench silently so that the teachers and students might not sense his presence in the classroom and they might not be influenced by him.

3.7 Data Analysis Technique

After collecting data and material from the study area through questionnaire and interview, the researcher has carefully reviewed, classified, tabulated, and analyzed

the collected data. Collected data have been presented in tables. These tables have been prepared in order to show percentages. The data have been analyzed and presented in a systematic and orderly way of some statistical techniques. The very common but essential program of SPSS: 16.0 software and Microsoft office excel program are used for analyzing the data.

3.8 Potential Ethical Issues/Considerations

The researcher went to collect data in the schools with request letter signed by his supervisors. Prior to starting data collection procedure, he took the oral and written permission from the headmasters. However the researcher assures that the names of the schools and identities of the persons from whom data would be collected would not be disclosed. Researcher informed the teachers about the permission whose class and interview he did observe. In the classroom observation, the researcher tried not to interrupt the classroom activities anyway. In the beginning of each new class, researcher introduced himself and the purpose of observation. He also did this before interviewing the teachers. The researcher was always respectful while dealing with teachers and students in the schools. In the time of interviewing teachers, they were told the topic and purpose of the study and asked to offer their assistance cordially. The interviewees were told that the data obtained from them would not be disclosed in any way. Those data were used for this specific research purpose only. The goal of this qualitative study is to investigate into the status and to find out the challenges of teaching and learning physics at secondary level in Bangladesh. To achieve this goal, different factors like teaching-learning practices, teachers and students' behavior, their motivation, classroom interactions, physical facilities, expectations of teachers and students, attitude of physics teachers have been studied. No doubt, the experiences of teachers and students and their classroom behavior represent the present state of physics teaching-learning at the secondary level of education in Bangladesh. Their beliefs and expectations reflect their psychological stand about teaching and learning physics. To collect data for ethical considerations the researcher took the following steps:

(i) Permission

Permission for learners to take part in the study was obtained from the school Head teachers, physics teachers and learners' parents. The aims and objectives of the study were explained verbally to the learners by the researcher prior to their participation.

(ii) Appointments

The researcher posted or distributed letters personally to the principals of each selected school, followed by visits and appointments to conduct interviews or submit questionnaires. Group meetings were held with the teachers and learners to explain the research project and the process. The researcher personally distributed the questionnaires to all schools with the help of the teachers.

(iii) Confidentiality

All respondents were assured of confidentiality by means of a written notice. Participants were given a pseudonym to protect their identities and to ensure confidentiality. At all times the learners were informed that they were free to withdraw from the study or not to answer any question if they so wished. Learners were assured of the confidentiality and anonymity of their answers and in particular, that the information they provided for the research would not be divulged to their school and teachers at any time. Care was taken to ensure total confidentiality.

(iv) Consent

Written consent was obtained voluntarily without duress and coercion or bribery for the physics teachers and students of class IX-X of the participating schools. The aims, objectives, method and duration of the research were described to the participants.

(v) Data Anonymity

The researcher assured all participants that the data collected would be destroyed after the data have been analyzed and the research report compiled and finalized. No person, except the researcher, supervisors and the data analyst, would be having access to the raw data. Even the transcript of the raw data contained no names, only the numbers of participants.

(vi) Post-research Relationships

The research report has been made available to the special collection section (Central library) of the University of Rajshahi in Bangladesh where researchers could have access to it.

3.9 Validity and Reliability of the Questionnaires

Validity is concerned with whether a test measures what it intends to measure. Both the construct and content validity of an instrument make sure that the data collected through them are correct. Content validity asks if the test content matches the content of the study and construct validity examines if the test matches a theoretical construct. The following aspects have been considered to design the questionnaires in order to ensure the content validity of the questionnaires.

a. Objectives of the proposed study
b. Opinion of the writers regarding research methods
c. Suggestions of the experienced researcher and physics teacher, educators working at TTCs
d. Comments of the teachers and students received in pre-testing of the questionnaires

Available books on research methods have been studied to learn different data collection methods, sampling procedure and their strengths and weakness. The study of the books on research methods helps to construct the questionnaires for surveys, interviews, and the checklist for observations. After the pre-testing of the questionnaires, valuable points have been added and questions that seemed to be useless have been excluded. Clear instructions have been provided to avoid ambiguity. Leading questions have consciously been avoided. Learned supervisor's and senior researchers' suggestions have sincerely been considered.

Reliability is concerned with the extent to which one can depend on the test results. It is said that there is always validity-reliability, tension and reliability offers a possible compromise. It is some time essential to sacrifice a degree of reliability to enhance validity. A valid and reliable test is useless if it is not practical in view of economy, administration and interpretation of results.

3.10 Designing Instruments for the Study

A pilot study was done with 60 students 20 Head teachers and 20 physics teachers before giving a final shape to the instruments for questionnaire survey and interview. A few changes and adjustments were made in the light of the feedback received from the pilot study. The instruments for the investigation were also designed in the light of the objectives of the study. The language of the questionnaire was kept as simple as possible to avoid confusion and ambiguity. In addition to this, some experts who guided research earlier and some researchers who had done their study in the related fields of study both at home and abroad were also consulted for the purpose of this study. So, some teachers and researchers in the Institute of Bangladesh Studies (IBS), the Institute of Education and Research (IER) Rajshahi University and the Institute of Education and Research (IER) Dhaka University were consulted several times.

Considering the advantages of data processing in the later stage, rating scales were used in the questionnaires. A five- point rating scale was used in of both the students' and teachers' questionnaires and classroom observation. The rating scales were used because they were easy for the respondents to answer and for the researcher to process and analyze the data.

Chapter Four
Data Analysis Results

This Chapter presents the analysis results of the data collected through three types of questionnaires. The analyses include the frequency distributions, graphical representations, cross-classifications using crosstabs for examining the relationship between two categorical variables, and correspondence analysis. The outline of the chapter is as follows. Sections 4.1, 4.2 and 4.3 discuss the results of Head teacher's interviews, Physics teacher's interviews and Students interviews, respectively. Section 4.4 explains the correspondence analysis of some important relevant variables.

4.1 Results of Head Teachers Interviews

The frequency distributions of the answers of some important variables given by the Head teachers are summarized in the following tables.

Table 4.1: Frequency distributions of the answers given by the Head teachers

Characteristic	Frequency		Percentage
Annual action plan of the school	Yes	77	95.1
	No	4	4.9
School have separate laboratory for physics subject	Yes	41	50.6
	No	40	49.4
School use multimedia system in the classroom	Yes	31	38.3
	No	50	61.7
School arrange in science fair in every year	Yes	16	19.8
	No	65	80.2
Schools have separate classroom for taking physics class	Yes	62	76.5
	No	19	23.5
School have computer lab	Yes	44	54.32
	No	37	45.68
Schools have adequate teaching aids	Yes	48	59.3
	No	33	40.7
Teachers take physics class in the laboratory	Yes	44	54.3
	No	37	45.7
Physics labs have adequate teaching aids and teaching instrument	Yes	43	51.1
	No	38	46.9
Teaching method of physics teacher is appropriate	Yes	56	69.1
	No	25	30.9

Interpretation of Table 4.1:

- 95.0% of schools have an annual action plan and 4.9% schools have no annual action plan. This indicates that schools have an annual action plan at a satisfactory level.
- 50.6% of schools have a separate laboratory for physics subject but 49.4% of schools do not have a separate laboratory for physics subject in the study area. It means that many schools have to create separate laboratory for the physics subject for improving the teaching-learning environment.
- Only 38.3% of schools use the multimedia system in the classroom 19.8% of schools arrange uses the multimedia system in the classroom 19.8% of schools arrange science fair every year in the study area. It is important to increase the uses of multimedia and arrange of science fair for increasing the interest of the students on the subject.
- The table shows that 76.5 % of schools have separate classroom for taking physics class and 23.5% of schools do not have separate classroom for taking physics class in the study area.
- The table also shows that 54.32% of schools have a computer lab, 59.3% of schools have adequate teaching aids and 54.3% of teachers take physics class in the laboratory 51.1% of physics labs have adequate teaching aids, and 69.1% of schools have appropriate teaching method for physics in the study area. All of these facilities must be increased for improving the teaching-learning facilities in the schools.

Table 4.2: Condition of laboratory

Characteristic	Frequency		Percentage
Condition of laboratory in school	Excellent	20	24.7
	Fair	9	11.1
	Good	41	50.6
	Not good	10	12.3
	Not good at all	1	1.2

The Table 4.2 shows that according to the Head teachers, so far as the condition of laboratories is concerned, 24.7% of laboratories are excellent, 11.1% is fair, 50.6% is good, 12.3% is not good and 1.2% is not good at all. This information illustrates that the conditions of many laboratories need to be improved.

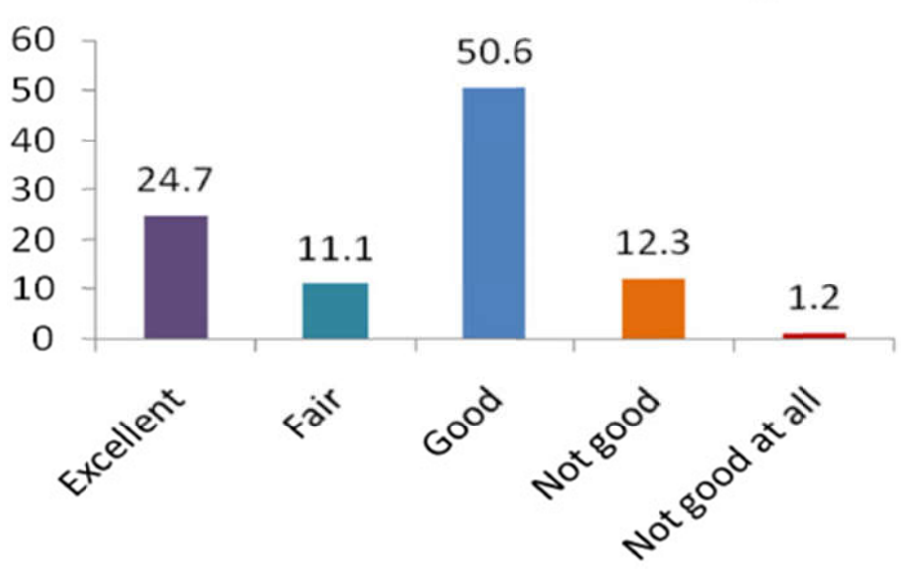


Figure 4.1: Condition of laboratory in school

Table 4.3: Facilities needed for developing professional skills

Characteristic	Frequency		Percentage
Development professional skill of teacher need	Opportunity of promotion	21	25.9
	Award for good teaching	11	13.6
	Attractive environment of the school	7	8.6
	Short Cores of training	24	29.6
	Arrangement of necessary teaching aids	9	11.1
	All of them	9	11.1

The table shows that for the development of professional skill of teachers the need for opportunity of promotion is 25.9% award for good teaching, 13.6% attractive environment of the school, 8.6 % short Cores of training, 29.6% arrangement of necessary teaching aids, 11.1% and all of them, 11.1%. This information is graphed in the Figure 4.2.

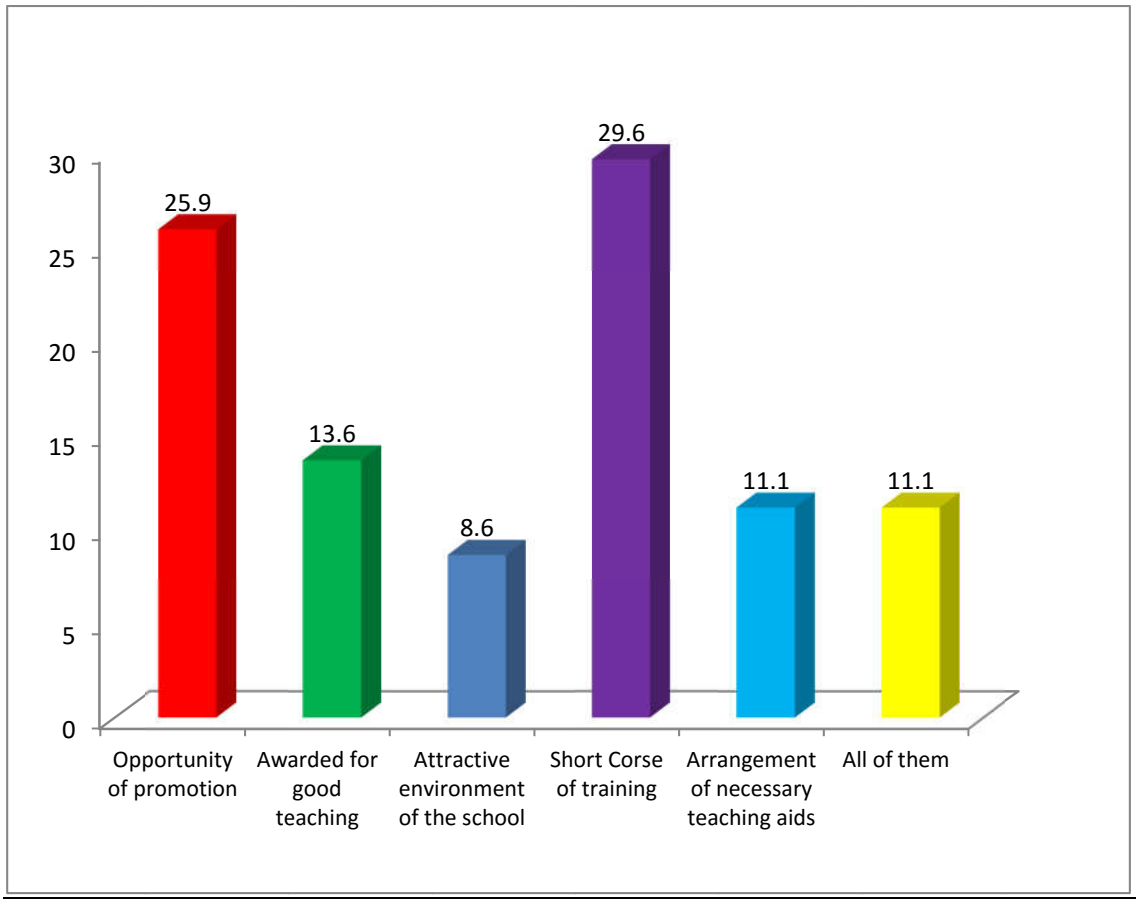


Figure 4.2: Development professional skill of teacher need

Table 4.4: Availability of classroom and furniture

Characteristic	Frequency		Percentage
Schools have furniture and classroom	More than necessary	2	1.98
	As necessary	40	39.60
	Less than necessary	39	38.61

The table shows that 1.98% schools have furniture and classroom more than necessary, 39.60% as necessary, 38.61% less than necessary.

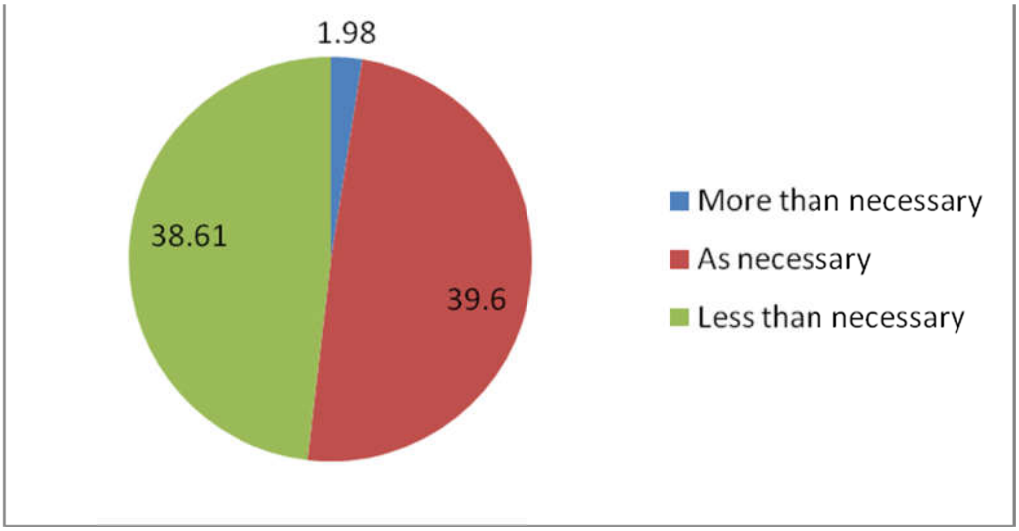


Figure 4.3: Availability of classroom and furniture

Table 4.5: Teaching system of schools

Characteristic	Frequency		Percentage
System of teaching of your school	Highly moderate	6	7.4
	moderate	6	7.4
	undecided	47	58.0
	not moderate	22	27.2

The table shows that system of teaching of your school 7.4%highly moderate, 7.4%moderate, 58.0% undecided and 27.2% not moderate. These frequencies are presented by Figure 4.4, which indicates that most of the schools are undecided about the teaching system.

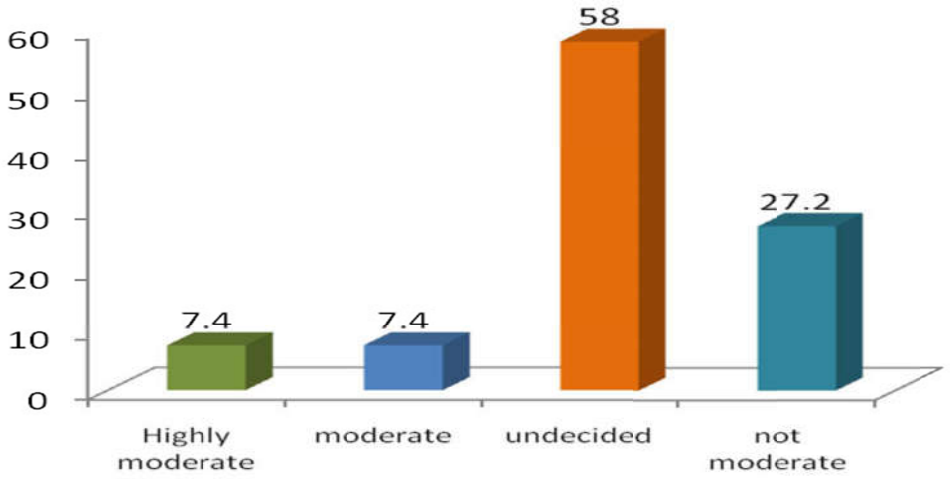


Figure 4.4: System of teaching of your school

Table 4.6: Teacher cannot take class timely

Characteristic	Frequency		Percentage
Teachers cannot take class timely because	Visitor cannot visit school regularly	34	42.0
	Teachers cannot take class with creative teaching method	17	21.0
	Teachers are unconscious of the work	20	24.7
	Teachers do not respond.	10	9.90

The table shows that teachers cannot get class timely because 42.0% Visitor cannot visit school regularly, 21.0% teachers cannot take class with creative teaching method, 24.7% teachers are unconscious of the work, 9.90% teachers do not respond.

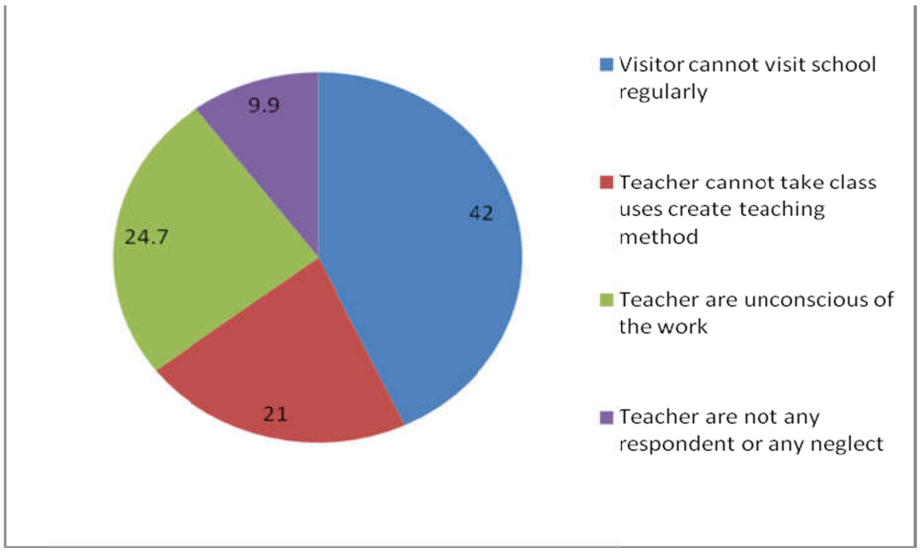


Figure 4.5: Teacher cannot take class timely

Table 4.7: Teacher are not interested for professional teaching

Characteristic	Frequency		Percentage
Teachers are not interested for professional teaching because	Promotion is not expected	27	33.3
	Salary is not increasing for training	11	13.6
	Teachers are not absence of sufficient environment in school	8	9.9
	Absence of sufficient environment in the school	10	12.3
	Teacher are not involved in training	25	30.9

The table shows that teachers are not interested for professional teaching because 33.3% promotion is not expected, 13.6% salary is not increasing for training, 9.9% teachers are not absence of sufficient environment in school, 12.3% absence of sufficient environment in the school.

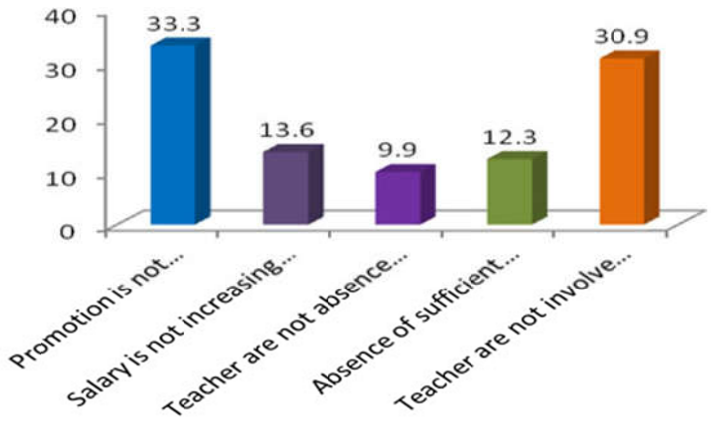


Figure 4.6: Teacher are not interested for professional teaching

4.2 Results of Physics Teachers Interviews

Modern society demands high quality teaching and learning from teachers. Teachers have to possess a great deal of knowledge and skills with regard to both teaching and assessment practices in order to meet those demands and standards of quality education. Teacher learning is a continuous process that promotes teachers' teaching skills, new knowledge, new proficiency, which in turn, help improve students' learning. Previous studies have indicated that when teachers are effective classroom managers, their students achieve a higher level and display more interest in the class subject matter. Classroom management is essential to both teachers' education and teachers' professional development, it is crucial to keep teachers knowledge up to date, so they can deliver high quality teaching.

The frequency distributions of the answers of some important variables given by the Physics teachers are summarized in the following table.

Table 4.8: Frequency distributions of the answers given by the physics teachers

Characteristic	Frequency		Percentage
Do you think that present syllabus is appropriate in class IX-X	Yes	63	67.7
	No	30	32.2
Do you finish your syllabus in due time of class IX-X	Yes	63	67.7
	No	30	32.3
Do you use lesson plan in the class	Yes	64	68.8
	No	29	31.2
Do you give awards to your students for good result	Yes	65	69.9
	No	28	30.1
Are you involved in private teaching	Yes	32	34.4
	No	61	65.6
Do your school have sufficient science teaching aids	Yes	33	35.5
	No	60	64.5
Do you think more figures are necessary for physics subject	Yes	72	77.4
	No	21	22.6
Are you involved in physics private teaching	Yes	21	22.6
	No	72	77.4
Do you have any coaching center for teaching	Yes	5	5.4
	No	88	94.6

Interpretation of Table 4.8:

- The table shows that 67.7% teachers think that present syllabus is appropriate in class IX-X where as 32.2% teachers think that present syllabus is not appropriate in class IX-X. This indicates that there is scope to improve the present syllabus to a satisfactory level.

- The table indicates that 67.7% teachers complete their syllabus in due time but 32.3% teachers cannot complete their syllabus in due time of class IX-X in the study area. This indicates that some teacher cannot complete their syllabus in due time. So anchoring teacher must be finishing their syllabus in expected time.

- 68.8% teachers use lesson plan but 31.2% teachers do not use lesson plan in the study area. Lesson plan is an important element for teaching and learning. It must be ensured satisfactory level.

- 69.9% teachers give awards to their students for good result when 30.1% teachers do not give awards to their students for good result. Teacher and administration may encourage their students by giving awards for good results.

- 22.6% physics teachers are involved in physics private teaching and 77.4% physics teachers are not involved in physics private teaching. 5.4% physics teachers have coaching center for teaching and 94.6% physics teachers do not have coaching center for teaching.

- Only 35.5%schools have sufficient science teaching aids but 64.5%schools do not have sufficient science teaching aids. Teaching aids are very essential for the students of physics. Teaching aids must be increased for improving the teaching learning facilities in the school.

- The table shows that 77.4% teachers think more figures are necessary for physics subject but only 22.6% teachers think more figures are not necessary for physics subject. Necessary figures must be included in physics at secondary level.

Table 4.9: Method used in the classroom

Characteristic	Frequency		Percentage
What method do you use in the classroom	Lecture method	89	95.7
	Project method	1	1.1
	Laboratory method	3	3.2

The table shows that 95.7% teachers use lecture method 1.1% teachers use project method and 3.2% teachers use laboratory method in time of teaching. This table indicates the importance of increase the use of project and laboratory method based teaching in the classroom.

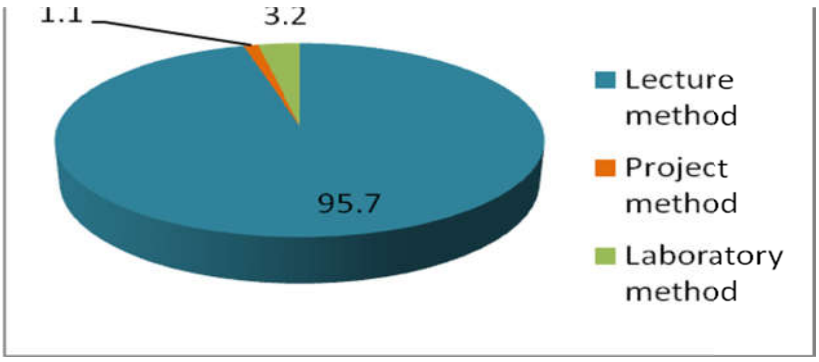


Figure 4.7: What method do you use in the classroom?

Table 4.10: Appropriate method

Characteristic	Frequency		Percentage
What method do you think appropriate	Teacher centered method	2	2.2
	Students centered method	39	41.9
	Lecture method	1	1.1
	Demonstration method	23	24.7
	Discussion method	18	19.4
	Project method	3	3.2
	Invention method	1	1.1
	Teacher's own method	6	6.5

The table shows that 2.2% teachers think teacher centered method, 41.9% teachers think students centered method, 1.1% teachers think lecture method, 24.7% teachers think demonstration method, 19.4% teachers think discussion method, 3.2% teachers think project method, 1.1% teachers think invention method and 6.5% teachers think that teacher' sown method is appropriate for teaching physics in the study area.

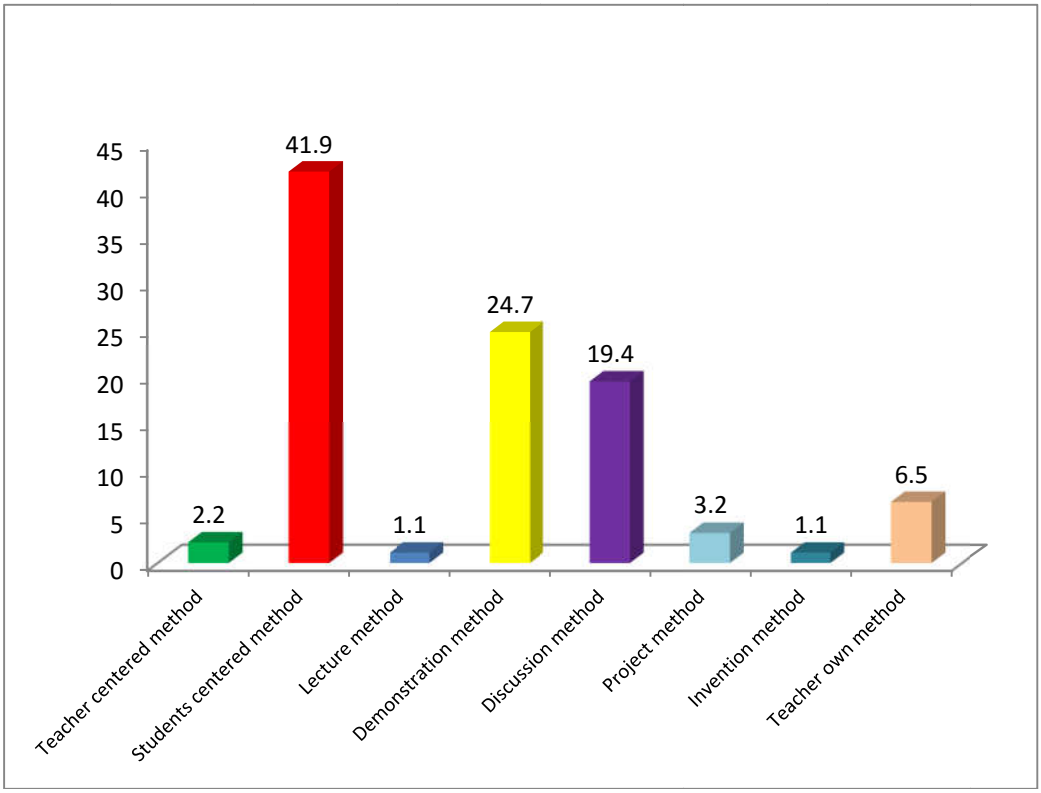


Figure 4.8: What method do you think appropriate?

Table 4.11: Interest for group work of your students

Characteristic	Frequency		Percentage
Do you have interest for group work of your students in the classroom	Always	49	52.7
	Often	42	45.2
	Sometimes	0	0.0
	Rarely	2	2.2
	Never	0	0.0

The table shows that 52.7% teachers always, 45.2% teachers often and 2.2% teachers rarely have interest for group work of their students.

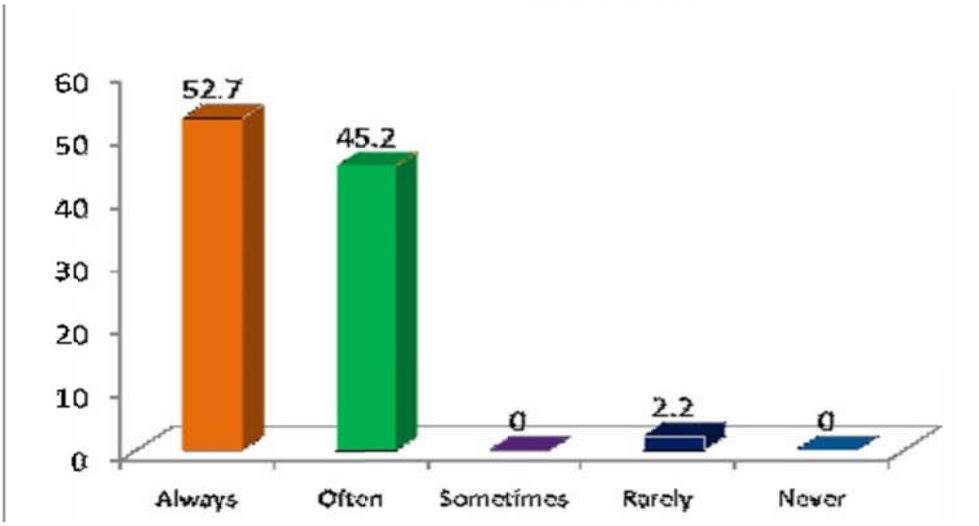


Figure 4.9: Do you have interest for group work of your students in the classroom

Table 4.12: Main barrier of teaching physics

Characteristic	Frequency		Percentage
Main barrier of teaching physics is	Trained teacher are not available	22	23.7
	Involving more private coaching	3	3.2
	Subject teachers are not available	45	48.4
	Students think that physics is so hard	18	19.4
	Teachers are not interested in physics	5	5.4

The table shows that 23.7% of teachers think that trained teachers are not available, 3.2% involving more private teaching, 48.4% subject teachers are not available, 19.4% students think that physics is so hard and 5.4% teachers are not interested in physics subject. These tables recommend that special attention should be necessary for increasing the numbers of trained teachers and subject-based teachers in the schools.

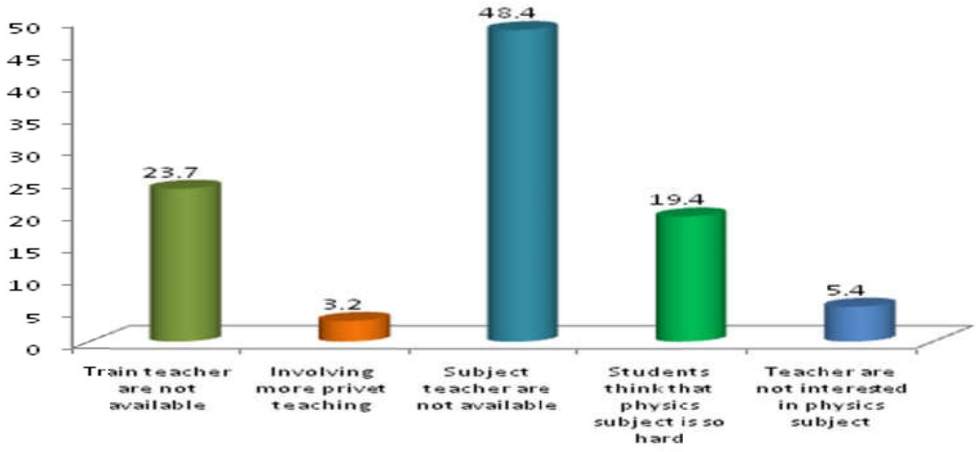


Figure 4.10: Main barrier of teaching physics

Table 4.13: Visit of class teaching

Characteristic	Frequency		Percentage
Does your head teacher visit your class teaching	Always	79	84.9
	Often	4	4.3
	Sometimes	2	2.2
	Rarely	4	4.3
	Never	4	4.3

The table shows that 84.9% teachers always, 4.34% teachers often, 2.2% teachers sometimes, 4.3% teachers rarely and 4.3% teachers never reported that their head teachers visit their class.

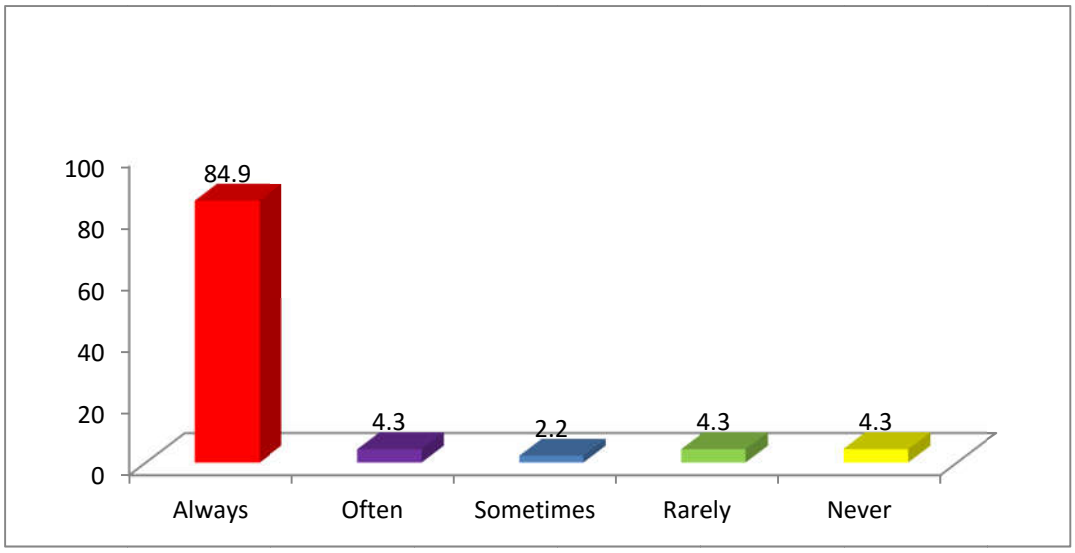


Figure 4.11: Does your head teacher visit of your class teaching

Table 4.14: Make lesson plan before starting class

Characteristic	Frequency		Percentage
Do you make lesson plan before starting class	Always	35	37.6
	Often	50	53.8
	Sometimes	3	3.2
	Rarely	4	4.2
	Never	1	1.1

The table shows that 37.6% teachers always, 53.8% teachers often, 3.2% teachers sometimes 4.2% rarely and 1.1% teachers never make lesson plan before starting class. About 62% teachers have not prepared lesson plan regularly before starting classes.

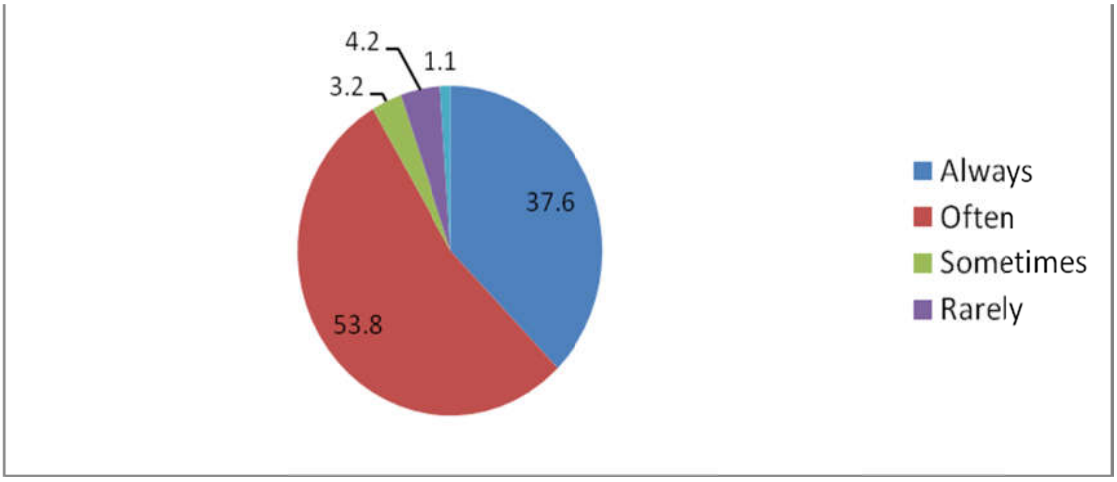


Figure 4.12: Do you make lesson plan before starting class

Table 4.15: Practical Instruments

Characteristic	Frequency		Percentage
Does your school have adequate practical instruments	Adequate	13	13.98
	not adequate	43	46.24
	undecided	37	39.78

The table shows teachers' opinions about the frequency of practical instruments 13.98% teachers adequate, 46.24% teachers not adequate and 39.78% teachers undecided about practical instruments in the study area.

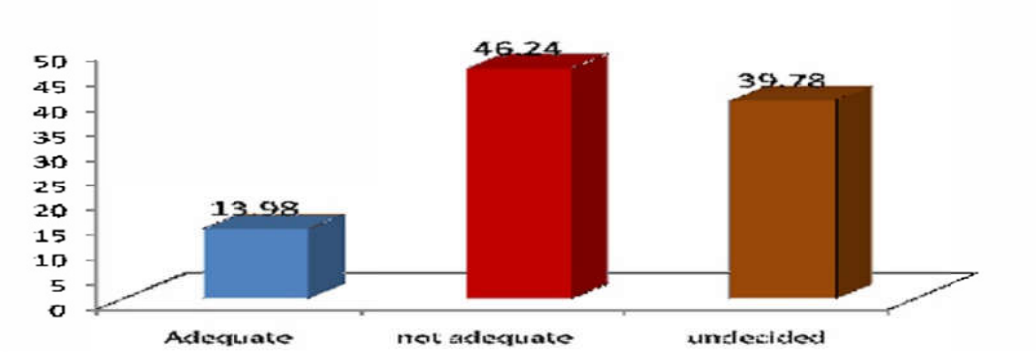


Figure 4.13: Does your school have adequate practical instruments

Table 4.16: Language of physics

Characteristic	Frequency		Percentage
Language of physics is appropriate for secondary level	Very easy and clear	9	9.7
	Normal and clear	59	63.4
	Hard but clear	12	12.9
	So hard	5	5.4
	Unclear	8	8.6

The table shows that 9.7% teachers said, language of physics is very easy and clear, 63.4% teachers said, language of physics is normal and clear, 12.9% teachers said, language of physics is hard but clear, 5.4% teachers said, language of physics is so hard 8.6% teachers said, language of physics is unclear for secondary level.

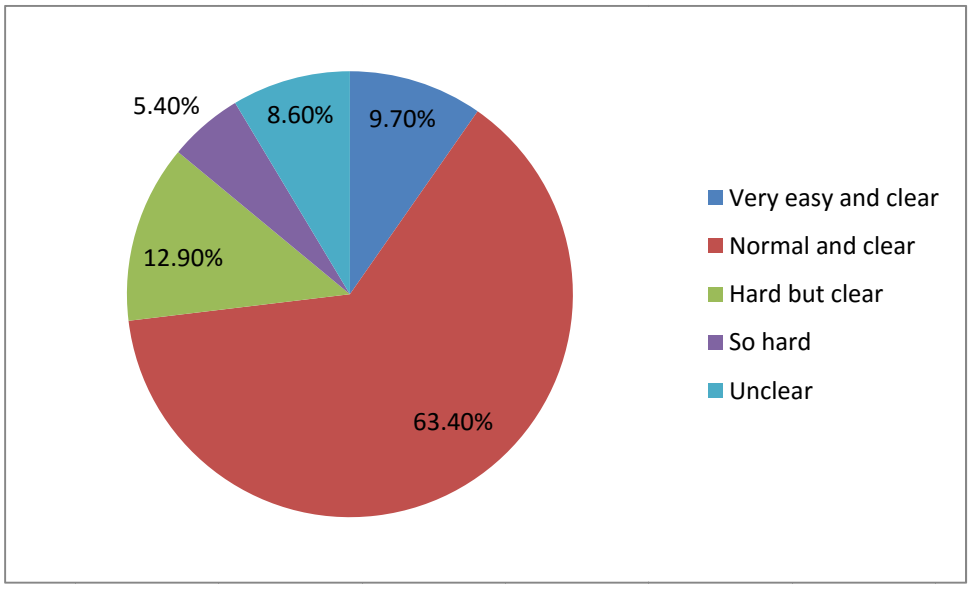


Figure 4.14: Language of physics is appropriate for secondary level

Table 4.17: What method do you apply for the evaluation of your students

Characteristic	Frequency		Percentage
What method do you apply for the evaluation of your student	Easy type	3	3.2
	Multiple choice	14	15.1
	Short and easy types	6	6.5
	Creative and short	19	20.4
	Creative and narrative	51	54.8

The table shows that 3.2% teachers apply easy type, 15.1% teachers apply multiple choices, 6.5% teachers apply short and easy types, 20.4% teachers apply creative and short types and 54.8 teachers apply creative and narrative types.

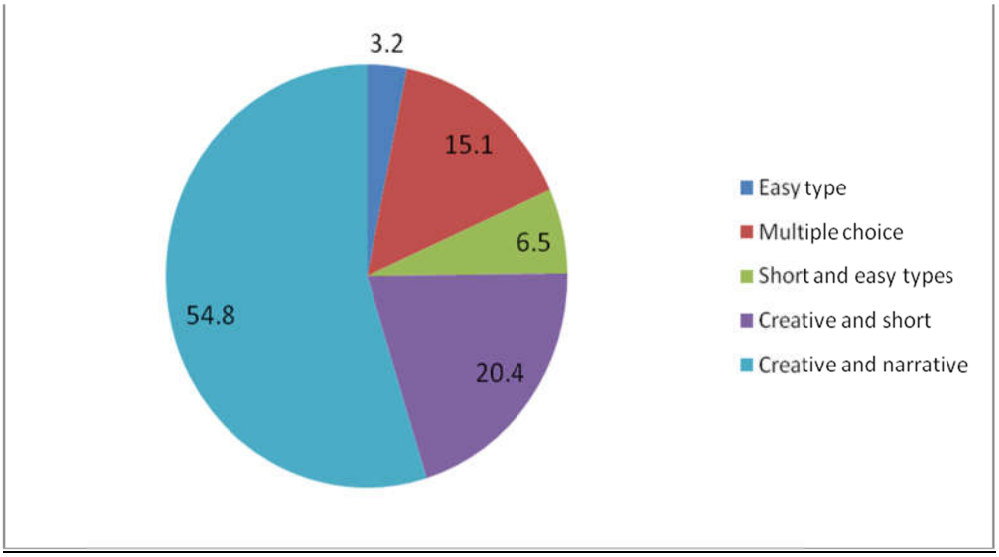


Figure 4.15: What method do you apply for the evaluation of your student?

Table 4.18: Academic facilities needed for teaching physics

Characteristic	Frequency		Percentage
What academic facilities needed for teaching physics	Classrooms are not available	18	19.4
	lab instruments are not available	30	32.3
	head teachers are not co-operative	9	9.7
	teaching aids are not available	17	18.3
	all of the following	19	20.4

The table shows that 19.4% classrooms are not available, 32.3% lab instruments are not available, 9.7% head teachers are not co-operative, 18.3% teaching aids are not available, 20.4% all of the following are needed for teaching physics. Facilities regarding lab instruments, classrooms, and teaching aids are needed for improving teaching-learning environments.

Table 4.19: Trained teachers do not use creative method of teaching

Characteristic	Frequency		Percentage
Trained teachers do not use creative method of teaching because	Limitation of class time	12	12.9
	teaching aids are not available	38	40.9
	classroom size is large	17	18.3
	lack of sufficient classroom	24	25.8
	teachers are not interested	2	2.2

The table shows that 12.9% teachers have Limitation of class time, 40.9% schools teaching aids are not available, 18.3% schools classroom size is large, 25.8% lack of sufficient classroom, 2.2% teachers are not interested create method of teaching.

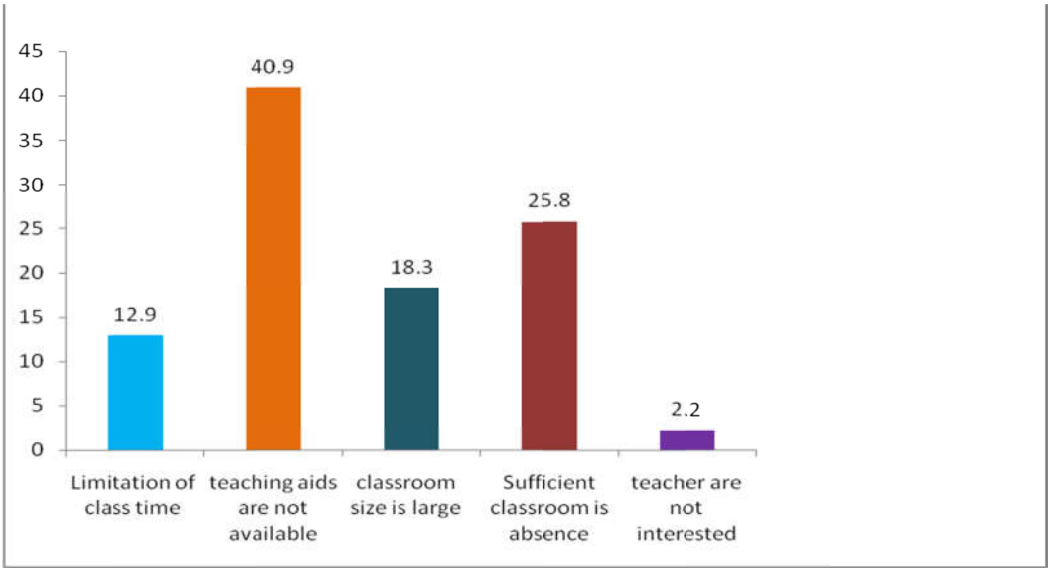


Figure 4.16: Trained teachers do not use creative method of teaching

Table 4.20: Teacher are more attentive to private teaching than class teaching

Characteristic	Frequency		Percentage
Teacher are more attentive to private teaching than class teaching	To earn more money	44	47.3
	To develop own skill	20	21.5
	School environment is not appropriate for teaching	4	4.3
	To share more with students	20	21.5
	School teaching is not interesting	5	5.4

The table shows that 47.3% teachers want to earn more money, 21.5% teachers want to develop their own skill, 4.3% school environment is not appropriate for teaching, 21.5% teachers want to share more with students, 5.4% schools' teaching is not interesting.

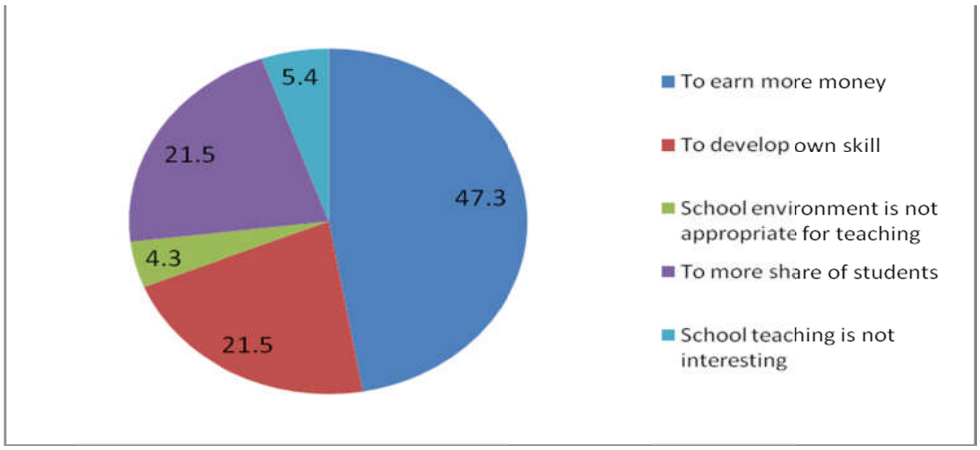


Figure 4.17: Teachers are more attentive to private teaching than class teaching

Table 4.21: Present textbook of physics is helpful for higher education

Characteristic	Frequency		Percentage
Present textbook of physics is helpful for higher education	More helpful	22	23.7
	Helpful	52	55.9
	Undecided	16	17.2
	Not helpful	3	3.2
	Not helpful at all	0	0.0

The table illustrates that 23.7% teachers told that present textbook of physics are more helpful, 55.9 % helpful, 17.2% undecided, and 3.2% not helpful for higher education.

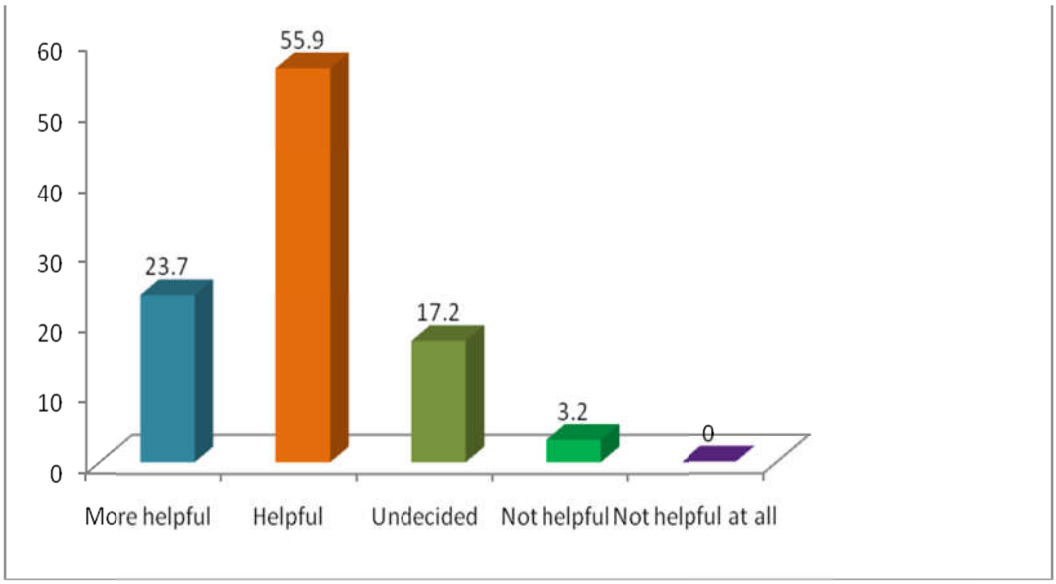


Figure 4.18: Present textbook of subject is helpful for higher education

Table 4.22: Training of teacher

Characteristic	Frequency		Percentage
What training do you achieve	No training	7	7.5
	B Ed	17	18.3
	CPD	12	12.9
	TQI	13	14.0
	B Ed+others training	36	38.7
	M Ed +others training	8	8.6

The table demonstrates that 7.5% teachers have no training, 18.3% teachers have B Ed training, 12.9% teachers have CPD training, 14.0% teachers have TQI training, 38.7% teachers have B. Ed+ others training, 8.6% teachers have M.Ed and other trainings.

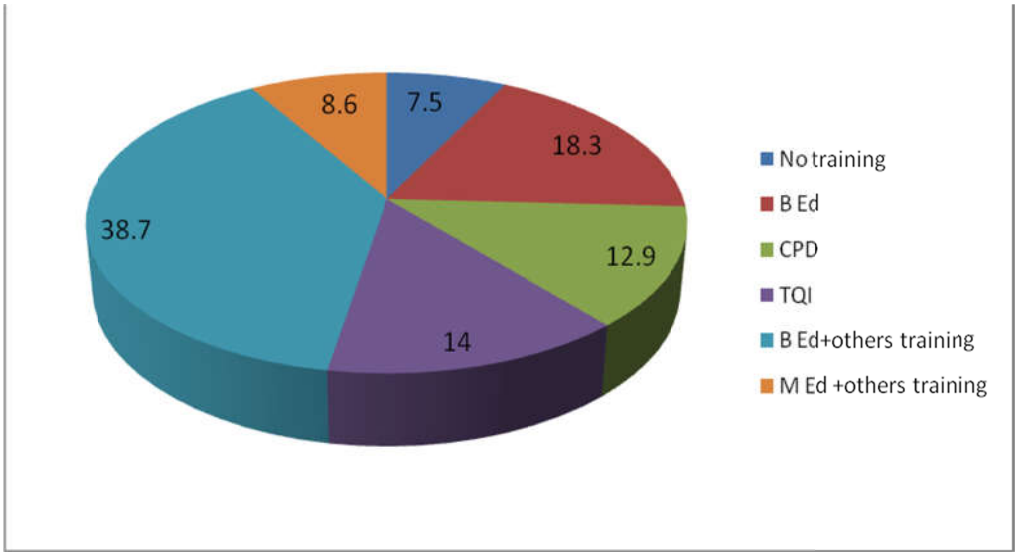


Figure 4.19: What training do you achieve?

Table 4.23: How many classes do you take every day in your school (on an average)

Characteristic	Frequency		Percentage
How many classes do you take every day in your school (on an average)	Three	1	1.1
	Four	14	15.1
	Five	56	60.2
	Six	22	23.7
	Seven	0	0.0

The table shows that 1.1% teachers take three, 15.1% teachers take four, 60.2% teachers five, 23.7% teachers six classes everyday of schools. Maximum of the teachers (60.2%) on average conduct five classes per day, which indicates over loads for the teachers.

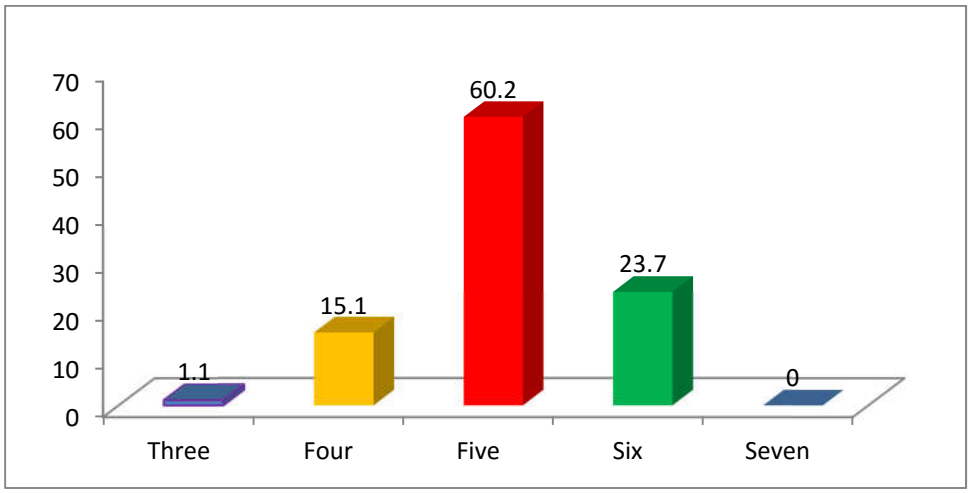


Figure 4.20: How much class do you take every day of your school (on an average?)

Table 4.24: Do you think that present text book of physics is appropriate for class IX-X at secondary level

Characteristic	Frequency		Percentage
Do you think that present text book of physics is appropriate for class IX-X at secondary level	Excellent	3	3.2
	very good	4	4.3
	good	23	24.7
	not good	7	7.5
	on an average	6	6.5
	need improve	50	53.8

The table shows that so far as the present textbook of physics is concerned 3.2% teachers think excellent, 4.3% teachers think very good, 24.7% teachers consider good, 7.5% teachers think, not good, 6.5% teachers think ,on an average and 53.8% teachers think, need improvement of books for class IX-X.

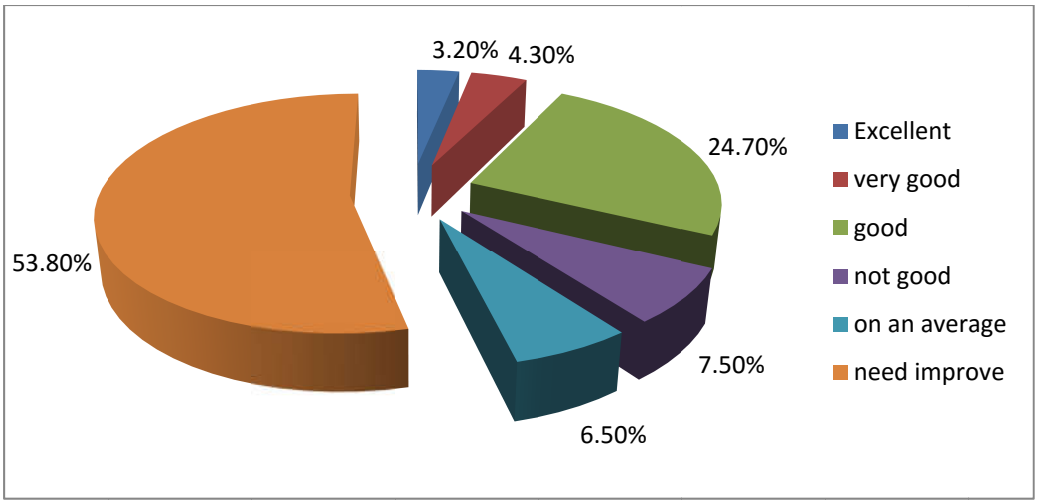


Figure 4.21: Do you think that present text book of physics is appropriate for class IX-X at secondary level

4.3 Results of Students Interviews

A survey is conducted on 500 students of the physics to know their opinion about the subject. The frequency distributions of the answers of some important variables are summarized in the following tables.

Table 4.25: Frequency distributions of the answers given by the students

Characteristic	Frequency		Percentage
Do you feel pleased to study in the group of science	Yes	483	96.6
	No	17	3.4
Do you think that a group helps understand the lesson more	Yes	481	96.2
	No	19	3.8
Does the head teacher supervise the class room during the time of teaching	Yes	427	85.4
	No	73	14.6
Does your guardian take care of your studies	Yes	480	96.0
	No	20	4.0
Is science fair held every year	Yes	100	20.0
	No	400	80.0
Do you participate in science fair	Yes	138	27.6
	No	362	72.4
Do you feel pleased in participating science fair	Yes	370	74.0
	No	130	26.0
Do you face problems to understand the language of physics	Yes	170	34.0
	No	330	66.0
Do you get lesson from coaching/private batch	Yes	365	73.0
	No	135	27.0
Is there physics lab in your school	Yes	261	52.2
	No	239	47.8
Do you feel physics hard when reading at home	Yes	151	30.2
	No	349	69.8
Do you think private tutor is needed after finishing the physics class	Yes	280	56.0
	No	220	44.0
Does the teacher use lesson standard teaching aid during class time	Yes	384	76.8
	No	116	23.2
Is the practical class more interesting than theory class	Yes	436	87.2
	No	64	12.8
Do your father get information about the result of your examination	Yes	467	93.4
	No	33	6.6
Does the teacher give you inspiration for your creativity	Yes	452	90.4
	No	33	9.6
Do you think economic insolvency hampers your study	Yes	227	45.4
	No	273	54.6

Interpretation of Table 4.25

- The table shows that 96.6% students feel pleased and 3.4% students do not feel pleased with studying in the group of science. This indicates that most of the students feel pleased with studying in the group of science at a satisfactory level.

- 96.2% of students think that group work helps but 3.8% students think that groups work does not help understand the lesson more. This indicates that group work is the helpful for the physics student.

- 85.4% students said that their Head teacher supervises classroom but 14.6% students said that their head teachers do not supervise classroom in the time of teaching. Head teacher's supervision classroom in the time of teaching at a satisfactory level.

- 96.0% students said that their guardian takes care of their studies but 4.0% students said that their guardians do not take care of their studies. This indicates that guardian takes care of their students at a satisfactory level.

- 20.0% students said that science fair is held every year and 80.0% students said science fair is not held every year. 27.6% students participate in science fair but 72.4% students do not participate in science fair.74.0% students feel pleased with participating science fair but 26.0% students do not feel pleased with participating science fair. It is important to increase arrange of science fair for increasing the interest of the student on the physics subject.

- 34.0% students face problems to understand the language of physics and 66.0% students do not face problems to understand the language of physics. It is important to understand the language of physics. Therefore, the language of physics subject at secondary level requires revision to make as much as easy and clear to the students.

- 73.0% students get lesson from coaching/private batch but 27.0% students do not get lesson from coaching/private batch.

- 52.2% students said that their schools have physics lab but 47.8% students said that their schools have no physics lab. Physics lab is essential for teaching learning in physics.

- 30.2% students feel physics hard when reading at home and 69.8% students do not feel physics hard when reading at home.

- 56.0% students think private tutor is needed after finishing the physics class but 44.0% students think private tutor is not needed after finishing the physics class.

- 76.8 students said teacher uses standard teaching aid during class time and 23.2% students said teacher does not use standard teaching aid during class time. 87.2% students said that practical class is more interesting than theory class but 12.8% students said that practical class is not more interesting than theory class. All of facilities must be increased for improving the teaching-learning facilities in the schools.

- 93.4% students said their fathers get information about the result of their examination but 6.6% students said their fathers do not get information about the result of their examination.

- 90.4% students said that their teachers give them inspiration for their creativity but 9.6% students said that their teachers do not give them inspiration for their creativity.

- 45.4% students think that economic insolvency hampers their study but 54.6% students think that economic insolvency does not hamper their study. Economical in solvency is hampers study. All of facilities must be increased for improving the teaching-learning facilities in the schools.

Table 4.26: Feel in studying physics in the class

Characteristic	Frequency		Percentage
How do you feel in studying physics in the class	Excellent	233	46.6
	Moderate	244	48.8
	It does not give interest	15	3.0
	It does not give interest at all	3	0.6
	It seems boring	5	1.0

The table shows that 46.6% students feel excellent, 48.8% students feel moderate, 3.0% students feel no interest, o.6% students feel no interest at all, and 1.0% students feel boring in studying physics in the class. This table indicates that student's interest on the subject is good.

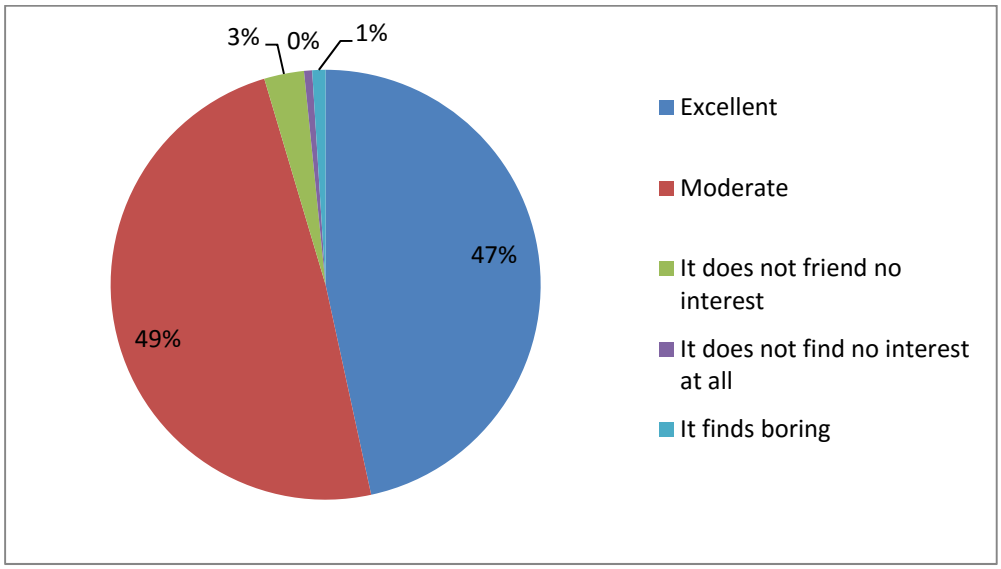


Figure 4.22: What do you feel in studying physics in the class?

Table 4.27: How do you feel studying in the group of science

Characteristic	Frequency		Percentage
How do you feel studying in the group of science	Feeling well	376	75.2
	Moderately well	96	19.2
	Feeling well sometimes	25	5.0
	Feeling not well at all	2	.4
	Feeling very well	1	.2

The table shows that75.2% students feeling well, 19.2% students' moderately well, 5.0%students feeling well sometimes, 0.4%students feeling not well at all, 0.2% students feeling very well.

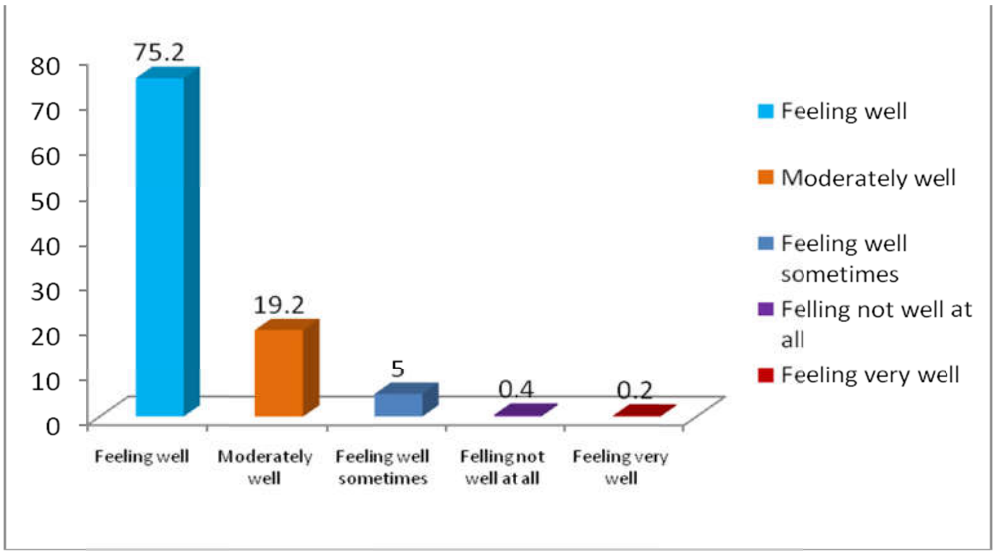


Figure 4.23: How do you feel studying in the group of science

Table 4.28: Does the teacher use the teaching aids in the class room

Characteristic	Frequency		Percentage
Does the teacher use the teaching aids in the class room	No used	64	12.8
	Sometimes used	288	57.6
	All the time	133	26.6
	Never used	15	3.0

The table shows that 12.8% students said that teachers do not use the teaching aids in the class, 57.6% students said that teacher sometimes use the teaching aids in the class, 26.6% students said that teachers all the time use the teaching aids in the class, 3.0% students said that teachers never use the teaching aids in the class.

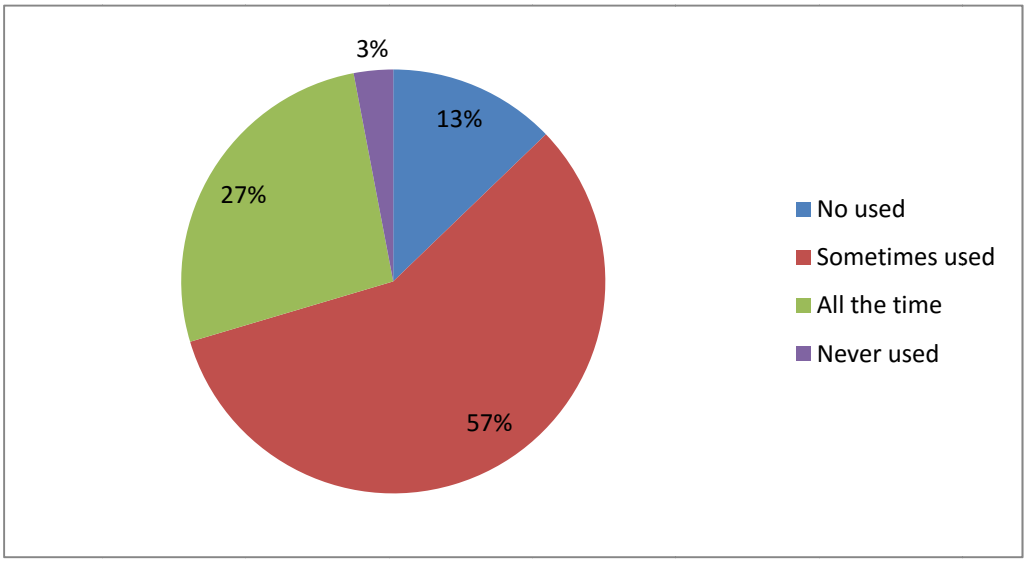


Figure 4.24: Does the teacher use the teaching aids in the class room

Table 4.29: The obstacle of your study

Characteristic	Frequency		Percentage
The obstacle of your study	Home atmosphere	101	20.2
	School atmosphere	89	17.8
	Circumstances	124	24.8
	Economic insolvency	82	16 .4
	Personal unconsciousness	80	16 .0
	Mode of vary in favorable transportation/inconvenient transportation	24	4.8

The table shows that 20.2% students said that home atmosphere, 17.8% students said that school atmosphere, 24.8% students said that circumstances, 16.4% students said that Economic insolvency, 16.0% students said that personal unconsciousness, 4.8% students said that mode of vary in favorable transportation/inconvenient transportation are the obstacles of their studies.

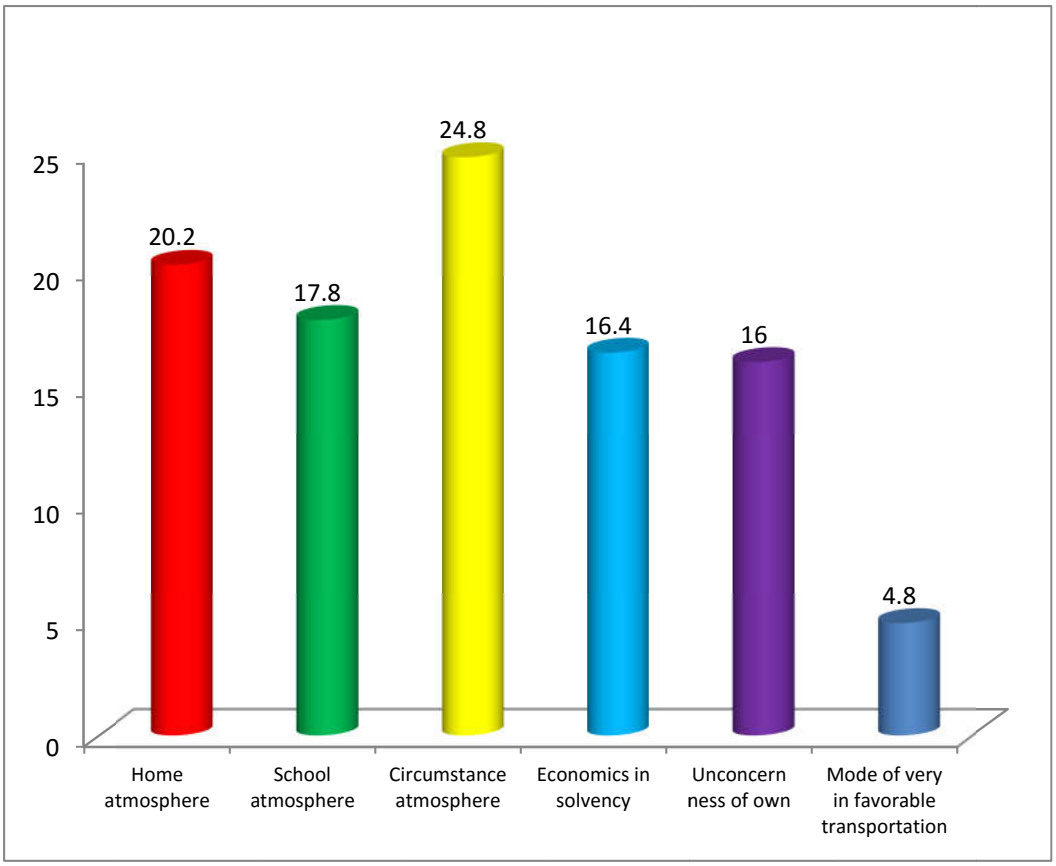


Figure 4.25: The obstacle of your study

Table 4.30: The school where you study is not comfortable

Characteristic	Frequency		Percentage
The school where you study is not comfortable because	Infrastructure is broken	59	11.8
	Lack of skilled teachers	112	22.4
	Class mates not co-operative in the lesson	123	24.6
	Transportation not well	96	19.2
	School atmosphere is not well	110	22.0

The table shows that 11.8% students said that Infrastructure is broken, 22.4% students said that lack of skilled teachers, 24.6% students said that class mates not co-operative in the lesson, 19.2% students said that transportation not well, 22.0% students said that school atmosphere is not good for comfortable study.

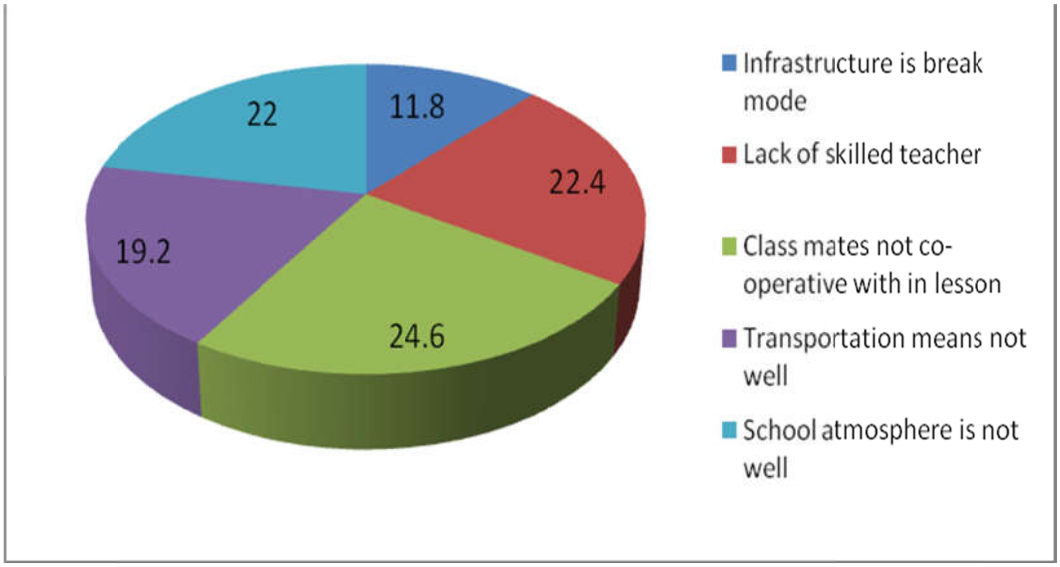


Figure 4.26: The school where you study is not comfortable

4.4 Tests of Relationship between Variables

The Contingency table or Crosstabs procedure offers tests of independence and measures of association and agreement for nominal and ordinal data. In the contingency table, the chi-square test measures the discrepancy between the observed cell counts and what we would expect if the rows and columns were unrelated or independence. This section applies chi-square test for testing the relationship (independence or not) between some selected variables and the results are shown in the following tables.

4.4.1 Test of relationship between some opinions of Head teachers

Table 4.31: Test of relationship between some opinions of Head teachers

SL. No	Statement	χ^2	DF	Level of Significant
1.	Do your teacher take physics class in the laboratory * Do you think that the teaching method of physics teacher is appropriate	2.989	1	.097*
2.	Do your teacher take physics class in the laboratory * Condition of laboratory	10.797	4	.029**
3.	Do your physics lab have adequate teaching aids and teaching instrument * Condition of laboratory	14.281	4	.006**
4.	Do the student read physics in library * Do you think that the teaching method of physics teacher is appropriate	7.250	1	.009**
5.	Do your school have annual year plan * Do your school have library	10.853	1	.012**
6.	Do your schools have adequate teaching aids? * Do your teacher take physics class in the laboratory	7.237	1	.007**
7.	Do your school have multimedia classroom * Do your school use multimedia system in the classroom	17.697	1	.000**
8.	Do your school have separate physics lab * Do your teacher take physics class in the laboratory	17.706	1	.000**
9.	Do your teacher take physics class in the laboratory * Do your physics lab have adequate teaching aids and teaching instrument	8.813	1	.003**
10.	Teacher cannot developed of the student in creativity * Teacher are not interested for professional teaching because	24.269	16	.084*
11.	Do your schools have adequate teaching aids? * Do your teacher take physics class in the laboratory	7.237	1	.007**
12.	Do your teacher take physics class in the laboratory * Condition of laboratory	10.797	4	.029**
13.	Teacher don't take class better because * To development professional skill of teacher need	47.396	25	.004**

Comment: * = Significant, ** = Highly Significant. NS = None Significant

The table shows that there have significant, highly significant and none significant relationships of some selected variables.

For example, the test between the variables “Do your teacher take physics class in the laboratory” and “Do you think that the teaching method of physics teacher is appropriate” shows $\chi^2_{(1)} = 2.989$, $p = 0.097$.This accepts the null hypothesis of independence and tells us that there is no statistically significant association between these two variables at 5% level of significance, that is, they are independent.

Similarly, the test between the variables “Do your teacher take physics class in the laboratory” and “Condition of laboratory” shows $\chi^2_{(4)} = 10.797$, $p = 0.029$.This null hypothesis rejected and indicates a statistically significant relationship between these two variables at 5% level of significance.

The test between the variables “Do your teacher take physics class in the laboratory” and “Do your physics lab have adequate teaching aids and teaching instrument” shows $\chi^2_{(1)} = 8.813$, $p = 0.003$.This null hypothesis rejected and indicates a statistically significant relationship between these two variables at 5% level of significance.

The test between the variables “Do your schools have adequate teaching aids” and “Do your teacher take physics class in the laboratory” shows $\chi^2(1) = 7.237$, $p = 0.007$. This null hypothesis rejected and indicates a statistically significant relationship between these two variables at 5% level of significance.

The test between variables “Do your school have separate physics lab” and “Do your teacher take physics class in the laboratory” shows $\chi^2_{(1)} = 17.706$, $p = 0.000$.This null hypothesis rejected and indicates a statistically significant relationship between these two variables at 5% level of significance.

4.4.2 Test of relationship between some opinions of Physics teachers

Table 4.32: Test of relationship between some opinions of Physics teachers

SL. No	Statement	χ^2	DF	Level of Significant
1.	Students are not interested of the subject because * Language of physics subject is appropriate for secondary level	14.334	16	.574 NS
1.	Do you use lesson plan in the class * Do you finish your syllabus due time of class IX-X?	.095	1	.468 NS
2.	Do you involve in privet teaching * Do you feel interest in taking class	1.072	1	.428 NS
3.	Do you think that present syllabus is appropriate in class IX-X * Do you think more figure is necessary for physics subject	2.166	1	.112 *
4.	Do you privet teaching of your class students * Do you have any coaching center for teaching	5.593	1	.048**
5.	Students are not interested of the subject because * Do you think that present text book of physics is appropriate for class IX-X at secondary level	24.639	20	.216 NS
6.	Do you feel interest in taking class * Do your school have sufficient science teaching aids	.188	1	.586 NS
7.	Do you finish your syllabus due time of class IX-X? * Do you involve in privet teaching	4.770	1	.026**
8.	Do you finish your syllabus due time of class IX-X? * Do you involve in physics privet teaching	1.394	1	.179*
9.	How many class do you take every day of your school (on an average) * How many class of a day is better for a teacher for good teaching	23.625	12	.023**
10.	What method do you apply for evaluated of your student * What academic facilities needed for teaching physics	21.106	16	.174*
11.	Do you involve in physics privet teaching * How many earn per month including job	10.413	5	.064**
12.	Do your school have adequate practical instrument * What academic facilities needed for teaching physics	12.569	12	.401 NS
13.	Do you think that present text book of physics is appropriate for class IX-X at secondary level * Present textbook of physics subject is helpful for higher education	14.770	15	.468 NS
14.	Do you make lesson plan before starting class * What's training do you achieve	25.360	20	.188*
15.	What was the aim of you students life * Why you choice teaching profession	45.085	12	.000**

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16.	Do you think that present syllabus is appropriate in classIX-X * Do you finish your syllabus due time of class IX-X?	15.597	1	.000**
17.	Do you involve in physics privet teaching * Do you privet teaching of your class students	6.103	1	.013**
18.	Do the students feel interest for group work * Do you interest for group work of your students in the classroom	55.906	6	.000**
19.	What's training do you achieve * How many class do you take every day of your school (on an average)	22.572	15	.094*
20.	What method do you apply for evaluated of your student * Do your laboratory have necessary teaching aids and instrument for teaching according to syllabus	18.687	12	.096*
21.	Do you feel interest in teaching physics * Skill of teacher are undeveloped because	18.552	12	.100*
22.	Language of physics subject is appropriate for secondary level * Teacher are more attentive to privet teaching then class teaching	20.532	16	.197*
23.	Do you satisfied of teaching profession * Why you choice teaching profession	35.625	9	.000**
24.	Main barrier of teaching physics is * Do your laboratory have necessary teaching aids and instrument for teaching according to syllabus	17.335	12	.137*

Comment * = Significant. ** = Highly Significant, NS = None Significant

The table shows that there have significant, highly significant and None Significant relationships of some selected variables.

For example, the test between the variables "Do you think that present syllabus is appropriate in class IX-X" and "Do you think more figure is necessary for physics subject" shows $\chi^2_{(1)} = 2.166$, $p = 0.112$.This accepts the null hypothesis of independence and tells us that there is no statistically significant association between these two variables at 5% level of significance, that is, they are independent.

Similarly, the test between the variables "Do you privet teaching of your class students" and "Do you have any coaching center for teaching" shows $\chi^2(1) = 5.593$, $p = 0.048$. This rejected null hypothesis and indicates a statistically significant relationship between these two variable at 5% level of significance.

The test between the variables “Do you think that present text book of physics is appropriate for class IX-X at secondary level” and “Present textbook of physics subject is helpful for higher education” shows $\chi^2(15) = 14.770$, $p = 0.468$. This accepts the null hypothesis of independence and tells us that there is no statistically significant association between these two variables at 5% level of significance, that is, they are independent

The test between the variables “Do you involve in physics privet teaching” and “Do you privet teaching of your class students” shows $\chi^2(1) = 6.103$, $p = 0.013$. This null hypothesis rejected and indicates a statistically significant relationship between these two variable at 5% level of significance.

The test between the variables “Language of physics subject is appropriate for secondary level” and “Teacher are more attentive to privet teaching then class teaching” shows $\chi^2(16) = 20.532$, $p = 0.197$. This accepts the null hypothesis of independence and tells us that there is no statistically significant association between these two variables at 5% level of significance, that is, they are independent.

The test between the variables “Do you finish your syllabus due time of class IX-X? ” and “Do you involve in privet teaching” shows $\chi^2(1) = 1.394$, $p = .179$ .This accepts the null hypothesis of independence and tells us that there is no statistically significant association between these two variables at 5% level of significance, that is, they are independent.

4.4.3 Test of relationship between some opinions of Students

Table 4.33: Test of relationship between some opinions of Students

SL No	Statement	χ^2	DF	Level of Significant
1.	Do you feel pleaser to study in the group of science? Vs Do you feel problem to understand the language of physics?	2.814	1	.093*
2.	Does the teacher use lesson standard teaching aid during class time? * Is it easy to understand to using lesson standard teaching aid?	.017	1	.896 NS
3.	Is there holding class of physics in laboratory * Is the practical class more interesting than that of theory?	3.117	1	.077*
4.	Do you think that a group helps understanding the lesson more? * Do you teacher engage you in group activities	4.531	1	.033**
5.	Do you go to the teacher of physics if you fail physics to understand? * Do you feel physics hard when reading at home?	4.625	1	.026**
6.	Do you think there is needed private tutor after finishing the physics class? * Is more attractive the class to you the teaching of house tutor/cussing tutor than that of class teacher.	31.286	1	.000**
7.	Do you participate in science fair? * Do you feel pleaser in participating science fair?	43.388	1	.000**
8.	Do you feel physics hard when reading at home? * Is there anybody to understand you physics at home?	3.222	1	.044**
9.	Do you go to the teacher of physics if you fail physics to understand? * Does the teacher give you inspiration of your creativity?	42.255	2	.000**
10.	Do you think economical insolvency hamper of your study? * the obstacle of your study is	96.998	20	.000**
11.	What method is applicable to paying more attention in studying * When do you feel comfortable to study.	16.458	12	.171*

Comment:* = Significant ** = Highly Significant NS = None Significant

The table shows that there have significant, highly significant and None Significant relationships of some selected variables.

For example, the test between the variables “Is there holding class of physics in laboratory” and “Is the practical class more interesting than that of theory?” shows $\chi^2(1) = 3.117$, $p = 0.077$.This accepts the null hypothesis of independence and tells us that there is no statistically significant association between these two variables at 5% level of significance, that is, they are independent.

Similarly, the test between the variables “Do you feel pleaser to study in the group of science?” and “Do you feel problem to understand the language of physics?” Shows $\chi^2(1) = 2.814$, $p = 0.093$. This accepts the null hypothesis of independence and tells us that there is no statistically significant association between these two variables at 5% level of significance, that is, they are independent.

The test between the variables “Does the teacher use lesson standard teaching aid during class time?” and “Is it easy to understand to using lesson standard teaching aid?” Shows $\chi^2(1) = .017$, $p = 0.896$. This accepts the null hypothesis of independence and tells us that there is no statistically significant association between these two variables at 5% level of significance, that is, they are independent.

The test between the variables “Do you think that a group helps understanding the lesson more?” and “Do you teacher engage you in group activities” shows $\chi^2(1) = 4.531$, $p = 0.033$.This null hypothesis rejected and indicates a statistically significant relationship between these two variable at 5% level of significance.

The test between the variables “Do you think economical insolvency hamper of your study?” and “the obstacle of your study is” shows $\chi^2(20) = 96.998$, $p = 0.000$.This null hypothesis rejected and indicates a statistically significant relationship between these two variable at 5% level of significance.

4.5 Correspondence Analysis

4.5.1 Introduction to Correspondence Analysis

Correspondence analysis (CA) is a method of data analysis for representing tabular data graphically. It is a statistical technique which is useful to all students, researchers and professionals who collect categorical data, for example, data collected in social surveys. The method is particularly helpful in analyzing cross tabular data in the form

of numerical frequencies, and results in an elegant but simple graphical display which permits more rapid interpretation and understanding of the data.

Correspondence analysis is a method of displaying the rows and columns of a table as points in a spatial map, with a specific geometric interpretation of the positions of the points as a means of interpreting the similarities and differences between rows, the similarities and differences between columns and the association between rows and columns.

Simple correspondence analysis performs a weighted principal components analysis of a contingency table. If the contingency table has *I* rows and *J* columns, the number of underlying dimensions is the smaller of (*I* - 1) or (*J* - 1). As with principal components, variability is partitioned, but rather than partitioning the total variance, simple correspondence analysis partitions the Pearson χ^2 statistic (basically the same statistic calculated in the χ^2 test for association). Traditionally, correspondence analysis uses χ^2/n, which is termed inertia or total inertia, rather than χ^2. The inertias associated with all of the principal components add up to the total inertia. Ideally, the first one, two, or three components account for most of the total inertia. Lower dimensional subspaces are spanned by principal components, also called principal axes. The first principal axis is chosen so that it accounts for the maximum amount of the total inertia; the second principal axis is chosen so that it accounts for the maximum amount of the remaining inertia; and so on.

The first principal axis spans the best one-dimensional subspace (closest to the profiles using an appropriate metric; the first two principal axes span the best two-dimensional subspace; and so on. The contingency table can be analyzed in terms of row profiles or column profiles. A row profile is a list of row proportions that are calculated from the counts in the contingency table. A column profile is a list of column proportions that are calculated from the counts in the contingency table. More detail on correspondence analysis can be found in Green acre (2007) and Johnson and Wichern (2002).

4.5.2 Correspondence Analysis for opinion of the Head teachers

The following is the contingency table for the opinions of the variables “Teacher don't take class better because” and “To development professional skill of teacher need” given by Head teachers.

Table 4.34: Cross table of Teacher don’t take class by Development professional skill

		To development professional skill of teacher need					
		OP	AGT	AES	SCT	ANTA	AO
Teacher dont take class better because	TANA	5	1	1	3	1	0
	TENG	4	2	4	6	0	1
	NIFIS	0	3	1	2	0	0
	NTT	6	1	1	8	3	2
	TNA	3	4	0	3	3	0
	AOF	2	0	0	1	2	5

Where,

TANA : teaching aids are not available

TENG : teaching environment are not so good

NIFIS : need interest for increasing skill

NTT : need of teacher training

TNA : Teachers are not available

AOF : all of the following

OP : opportunity of promotion

AGT : awarded for good teaching

AES : attractive environment of the school

SCT : short cores of training

ANTA : arrangement of necessary teaching aids

AO : all of

Row Points plot

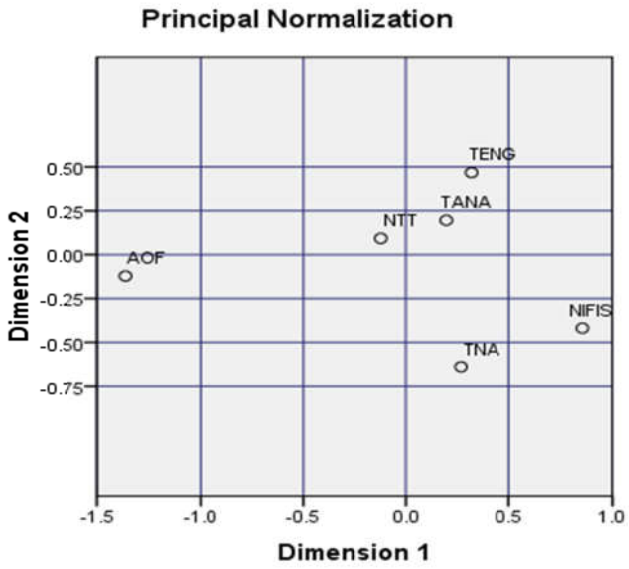

Figure 4.27: Perceptual map for the Contingency Table- 4.34

Interpretation

The row points plot sows that NTT, TANA, TENG are both very close to the origin, indicating that they differ little from the average row profile. The location in the left of the plot AOF is far from the origin. In Figure 4.27 For "Teacher don't take class better because" the positions of the option AOF and NIFIS are far away from other options.

Column Points Plot

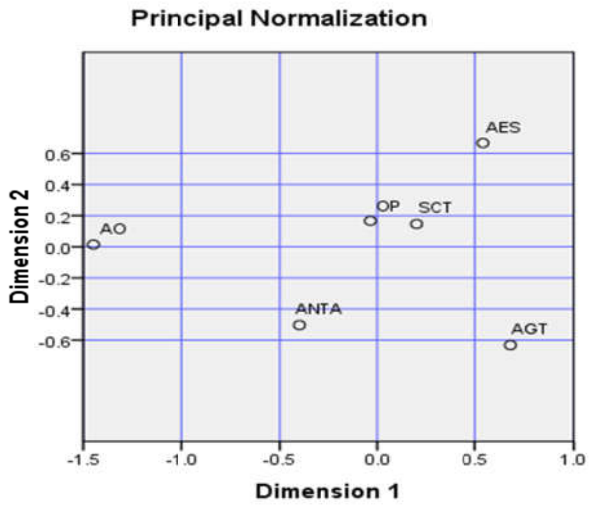

Figure 4.28: Perceptual map for the Contingency Table 4.34

Interpretation

The column points plot sows that OP and SCT are both very close to the origin, indicating that they differ little from the average column profile. The location in the left of the plot AO and AGT are far from the origin. For "To development professional skill of teacher need" the option AO is far away from AGT.

4.5.3 Correspondence Analysis for opinion of the Physics teachers

The following is the contingency table for the opinions of the variables "Do you feel interest in teaching physics" and "Do you satisfied of teaching profession" given by the Physics teachers.

Table 4.35: Cross table of do you feel interest in teaching physics by Do you satisfied of teaching profession

		Do you satisfied of teaching profession				
		SS	S	U	D	SD
Do you feel interest in teaching physics	A	33	17	1	0	0
	O	0	1	0	0	0
	S	19	16	2	1	0
	R	1	2	0	0	0
	N	0	0	0	0	0

Where

A : always

O : often

S : sometimes

R : rarely

N : never

SS : strongly satisfactory

S : satisfactory

U : undecided

D : dissatisfactory

SD : strongly dissatisfactory

Row points plot

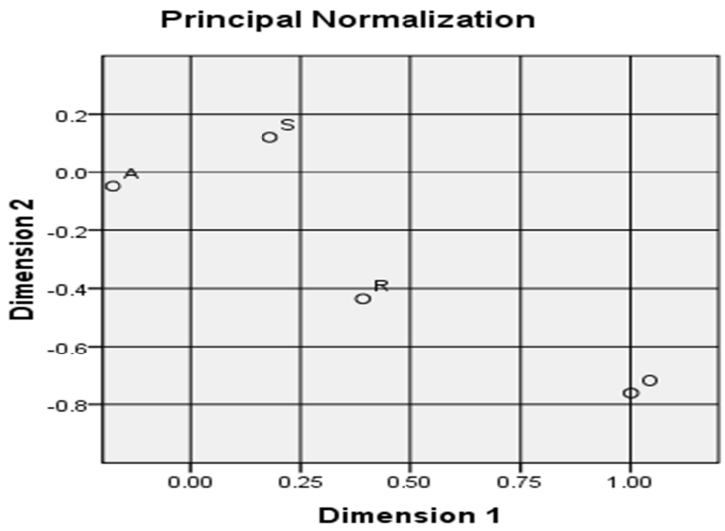

Figure 4.29: Perceptual map for the Contingency Table 4.35

Interpretation

The row points plot shows that A and S are both very close to the origin, indicating that they differ little from the average row profile. The location in the right of the plot O is far from the origin. For "Do you feel interest in teaching physics" the option A is far away from O. The points close to the center of the display A and S have no differences.

Column points plot

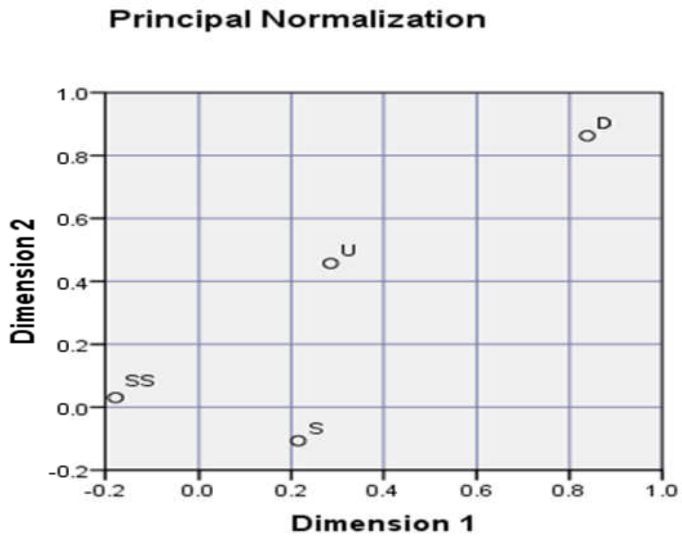

Figure 4.30: Perceptual map for the Contingency Table 4.35

Interpretation

The Column points plot shows that SS and S are both very close to the origin, indicating that they differ little from the average column profile. The location in the upper right of the plot D is far from the origin. For "Do you satisfied of teaching profession" the option SS is far away from D. The points close to the center of the display SS and S have no differences.

4.5.4 Correspondence Analysis for opinion of the students

The following is the contingency table for the opinions of the variables "Learners do not feel pleasure by studying physics, because" and "Lerner's fail to understand the teaching of physics, because" given by the Students.

Table 4.36: Cross table of Learners do not feel pleasure by studying physics, because by Lerner's fail to understand the teaching of physics, because

		Learners are fail to understand the teaching of physics, because				
		TCDACB	LTLC	LSL	LWST	LUBH
Learners do not feel pleasure by studying physics, because	AEA	8	6	20	20	1
	TTHSC	5	6	31	16	6
	PSSFS	45	41	124	17	42
	TASC	5	15	45	7	5
	SSBC	18	9	5	2	1

Where

AEA : teacher does not explain attractively

TTHSC: teacher does not take his schedule class regularly

PSSFC : physics studies seems phobia to on self

TASC : there is no good atmosphere of studying in the class

SSBC : studies do not seen to be comfortable

TCDACB: there is no clear discretion about contents s in the book

LTLC : learners are not taught will in the lower class

LSL : lack of suitable laboratory

LWST : lack of worthy and sick teacher

LUBH : language of books is hard

Row points plot

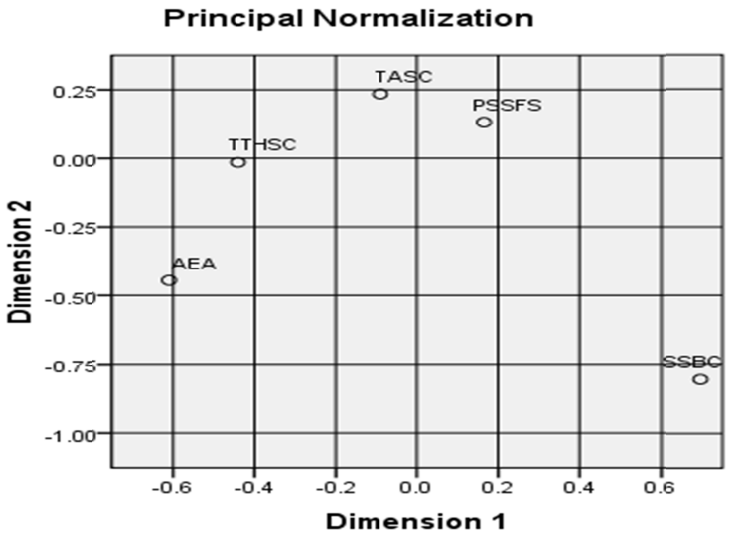

Figure 4.31: Perceptual map for the Contingency Table 4.36

Interpretation

The row points plot sows that TASC and PSSFS are both very close to the origin, indicating that they differ little from the average row profile. The location in the lower right of the plot SSBC is far from the origin. For "Learners do not feel pleasure by studying physics, because" the option TTHSC, AEA are far away from SSBC.

Column points plot

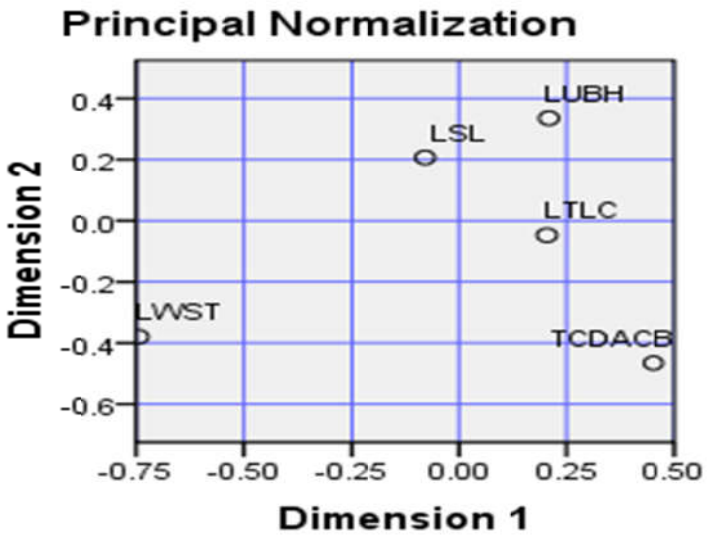

Figure 4.32: Perceptual map for the Contingency Table 4.36

Interpretation

The column points plot shows that LSL and LTLC are both very close to the origin, indicating that they differ little from the average column profile. The location in the lower left LWST and lower right of the plot TCDACB is far from the origin. For "Learners are fail to understand the teaching of physics, because" the option LWST is far away from LUBH and TCDACB.

4.6 Results of Classroom Observation

The researcher investigated 81 schools and evaluated the statements on the basis of using a five points rating scale ranging from 1= Poor, 2= Weak, 3= Fair, 4= Good, 5= Very good

Table 4.37: Classroom Observation

Title: Nature of Physics Teaching Physics at Secondary Level in Bangladesh

Sl. no	Statement	Conditions of %				
		1	2	3	4	5
1	Teachers' uses of Lesson plan (Q_1)	10.1	15.3	23.2	33.8	17.6
2	Classroom management system of teacher are good(Q_2)	10.4	8.3	28.5	40.5	12.3
3	Motivation of students(Q_3)	3.7	8.6	24.7	21	42
4	Technique of questionnaire of teacher are fine(Q_4)	12.1	5.2	32.1	16	34.6
5	Infrastructure of school is good(Q_5)	11.1	9.7	14.8	43.7	21.7
6	Teacher student relationship are friendship(Q_6)	1.2	18.5	33.3	44.4	2.5
7	Use of body language capacity are suitable(Q_7)	11.4	9.7	34.2	23.4	21.3
8	Teacher uses of teaching aids (Q_8)	30.9	12.3	9.9	13.6	33.3
9	Condition of laboratory are good(Q_9)	1.2	12.3	50.6	11.1	24.7
10	Condition of apparatus are sufficient(Q_{10})	8.5	12.3	28.3	35.7	15.2
11	Student do their homework(Q_{11})	21.0	24.7	21.0	19.8	13.6
12	Condition of classroom are satisfactory(Q_{12})	20.4	18.3	9.7	32.3	19.4
13	Classroom temperature has been found normal(Q_{13})	25	7.8	15.4	30.2	21.6
14	Classroom has been found free from Sound pollution(Q_{14})	21	12.7	19.6	30.3	16.4
15	School atmosphere was satisfactory(Q_{15})	2.5	7.4	46.9	14.8	16
16	Teacher has entered the classroom with smiling face (Q_{16})	14.3	9.6	34.9	28.5	12.7
17	Teacher voice was audible(Q_{17})	2.3	7.9	38.2	36.4	15.2
18	Feedbacks of students are satisfactory(Q_{18})	19.6	7.5	25.3	40.2	7.4
19	Proper uses of equipment in laboratory(Q_{19})	48.4	19.4	10.2	9.3	12
20	Teacher has maintained time properly (Q_{20})	2.2	25.8	18.3	40.9	12.9

Comment: 1= Poor, 2= Weak, 3= Fair, 4= Good, 5= Very

Teachers use Lesson plan (Q_1)

The table shows that 10.1% teachers poor, 15.3% teachers weak, 23.2% teachers fair, 33.8% teachers good, 17.6% teachers very good in using of lesson plan in the classroom.

Classroom management system of teacher are good (Q_2)

10.4% teacher poor, 8.3% teachers weak, 28.5% teachers fair, 40.5% teachers good, 12.3% teachers very good management of their class in the classroom.

Motivation of students (Q_3)

3.7% student's poor, 8.6% students weak, 24.7% students fair, 21% students good, 42% students very good motivated in the classroom.

Technique of questionnaire of teacher are fine (Q_4)

12.1% teachers poor, 5.2% teachers weak, 32.1% teachers fair, 16% teachers good, 34.6% teachers very good at making questionnaire.

Infrastructure of school is good (Q_5)

11.1% schools poor, 9.7% schools weak, 14.8% schools fair, 43.7% schools good, 21.7% schools very good of their Infrastructure.

Teacher student relationships are friendly (Q_6)

1.2% schools poor, 18.5% schools weak, 33.3% schools fair, 44.4% schools good, 2.5% schools teacher-student have very good friendly relationship.

Use of body language capacity are suitable (Q_7)

11.4% teachers poor, 9.7% teachers weak, 34.2% teachers fair, 23.4% teachers good, 21.3% teachers very good uses of body language.

Teacher uses of teaching aids (Q_8)

30.9% teachers poor, 12.3% teachers weak, 9.9% teachers fair, 13.6% teachers good, 33.3% teachers very good uses of teaching aids.

Condition of laboratory are good (Q_9)

1.2% schools poor, 12.3% schools weak, 50.6% schools fair, 11.1% schools good, 24.7% schools have very good library in their schools.

Condition of apparatus are sufficient (Q_{10})

8.5% schools poor, 12.3% schools weak, 28.3% schools fair, 35.7% schools good, 15.2% schools have very good apparatus in their schools.

Student do their homework (Q_{11})

21.0% student's poor, 24.7% students weak, 21.0% students fair, 19.8% students good, 13.6% students very good do their homework.

Condition of classroom are satisfactory (Q_{12})

20.4% schools poor, 18.3% schools weak, 9.7% schools fair, 32.3% schools good, 19.4% schools have very good of classroom condition.

Classroom temperature has been found normal (Q_{13})

25% schools poor, 7.8% schools weak, 15.4% schools fair, 30.2% schools good, 21.6% schools have very good of classroom temperature.

Classroom has been found free from Sound pollution (Q_{14})

21% schools poor, 12.7% schools weak, 19.6% schools fair, 30.3% schools good, 16.4% schools have very good of free from sound pollution.

School atmosphere was satisfactory (Q_{15})

2.5% schools poor, 7.4% schools weak, 46.9% schools fair, 14.8% schools good, 16% schools have very good atmosphere.

Teacher has entered the classroom with smiling face (Q_{16})

14.3% teachers poor, 9.6% teachers weak, 34.9% teachers fair, 28.5% teachers good, 12.7% teachers very good entered the classroom with smiling face.

Teacher voice was audible (Q_{17})

2.3% teachers poor, 7.9% teachers weak, 38.2% teachers fair, 36.4% teachers good, 15.2% teachers have very good voice in the classroom.

Feedback of student are satisfactory (Q_{18})

19.6% student's poor, 7.5% students weak, 25.3% students fair, 40.2% students good, 7.4% students very good feedback in the class.

Proper uses of equipment in laboratory (Q_{19})

48.4% student's poor, 19.4% students weak, 10.2% students fair, 9.3% students good, 12% students very good proper uses of equipment in laboratory.

Teacher has maintained time properly (Q_{20})

2.2% teachers poor, 25.8% teachers weak, 18.3% teachers fair, 40.9% teachers good, 12.9% teachers very good maintained time properly.

Chapter Five
Discussion and Conclusion

5.1 Introduction

The purpose of this study was to investigate and describe the nature of teaching physics and its importance in developing conceptual knowledge of physics at the secondary level in Bangladesh. In this study, qualitative data has been collected based on the teacher's comments and observations of their teaching and students learning. The collected data were then used to interpret what teachers say and what they actually do in practice. The findings of this study could be used to explore the reasons for secondary science students poor conceptual knowledge of physics and to consider aspects of secondary physics education and in a broader sense, to make recommendations to develop physics education in Bangladesh. The findings of the study indicate that participating teachers believe that providing theoretical knowledge of physics accompanied by essential practical work can ensure effective teaching and learning of physics. All physics classes should be taught in the physics laboratory furnished with the necessary equipment. Teachers tend to avoid practical work in teaching and learning physics, although they did not do much practical work in their classroom teaching lack of equipment related to the contents of the physics curriculum. The only practical activities that nearly all students did were the experiments in the practical classes. Lack of sufficient equipment for the large numbers of science students also hinders practical experiments. The ratio of teacher and student is high in most of the schools, and a number of assigned classes created an extreme work load for the teachers. There is no laboratory assistants in many schools in the study area and it can be expected the similar picture in the other secondary schools in Bangladesh. The teachers and students in non-government schools faced more difficulties with practical equipment, the timing of practical classes, compared to the teachers and students in government schools and also with not having a laboratory or a specific room for doing practical classes. The study was conducted in Rajshahi District with a view to revealing pictures of the actual teaching of physics at the secondary level in Bangladesh.

5.2 Discussion

In this Section summaries the whole thesis, presents the findings of the study, and suggests some measures to be taken by schools. Head teachers explained that 50.60% of schools have a separate laboratory for physics teaching. It is observed that the individual scores of physics teacher's only 18.30% of teachers have B.Ed. training, 7.5% of teachers have no training and only 8.6% of teachers are highly trained up. In the study it was observed that only 3.2% of teacher uses laboratory method, 95.7% of teacher uses lecture method. However, teachers claim that there are varied factors affecting their effectiveness like the method of teaching physics, crowdedness of classrooms or insufficiency of school settings (Bereketoğlu, 2012). In Bangladesh experienced teachers complain about the insufficiency of physics courses and teaching activities at high school level compared to those in university education. The study explores that present textbook of class IX-X is 55.90% helpful for higher education. Teachers and teacher candidates state that they are not self-confident about their content based knowledge (Azar, 2015). On the other hand, in our study, teacher exclaimed that 46.24% secondary schools have not adequate practical instruments. School those have adequate practical instruments motivating students rapidly (Azar, 20013). Results of our study support Azare's findings. Since our teacher sample consisted of experienced teachers, teachers' scores on items about subject matter knowledge are not low. On the other hand, physics teachers have problems in the dimension of teaching ability and interpersonal relationships. Therefore by considering the findings of the previous studies and our results, it can be concluded that 32.2% teacher think that present syllabus of physics is not appropriate in class IX-X. Our findings revealed that 64.50% school have not sufficient physics teaching aids (overhead projector, computer etc.) teachers do not discuss about books, concentrated on their professions in the class or current developments about the subject matter. As reported by (Bereketoglu, 2012), teachers cannot demonstrate such characteristics because the insufficiency of physics teaching aids. Studies investigating the correlation between do you finish your physics syllabus due time vs do you involve in private coaching χ^2 value is 0.026 which is highly significant at the level of 5%.Specific teacher characteristics and overall effective teaching indicate

that teacher characteristics related to teaching ability are important for effective teaching (Ramanath, 2013).

In a study conducted by (Smith and Cranton, 2014), student ratings of teacher behavior were collected from a sample of 42,407 students. They divided a set of 20 teaching skills into four factors: Interest and Atmosphere, Organization and Clarity, Evaluation, and Discussion. From the study, 38% of students do not understand physics for home atmosphere and schools atmosphere. Data analysis revealed a strong correlation between do you think economical insolvency hamper of your study vs obstacle of your study χ^2 value is 0.000 which is highly significance. Teachers should also help students retain the material taught by identifying what to remember using strategies of emphasizing and summarizing (Hativa, 2003). Another study attempted to find out what high school students regarded as the good qualities of teacher twenty-eight high school teachers were ranked by their students, and the qualities they considered good and bad teachers are listed (Bossing, 2012). 54.80% of teachers applied creative and narrative method for evaluating students. According to the literature, while there are researchers who found weak positive relationships between the evaluation characteristics of the teachers and the effective teachers (Smith, 2013), there are ones who found stronger correlations, too (Sieh, 2014). Some researchers, on the other hands, surveyed the expectations of students from their teachers and found that evaluation is an important factor for effective physics teaching (Duruhan, 2015). In their study described earlier, identify evaluation as one of the factors that accounted for the variance in teaching effectiveness. Items asking if students were informed of their progress in class, if teachers provided explanations of evaluation procedures, and if evaluation was consistent were included in their questionnaire. (Cranton, 2012) reported a correlation between evaluation and teaching effectiveness, but evaluation only accounted for 17 percent of the variance in teaching effectiveness. A study conducted by Jirovec et al. (2016), on social work students, revealed that the instructor's skill in grading was identified as one of the dimensions of teaching effectiveness. Students were asked to complete an instrument designed to measure teaching ability. Items related to evaluation asked if grading procedures had been explained, if feedback was prompt, and if exams were fair. Similar to Smith and

Cranston's (2012) findings, evaluation accounted for only small amount of variance in teaching effectiveness. Other researchers have found evaluation skills to be more important. In a study designed to examine perceptions of clinical teachers, 199 students and 22 faculty members were asked to rank effective teaching behaviors (Sieh & Bell, 2004). Both students and faculty rated evaluation of students as the most important characteristics of the effective teachers. Some of the highly rated items like "Corrects students' mistakes without belittling them" and "Identifies students' strengths and limitations objectively" are directly related to evaluation. 46.20% student students do not finish their home work properly in due time. Studies mentioned above revealed that teacher characteristics like giving homework in that support learning, giving feedback to students, correcting their mistakes without belittling them and evaluating objectively are physics teaching characteristics about evaluation. Teachers have a lot of complain about the text Books and Teaching physics itself. From the study only 38.70% teachers have been trained but they were not motivated to teach physics following the proper methods. So they stick to teaching physics in the traditional way as they were doing previously. As a result learners were not acquired react knowledge room their learning. The study revealed that the status of teaching physics at the secondary level Bangladesh was not satisfactory many teachers did not have training on the subject, due to lack of training teachers were fail to make interest the content to the student. Major problems of the subject identified by the respondents are training of the teachers teaching aids, subjects based teachers, less interest of backward learners, difficult to get by heart the subject matter. According to respondents curriculum of physics could not satisfy them they mentioned that curriculum were not satisfactory. Physical facilities of the schools were poor. They have very few numbers of teaching aids and they seldom used it. Quality of education depends on teaching learning situation and class room facilities, Air movement, proper sunlight, electricity facilities can avoid gloomy environment and create education friendly atmosphere. Teaching for understanding requires flexible subject matter knowledge. Subject matter knowledge is a precondition for teachers as it also assists teachers to identify concepts that the students have difficulties with. All participating teachers stated that subject matter knowledge is necessary for teasing general; they did not mention anything about the necessity of subject matter

knowledge in teaching physics. The purpose of teaching physics at secondary level is to provide students with the theoretical and the practical knowledge of physics that will be develop their confidence. The significant learning is possible only when students have self confidence in their ability to learn. The findings of this study also indicate that teachers believed that when students become interested in learning, they become more attentive. Interest in lesson affects the quality of learning; the educators largely agree that interest plays an important role learning because interest is considered as a sustained personal phenomenon, which is an experience parallel to the curiosity that arises from a surprising incident. Lack of equipment presents a major problem in effective teaching and learning physics in Bangladesh. The lack of equipment seemed to be one of the important factors hindering teachers and students from doing reasonable amount of practical activities both in theoretical and practical classes in Bangladesh. In this study, it is observed that there was sufficient equipment for physics subject even compared to the large number of students which is the nature of teaching physics at secondary schools in Bangladesh. Lack of sufficient physics teachers with higher students in physics was another factor that harms the effective learning of physics. According to the participants of this study, school administration and some physics teacher's awareness of the value of teaching and learning physics can reduce the existing problems for good teaching of physics subject at secondary level in Bangladesh.

5.3 Implications

The findings of this study have several implications for the development of teaching physics at the secondary level in Bangladesh. The Study may enable to reflect on and understand for secondary school physics teachers‟ perceptions of the relationship between practical work and developing conceptual knowledge of physics and also to reflect on their actual teaching. The participating teachers were conscious of the importance of teaching and learning physics at the secondary level. They pointed out the importance of students‟ regular presence in classes for students‟ effective learning and also the importance of appointing sufficient teachers with higher studies in physics for the effective teaching of a complex science subject. They were mentally ready to teach effectively if the limitations were reduced. These findings have implications for other physics teachers and also for the school administrations who read the findings of

this study. The findings of the study imply that there is a need to improve the physical facilities for teaching and learning physics in classrooms as well as in the practical classes. Due to the lack of equipment needed to do practical activities, teachers and students faced difficulties in teaching and learning the theory and concept of physics. The physical facilities were comparatively worse for the non-government schools in Bangladesh. According to some of the participants, if school administration and also the physics teachers in some schools were aware, it could reduce the existing difficulties in teaching and learning. Ways to reduce teachers work load need to be explored and implemented in order to provide effective, quality teaching and learning of physics. The teacher/student ratio in most of the schools studied was high and the class size was large. There was no laboratory assistant in any of the government and non-government schools. Therefore, teachers did not get assistance to organize equipment or develop creative ways to demonstrate key concepts. This study broadened the researcher's view regarding the present situation of teaching and learning of physics in general, and in particular of physics at secondary level in Bangladesh.

5.4 Major Findings of the Research

The study finds that the nature of teaching physics at secondary level should be addressed in order to harvest a good collect of teaching-learning physics in Bangladesh. The following are the main findings of the study which covered all other minor findings.

1. Lack of qualified, well trained, devoted and highly motivated physics teachers.
2. Many teachers having no training on teaching methods and techniques. Teachers are not accustomed to the modern methods and techniques of teaching physics.
3. Teachers do not prepare or collect any teaching aids. Even some schools authorities do not buy teaching aids and do not encourage teachers to use them.
4. In schools there is no system of professional development. Teachers tend to avoid discuss their problems in teaching with other teachers at school.
5. The curriculum of physics is not perfect for class IX-X. They are faulty in many ways, there is no stable syllabus for class VI to class X. Physics started from class IX students with the heavy load.

6. 32.2% teachers think that existing textbook of physics is insufficient for teaching physics at the secondary level in Bangladesh.
7. 50.6% of schools have a separates laboratory for physics subject but 49.4% of schools do not have a separate laboratory for physics subject.
8. Group work is necessary for students in the classroom.
9. 77.4% teachers think more figures are necessary for physics subject but only 22.6% teachers think more figures are not necessary for physics subject.
10. The study explores that 76.5% of schools have separate classroom for taking physics class and 23.5% of schools do not have a separate classroom for taking physics class in the study area.
11. From the study, it was clear that 54.3% of teachers take physics class in the laboratory and 45.7% of teachers do not take physics class in the laboratory of the study area.
12. Concerning to the condition of laboratories 24.7% is excellent, 11.1% is fair, 50.6% is good, 12.3% is not good and 1.2% is not good at all.
13. The teaching method is one of the important parts of learning but, 69.1% schools have appropriate teaching method for physics whereas 30.9% schools do not have appropriate teaching method for physics teachers.
14. Teaching-learning depends on the appropriate syllabus, but the study indicated 67.7% teachers think that present syllabus is appropriate in class IX-X and 32.2%teachers think that present syllabus is not appropriate in class IX-X in the study area.
15. Lesson plan is necessary for good teaching, where as 68.8% teachers use lesson plan and 31.2% teachers not use lesson plan in the study area.100% teacher must be ensured lesson plan.
16. Physics teaching is greatly affected without teaching aids but the study shows that 35.5% schools have sufficient science teaching aids but 64.5% schools do not have sufficient science teaching aids.

17. Laboratory method is essential for physics teaching but 95.7% teachers use lecture method 1.1% teachers use project method and only 3.2% teachers' use laboratory method in time of teaching.

18. Languages of a subject must be clear and easy but the study explores that 9.7% teachers said, language of physics is very easy and clear, 63.4% teachers said, language of physics is normal and clear, 12.9% teachers said, language of physics is hard but clear, 5.4% teachers said, language of physics is so hard 8.6% teachers said, language of physics is unclear for secondary level.

19. Helpful textbooks are attractive for teacher and students but, 23.7% teachers told that present textbooks of physics are more helpful, 55.9% helpful, 17.2% undecided, and 3.2% not helpful for higher education.

20. Training makes a teacher perfect but 7.5% teachers have no training, 18.3% teachers have B Ed training, 12.9% teachers have CPD training, 14.0% teachers have TQI training, 38.7% teachers have B. Ed+ others training, 8.6% teachers have M. Ed and other trainings.

21. The study explores that so far as the present textbook of physics is concerned 3.2% teachers think excellent, 4.3% teachers think very good, 24.7% teachers think good, 7.5% teachers think, not good, 6.5% teachers think ,on an average and 53.8% teachers think, need improvement for class IX-X.

22. It is observed that 34.0% students face problems to understand the language of physics and 66.0% students not face problems to understand the language of physics.

23. Practical class should interesting, but 87.2% students said that practical class is more interesting than theory class but 12.8% students said that practical class is not more interesting than theory class.

24. Economic insolvency hampers physics. The study found that 45.4% students think that economic insolvency hampers their study but 54.6% students reported that they do not have economic insolvency.

25. Environment and atmosphere obstacles affect learning physics and the findings show that 20.2% students said that home atmosphere, 17.8% students said that school atmosphere, 24.8% students said that circumstances, 16.4% students said that Economic insolvency, 16.0% students said that personal unconsciousness, 4.8% students said that mode of very inconvenient transportation are the obstacles of their studies.

26. Data analysis exposed strong correlation between. Do your schools have separate physics lab vs Do your teacher take physics class in the laboratory? χ^2 value is.000** which is highly significant at the level of 5%.

27. Data analysis revealed strong correlation between. Do your teacher take physics class in the laboratory vs Do your physics lab have adequate teaching aids and teaching instrument χ^2 value is.003 which is highly significant at the level of 5%.

28. Studies investigating the correlation between Do you think that present syllabus is appropriate in class IX-X vs Do you finish your syllabus due time of class IX-X? χ^2 value is.000 which is highly significant at the level of 5%.

29. Data analysis revealed strong correlation between. Do the students feel interest for group work vs Do you interest for group work of your students in the classroom χ^2 value is.000 which is highly significant at the level of 5%.

30. Data analysis revealed strong correlation between. Do you go to the teacher of physics if you fail physics to understand? Vs Does the teacher give you inspiration of your creativity? χ^2 value is.000 which is highly significant at the level of 5%.

31. Data analysis revealed strong correlation between. Do you think economical insolvency hamper of your study? vs the obstacle of your study is χ^2 value is.000 which is highly significant at the level of 5%.

32. Condition of classroom must be satisfactory but 20.4% schools poor, 18.3% schools weak, 9.7% schools fair, 32.3% schools good, 19.4% schools have very good of classroom condition.

33. Classroom temperature has been found normal but, 25% schools poor, 7.8% schools weak, 15.4% schools fair, 30.2% schools good, 21.6% schools have very good of classroom temperature. So, physics teaching is hampered.
34. Classroom has been found free from Sound pollution for perfect teaching but from the study 21% schools poor, 12.7% schools weak, 19.6% schools fair, 30.3% schools good, 16.4% schools have very good of free from sound pollution.
35. School atmosphere must be satisfactory but,2.5% schools poor, 7.4% schools weak, 46.9% schools fair, 14.8% schools good, 16% schools have a very good atmosphere.

5.5 Recommendations

The findings of this study lead to the following recommendations regarding the effective teaching and learning of physics at secondary level in Bangladesh. They are:

- Necessary equipment should be provided in such quantities that the teachers in government schools and also in non-government schools can teach all the theories and concepts of physics using demonstrations.
- The class size must be rational so that every student can get the opportunity to do practical experiments through hands-on participation.
- There should have a specific laboratory for doing physics practical.
- To ensure students effective learning, all practical physics classes should be taught in the laboratory.
- The time allocated for physics classes should be increased.
- To ensure effective teaching and learning, only the teachers with higher education in physics should teach both the theoretical physics. For this purpose, a number of subject based teachers could be appointed in schools according to the number of science students.
- There should have initial teacher education programmers and also on-going professional development training programs for physics teachers for teaching the theories and concepts of physics using related equipment for demonstrations.

- In order to reduce the load of classes, the teacher/student ratio could be decreased; and sufficient number of subject-based teachers for each subject could be appointed in each school.
- The details of how many classes must be taken for teaching and learning: could be mentioned in the syllabus handbook.
- Practical classes during teacher training and actual teaching practice should be monitored.
- Regular attendance of students must be ensured.
- Awareness about teaching and learning of physics and students‟ clear conceptual knowledge of physics must be developed in administration staff as well as the physics teachers.
- The group work of students in the practical class should be ensuring.
- It should be ensured that physics teachers must conduct their classes with lessons plans.

5.6 Conclusion

The aim of the study was to explore the nature of teaching physics and its importance in developing conceptual knowledge of physics at secondary level in Bangladesh. This study collected qualitative data based on the teacher's comments interviews and observations of their teaching and students learning. The collected data was then used to interpret what teachers said they do and what they actually do in practice. The findings of this study could be used to explore the reasons for secondary science students‟ poor conceptual knowledge of physics; and to consider aspects of secondary science education; and in a broader sense, to make recommendations to develop science education in Bangladesh. The findings of the study indicate that participating teachers believed that providing theoretical knowledge of physics accompanied by essential practical work can ensure effective teaching and learning of physics. For this purpose, some participant thought that all physics classes should be taught in the physics laboratory furnished with necessary equipment. Although all participating teachers valued practical work in teaching and learning physics, they did not do much practical work in their classroom teaching because of a lack of equipment related to

the contents of the physics curriculum. The only practical activities nearly all students did were the experiments in the practical classes. Lack of sufficient equipment for the large numbers of science students also hindered practical experiments. The teacher/student ratio was high in most of the schools, creating an extreme work load for the teachers. There was no laboratory assistant in any of the four schools in this study, and participants indicated that this is the case for other secondary schools in Bangladesh. Compared to the teachers and students in government schools, the teachers and students in non-government schools faced more difficulties with practical equipment, timing of practical classes, and also with not having a laboratory or a specific room for doing practical classes.

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Appendices

Appendix-I
Questionnaire for Head Teachers

Title: Nature of Physics Teaching at Secondary Level in Bangladesh
(Questionnaire for M.Phil Thesis)

Section-A: Personal Information

a. Full name: ……
b. Joining date……
c. Experience:……d. ID. No……
e. Sex: Male □ Female □ f. Age… years……
g. Name of School: …….
h. Address of School……..
i. Category of School:
□Government □MPO Enlisted

j. Academic Qualifications:

Examination	Group	Board/ University	Year of passing	Result	Mark in physics %
SSC/Equivalent					
HSC/Equivalent					
Bachelor(Pass/Hones)					
Masters					

k. Information Relating to Training

Name of the Training course/Program	Training Institution	Learning Points	Duration
B. Ed			
M. Ed			
T.Q.I			
Others			

1. Do your school have year plan

   □ Yes □ No

2. Do your school have separate classroom for every class

   □ Yes □ No

3. Do your school have library

   □ Yes □ No

4. Do your library have physics book

   □ Yes □ No

5. Do the student read physics in library

   □ Yes □ No

6. Do your school have science group

   □ Yes □ No

7. Do you school have separate laboratory for physics subject

   □ Yes □ No

8. Do your school use multimedia system in the classroom

   □ Yes □ No

9. Do your school have multimedia classroom

   □ Yes □ No

10. Do your school take in use multimedia

    □ Yes □ No

11. Do your school arrange in science fair in every year

    □ Yes □ No

12. Do your school have separate classroom for taking physics class

    □ Yes □ No

13. Do your school have computer lab

    □ Yes □ No

14. Do you arrange guardian meeting regularly in your school

    □ Yes □ No

15. Does your school have adequate teaching aids?

    □ Yes □ No

16. Do your school arrange seminar and symposium with science students regularly

    □ Yes □ No

17. Do you give ACR for teacher

    □ Yes □ No

18. Do your school have Mach system

    □ Yes □ No

19. Do your school have separate physics lab

    □ Yes □ No

20. Do your teacher take physics class in the laboratory

□ Yes □ No

21. Do your physics lab have adequate teaching aids and teaching instrument

□ Yes □ No

22. Do you think that the teaching method of physics teacher is appropriate

□ Yes □ No

23. Condition of laboratory

□ Excellent □ Fair □ Good □ Not good □ Not good at all

24. Teacher don't take class better because

□ Teaching aids are not available □ Teaching environment are not so good

□ Need interest for increasing skill □ Need of teacher training

□ Teacher are not available □ Al of the following

25. To development professional skill of teacher need

□ Opportunity of promotion □ Awarded for good teaching

□ Attractive environment of the school □ Short Cores of training

□ Arrangement of necessary teaching aids □ All of them

26. Your school have furniture, classroom etc.

□ More than necessary □ As necessary □ Less than necessary

27. Your school have less students because

□ School infrastructure is weak □ school is available inside of this school

□ ignorant of the guardian □ need of experience teacher

□ communication system is not good

28. Quality of education is low position of non.gov. school

□ Absence of school □ teacher low salary of the teacher

□ absence of teacher and students co-ordination

□ school infrastructure is weak □ absence of the govt. follow-up

29. System of teaching of your school

□ Highly moderate □ moderate □ undecided □ not moderate

30. Cannot motivated students because

□ Large classroom size □ absence of teaching environment in the classroom

□ need of train teacher □ weakness of the teacher

□ school management is weak

31. Teacher cannot developed of the student in creativity

□ Teacher cannot create interest of students □ students are not interest

□ classroom size is large □ absence of teaching aids according to teaching absence of necessary lab

32. Teacher cannot gate class timely because

□ Visitor cannot visit school regularly □ teacher cannot take class uses create teaching method □ teacher are unconscious of the work □ teacher are not any respondent or any neglect

33. Teacher are not interested for professional teaching because

□ Promoting is not expected □ salary is not increasing for training □ teacher are not absence of sufficient environment in school □ teacher are not involve for training

34. What are the extra policy take you for the weak teacher

35. Give your opinion for developing of your Institution

36. Give your opinion describe the reason of decreasing science student

37. Do you think that Bangladesh is decreasing economically science student

□ Yes □ No

38. Give your opinion to attractive teaching physics at secondary level in Bangladesh

Appendix-II
Questionnaire for Physics Teachers

Title: Nature of Physics Teaching at Secondary Level in Bangladesh
(Questionnaire for M.Phil Thesis)

Section-A: Personal Information

a. Full name: ……ID. NO:……
b. Designation:……c. Joining date:……
c. Experience of teaching Mathematics:…….
e . Sex: Male □ Female □ f. Age:……years
g. Name of School: …….
h. Address of School:……..
i. Category of your School:
□ Government □ MPO Enlisted
j. Your Academic Qualifications:

Examination	Group	Board/University	Year of passing	Result	Mark in Physics%
SSC/Equivalent					
HSC/Equivalent					
Bachelor(Pass/Hones)					
Masters					

k.Science Background of Your Bachelor and /or Masters Level(s), if any:

Levels	Having Physics	Not having Physics
Bachelor (Pass/Hones)		
Masters		

L. Information Relating to Training on Teaching Physics

Name of the Training course/Program	Training Institution	Learning Points	Duration

1. Do you take physics class in class nine
   □ Yes □ No
2. Do you take practical class in physics
   □ Yes □ No
3. Do you think that present syllabus is appropriate in class IX-X
   □ Yes □ No
4. Do you finish your syllabus due time of class IX-X?
   □ Yes □ No
5. Do you use lesson plan in the class?
   □ Yes □ No
6. Do all students finish home work properly
   □ Yes □ No

7. Do your class uses co-curricular activities
   □ Yes □ No
8. Do you awarded of your students for good result
   □ Yes □ No
9. Do you involve in privet teaching
   □ Yes □ No
10. Do you feel interest in taking class
    □ Yes □ No
11. Do you get feedback of students for group work
    □ Yes □ No
12. Do your school have sufficient science teaching aids
    □ Yes □ No
13. Do you think more figure is necessary for physics subject
    □ Yes □ No
14. Do you involve in physics privet teaching
    □ Yes □ No
15. Do you have any coaching center for teaching
    □ Yes □ No
16. Do you privet teaching of your class students
    □ Yes □ No
17. Do your school have any laboratory for physics subject
    □ Yes □ No
18. Do you participate science fair any time
    □ Yes □ No
19. Do you participate science fair any time
    □ Yes □ No
20. Do you evaluate of your students in every class
    □ Yes □ No
21. Do you discuss any time any problems with your colleagues
    □ Yes □ No
22. Do you use guide book in teaching
    □ Yes □ No
23. What method do you use in the classroom
    □ Lecture method □ Project method □ Laboratory method

24. What method do you think appropriate

□ Teacher centered method □ Students centered method □ Lecture method

□ Demonstration method □ Discussion method □ Project method

□ Invention method

□ Teacher own method

25. How many student is appropriate for better teaching in the classroom

□ 30 □ 40 □ 50 □ 60 □ Other

26. Do you take pre-test knowledge of students before starting class

□ Always □ Often □ Sometimes □ Rarely □ Never

27. Do the students feel interest for group work

□ Always □ Often □ Sometimes □ Rarely □ Never

28. Do you interest for group work of your students in the classroom

□ Always □ Often □ Sometimes □ Rarely □ Never

29. Students are not interested of the subject because

□ Large class size □ They have no opportunity for question □ students are not interest with teacher any discussion □ text book is so hard experienced

□ teachers are not available

30. Main barrier of teaching physics is

□ train teacher are not available □ involving more privet teaching □ subject teacher are not available □ students think that physics subject is so hard

□ teacher are not interested in physics subject

31. Do you feel interest in teaching physics

□ Always □ Often □ Sometimes □ Rarely □ Never

32. Do you satisfied of teaching profession

□ Strongly satisfactory □ satisfactory □undecided □ dissatisfactory

□ strongly dissatisfactory

33. What type question is appropriate for the students

□ Easy type and multiple choice □ multiple choice and interview

□ Descriptive and narrative □ creative and descriptive □ creative and narrative

34. Do your head teacher visit of your class teaching

□ Always □ Often □ Sometimes □ Rarely □ Never

35. What was the aim of your students life

□ Doctor □ engineer □ teacher □ others

36. Why you choice teaching profession

□ There is no way of good job □ age is over for good job

□ teaching is interesting job

□ Job center is near of own home

37. Do you make lesson plan before starting class

□ Always □ Often □ Sometimes □ Rarely □ Never

38. Do your school have adequate practical instrument

□ Adequate □ not adequate □ undecided

39. Do you think that experiment of physics practical for class IX-X

□ More appropriate □ appropriated □ undecided □ not appropriated

40. Language of physics subject is appropriate for secondary level

□ Very easy and clear □ normal and clear □ hard but clear □ so hard □ unclear

41. What method do you apply for evaluated of your student

□ Easy type □ multiple choice □ short and easy types □ creative and short

□ creative and narrative

42. Do your laboratory have necessary teaching aids and instrument for teaching according to syllabus

□ Available □ undecided □ not available

43. What academic facilities needed for teaching physics

□ Classroom are not available □ lab instrument are not available □ head teacher are not co-operative □ teaching aids are not available □ all of the following

44. Train teacher not use create method of teaching because

□ Limitation of class time □ teaching aids are not available □ classroom size is large □ Sufficient classroom is absence □ teacher are not interested

45. Skill of teacher are undeveloped because

□ Absence of sufficient classroom □ environmental problem □ irregularity of students' □ absence of teaching aids □ helpfulness of related person

46. Teacher are more attentive to privet teaching then class teaching

□ To earn more money □ to develop own skill □ school environment is not appropriate for teaching □ to more share of students

□ school teaching is not interesting

47. Present textbook of physics subject is helpful for higher education

    □ More helpful □ helpful □ undecided □ not helpful □ not helpful at all

48. What class do you take in class IX-Xof your school?

    □ Bangle □ English □ mathematics □ physics □ chemistry □ biology

    □ social science □ religious

49. What is the brier of teaching physics class of your school?

50. What are the opinion of teaching physics more effective in class IX-Xof your school

51. What training do you achieve

    □ No training □ B Ed □ M Ed □ CPD □ TQI □ B Ed+others training

    □ M Ed +others training

52. How many class do you take every day of your school (on an average)

    □ Three □ four □ five □ six □ seven

53. How many class of a day is better for a teacher for good teaching

    □ Two □ three □ four □ five □ six □ seven

54. How many earn per month including job

    □ 8000-12000 □ 12001-15000 □ 15001-20000 □ 20001-25000

    □ 25001-30000 □ 30001-40000 □ 40001-above

55. What parts of physics are hard for teasing in physics subject in class IX-X

56. How many base are privet coaching of you

    □ Zero bass □ one □ two □ three □ four □ five □ six □ others

57. How many student are privet coaching of you

    □ Nil □ 01-10 □ 11-20 □ 21-30 □ 31-40 □ 41-50 □ 51 to above

58. Comment the guide book of physics in class IX-Xat secondary level in Bangladesh

59. Do you think that present text book of physics is appropriate for class IX-Xat secondary level

    □ Excellent □ very good □ good □ not good □ on an average □ need improve

Appendix-III
Questionnaire for Students

Title: Nature of Physics Teaching at Secondary Level in Bangladesh
(Questionnaire for M.Phil Thesis)

Section-A: Personal Information

a. Name: ----------
b. Father's name: ----------
c. Mother's name: ----------
d. Name of the institution and address: ----------
e. Class: ----------Roll No: ----------Section----------
f. Fathers' / Guardians' Occupation:

Types of occupation	Urban Students' Fathers' / Guardians' Occupation in percentage	Rural Students' Fathers' / Guardians' Occupation in percentage
Service		
Agriculture		
Business		
Agriculture & Business		
Service & business		
Service & agriculture		
Service, agriculture & business		

g. Mothers' Occupation:……
H.NameofFathers' and Mothers' Organization/Institution:
i. Fathers' Academic Qualifications:

Education levels	Students' Fathers' educational qualification of urban area in %	Students' Fathers' educational qualification of rural area in %
MA/M.Sc/M.Com		
BA/BSc/B.Com		
HSC/Equivalent		
SSC/Equivalent		
Primary level		
Literate		
Illiterate		

j. Mothers' Formal Education:

Education levels	Students' Mothers' educational qualification of urban area in %	Students' Mothers' educational qualification of rural area in %
MA/MSc/M.Com		
BA/BSc/B.Com		
HSC/Equivalent		
SSC/Equivalent		
Primary level		
Knowledge of literacy or illiterate		

k.Monthly Income of the Guardians:
(In Bangladesh Tk. in thousands)

Students' guardians' monthly income range	% of Students' guardians' monthly income of urban area	% of Students' guardians' monthly income of rural area
Below 2		
2-5		
5-10		
10-15		
15-20		
20-30		
30-40		
Above 40		

1. Do you feel pleaser to study in the group of science?
   □ Yes □ No
2. Does your teacher teach you the practical class of physics?
   □ Yes □ No
3. Do you think that a group dialups understanding the lesson more?
   □ Yes □ No
4. Is there an opportunely to use computer facilities at home?
   □ Yes □ No
5. Do you use computer to learn lesson?
   □ Yes □ No
6. Do your teacher use of black board?
   □ Yes □ No
7. Does the head teacher super files the class room during the time of teaching?
   □ Yes □ No
8. Does your guardian take care of your studies?
   □ Yes □ No
9. Do you teacher engage you in group activities
   □ Yes □ No
10. Do you write the lesson after reading it?
    □ Yes □ No
11. Do the teachers of your school take weekly examination of physics?
    □ Yes □ No
12. Is there taking place lasses with the help of multimedia?
    □ Yes □ No
13. Is there holding science fair every year?
    □ Yes □ No

14. Do you participate in science fair?

□ Yes □ No

15. Do you feel pleaser in participating science fair?

□ Yes □ No

16. Do you study science book bound task book

□ Yes □ No

17. Before every examination do the physics complete?

□ Yes □ No

18. Do you feel problem to understand the language of physics?

□ Yes □ No

19. Do you have house tutor?

□ Yes □ No

20. Do you gate lesson from couching/private.

□ Yes □ No

21. Do you take the lesson of physics from who teach you it?

□ Yes □ No

22. Is there physics lab in you school?

□ Yes □ No

23. Is there holding class of physics in laboratory

□ Yes □ No

24. Do the practical classes hold before ever examination as per syllabus?

□ Yes □ No

25. Do you go to the teacher of physics if you fail physics to understand?

□ Yes □ No

26. Do you fail physics hard when reading at home?

□ Yes □ No

27. Is there anybody to understand you physics at home?

□ Yes □ No

28. Do you think there is needed private tutor after finishing the physics class?

□ Yes □ No

29. Does the teacher make every chapter of physics under stand in the class room?

□ Yes □ No

30. Does the teacher use lesson standard teaching aid during class time?

□ Yes □ No

31. Is it easy to understand to using lesson standard teaching aid?

□ Yes □ No

32. Do you make any lesson standard teaching aid?

□ Yes □ No

33. Is there holding science related tour every year in your school?

□ Yes □ No

34. Does the long wage of physics seem hard to you from that of other?

□ Yes □ No

35. Is the practical class more interesting than that of theory?

□ Yes □ No

36. Is more attractive the class to you the teaching of house tutor/coaching tutor than that of class teacher.

□ Yes □ No

37. Does your father gate information about the result of your examination?

□ Yes □ No

38. Does the teacher give you inspiration of your creativity?

□ Yes □ No

39. Do you think it is easy to understand the lesson of every chapter of your physics task book if included more picture?

□ Yes □ No

40. Do you think economical insolvency hamper of your study?

□ Yes □ No

41. Learners do not friend pleaser by studying physics, because

□ Teacher does not explain attractively □ Teacher does not take his schedule class regularly □ Physics studies seems phobia/fearfully to one self-There is no go atmosphere of studding in the class

□ Studies do not seen to be comfortable.

42. Teacher does not take his schedule class of physics in due time because

□ There is no enough scope of using practical and teaching aid □ There is want of laboratory □ Learners are in attentive □ Teacher are in at tentative

□ Head teacher is in co-operative

43. Sometimes learner miss their classes, because

    □ Learners do not fill comfortable in the class □ To study is no comfortable

    □ There is no good atmosphere of teaching-learning in the class

    □ Teacher does not explain to the point.

    □ Parents do not repack for not attending the classes.

44. What do you feel in studying physics in the class?

    □ Excellent □ Moderate □ it does not friend no interest □ it does not find no interest at all □ it finds boring

45. When do you feel comfortable to study?

    □ When I understand □ When teacher give enthuse and make the lesson easy

    □ When teacher does no convey parmesan if failed to study

    □ A ranging entertainment to the class

46. What method is applicable to paying more attention in studying

    □ You are to lesson what said by teacher □ teaching through question and answering □ dividing a large no of student in to small

    □ Group from you appeared as a teacher to teach

47. When it finds to pay attention in study?

    □ Not to understand the teaching of teacher □ Loud speaking of the classmates during classes □ Teacher's punishment conveying □ not leasing the speaking of teacher v. parents showing in co

48. How much the teacher is science to make group discussion

    □ Very liberal □ Moderate liberal □ Not liberal □ Not liberal at all

49. Teaching aids that means

    □ Books/kakas/poster paper □ Chalk duster □ Formula chart

    □ Science apparatus □ All of

50. Lerner’s are fail to understand the teaching of physics, because

    □ There is no clear dissertation about contains in the book □ Learners and not taught will in the lower class □ Lack of suitable laboratory □ Lack of worthy and sickles teacher □ Long usage of books is hard

51. What is the aim of your life

    □ Becoming a doctor □ becoming an engineer □ becoming a teacher

    □ becoming a dietician □ other

52. How do you feel studying in the group of science?

□ Feeing well □ moderately well □ Feeling well sometimes

□ Filling not well at all □ Felling very well

53. Failing to make the lesson prepared teacher

□ Setting punishment □ Company affection □ to make the lesson understand

□ to informs guardian

54. Does the teacher use the teaching aids in the class room

□ No used □ Sometimes used □ all the time □ never used

55. Do you understand the specs spoken by the teacher in the class room

□ Understand very well □ Not understand very well □ Understand something

□ Not understand at all □ Hard to understand the space of teacher

56. The obstacle of your study is

□ Home atmosphere □ School atmosphere □ Circumstance atmosphere

□ Economics in solvency □ Unconcern nests of own

□ Mode of very in favorable transportation

57. What do you feel the teaching of your teacher

□ Teaching fleck neck is acceptable □ not acceptable □ needed to advance teaching quality □ Not acceptable at all □ Subject knowledge is poor

58. Who inspires you to study in the group of science?

□ Own interest □ Teacher □ Parents □ Classmate □ Other

59. What interested drown by guardian for your science study

□ Very interested □ not interested □ Moderate interested □ Not interested at all

60. What help given by the teacher if you go to him for understanding physics

□ To making understand □ not making understand □ making raff behaviors

□ Telling met latter □ Abroad □ Mess evaluate

61. The school where you study not feel comfortable because

□ Infracktacker is break mode □ Lack of sacked teacher

□Class mates not co-operative with in lesson

□ Transportation means not well □ School atmosphere is not well

62. Practical classes of physics are held in

□ Once per week □ once per month □ after examination □ not held

□ not held at all

63. Which to piece do you feel happy to study of your task book most which one is easiest
64. Who helps you when you unable to understand science lesson.
65. Who studies in the group of science from your dear ones?
66. What are the duties of the learners to make the result of physics well
67. The latest educational qualification of father

    □ Below SSC □ SSC □ BA/equivalent □ MA/equivalent □ Above
68. The latest educational qualification of mother

    □ Below SSC □ SSC □ BA/equivalent □ MA/equivalent □ Above
69. What is the monthly income of your family?

    □ 2000-5000tk □ 5001-8000tk □ 8001-12000tk □ 12001-16000tk

    □ 16001-20000tk □ 20001-30000tk □ 30001-40000tk □ 40001-above
70. How many members of your family?

    □ 3 □ 4 □ 5 □ 6 □ 7 □ more than 7
71. How many members of your family are studying

    □ 1-2 □ 3-4 □ 5-above

Appendix-IV
Physics Classroom Observation checklist

a. Name of the Teacher :
b. Name of your School :
c. Title of Lesson :
d. Number of Students : □ Male □ Female
e. Date : time :

Title; Nature of Physics Teaching Physics at Secondary Level in Bangladesh

Sl. no	statement	conditions of %				
		1	2	3	4	5
1	Lesson plan					
2	Classroom management					
3	Motivation					
4	Technique of questionnaire					
5	Infrastructure of school					
6	Teacher student relationship					
7	Use of body language					
8	Uses of teaching aids					
9	Condition of laboratory					
10	Condition of apparatus					
11	Home work					
12	Condition of classroom					
13	Room temperature					
14	Sound pollution					
15	School atmosphere					
16	Smiling face teacher					
17	Teacher voice audible					
18	Feedback of student					
19	Proper uses of equipment in laboratory					
20	Time management					

Comment:
1= Poor
2= Weak
3= Fair
4= Good
5= Very good