PROBLEM CHALLENGING THE ACADEMIC ACHIEVEMENTS OF PHYSICS STUDENTS IN OROMIA REGION WEST WOLLEGA ZONE (THE CASE OF THREE PREPARATORY SCHOOLS)

By:

Mathewos Bekele Getahun

A THESIS SUBMITTED TO APPLIED PHYSICS PROGRAM
SCHOOL OF APPLIED NATURAL SCIENCE

PRESENTED IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE IN PHYSICS.

OFFICE OF GRADUTE STUDIES

ADAMA SCIENCE AND TECHNOLOGY UNIVERSITY

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DECLARATION

I hereby declare that this is my original work and has not been presented for a degree in any other university, and all sources of data used for this thesis have been properly acknowledged.

Name **Mathewos Bekele** signature _____

This Msc. Thesis has been submitted for examination with my approval as thesis advisor.

Name **Mesfin Asfewu (PhD)** signature _____

Date of submission _____

ADAMA SCIENCE AND TECHNOLOGY UNIVERSITY

GRADUATE STUDIES PROGRAM

Examination Committee Approval Sheet

As members of the board of examiners for the Degree of Masters of Science in Physics. Thesis open defense examination of Mathewos Bekele I certify that I have read and evaluated his thesis in titled "Problem Challenging the academic achievement of students in physics in West Wollega zone in selected preparatory school" and examined the candidate. I therefore, recommended that the thesis could be accepted as it fulfills the requirements for degree of Masters of Science in physics.

Name of chairperson	signature	Date
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Name of Advisor	Signature	Date
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Name of internal Examiner	Signature	Date
_____	_____	_____
Name of external examiner	Signature	Date
_____	_____	_____

The final approval and acceptance of the thesis is contingent up on the submission of the final copy to the school of graduate studies (SGS) through the candidates dep't or school of graduate committee.

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LIST OF ABRAVIATION AND ACRONYMS

GPS	Ghimbi Preparatory School
NPS	Nedjo Preparatory school
MSPS	Mane Sibu Preparatory school
PSP	Preparatory School Principal
IDV	Independent variables
PT	Physics Teacher
BG	Between Groups
WG	Within Groups
SA	Strongly Agree
A	Agree
DA	Disagree
SDA	Strongly Disagree
NO	Neutral (No Opinion)
T	total

Abstract

This study was conducted to examine problems that challenged academic achievements of physics students in West wollega zone in the case of Mane Sibu, Nedjo and Ghimbi preparatory schools. Questionnaires, interviews and observation were used to collect relevant data for the study. Data from questionnaires was compiled and analyzed using a computerized data analysis package known as Statistical Package for Social Science SPSS 24.0. The ANOVA test and the case summary test were used to compute to test association between dependent variable and independent variables. On the other hand, percentages were used for comparison of data analysis and T-test was used to find out the gender difference in academic achievement in physics. The findings reveal the existence of a significant influence of teachers both in developing positive or negative attitude to subject (physics) and for their poor academic performance in lower class as well as in preparatory school. On the basis of the findings, the attitudes of physics teacher has a significant relationship with the independent variable (items) of p-value= 0.014, 0.037, 0.042 and 0.023 which are less than alpha(α) level of significance(0.05), which indicated that there is statistical significant difference between students academic achievement and physics teacher attitude. The school leader ship attitude has a significant relation with the independent variables with p-value= 0.044, 0.033, 0.013 and 0.041 are less than the alpha(α) level of significant 0.05, which reveals that there is a significant difference between principal attitude and students academic achievement. The study also found out that physics students' had a negative attitude towards the subject physics. The major factors which influenced students' achievement in physics were: lack of laboratory, lack of instructional resource, lack of good back ground in physics, the methodology the teacher implements in physics lesson, the lack of interest to the subject from the student side and students attitude toward physics were contributed students' low achievement in physics.

CHAPTER ONE

1. INTRODUCTION

1.1 Background of the study

Science had been of great importance internationally for sustainable and socio-economic development as well as for technological advancement of nations. Knowledge of science and technology is therefore a requirement in all countries and needed by all people globally due to numerous challenges that are facing them. These challenges include emergences of new drug resistant diseases, effects of genetic experimentation and engineering, ecological impact of modern technology, dangers of nuclear war and explosions and global warming among others **[1].** This had resulted to rapid changes taking place in medicine, industry, communication, and agriculture. Science as an agent of development plays an important role in bringing about these changes through technological advancement, national wealth enhancement, health improvement and industrialization **[2]**; this is why scientific and technological breakthrough is usually the goal of any developing nation. According to **[3]**, opined that Physics is a science of reality and will remain the fundamental science.

Physics is the bedrock of science and technology because many of the tools on which the scientific and technological advancement depends are the direct products of Physics. Physics is therefore a core subject in science and technology since it studies the essence of natural phenomena and helps people understand the rapidly technological changing society **[4].** The principles of Physics have been widely used for various economic, scientific and technological advancement such as in information technology, which has reduced the world into a global village through the use of satellites and computers. Also, the knowledge of Physics had led to sustainable development in the area of industrialization for improvement of materials useful to the well being of human race. Furthermore, Physics education enables the learners to acquire problem-solving and decision-making skills that pave way for critical thinking and inquiry that could help them to respond to widespread and radical changes in all facets of life. Despite the importance of Physics to the scientific and technological development of our nation, understanding of the subject had dwindled over the years and performance of the enrolled students had not been encouraging. In addition **[5],** discussed that in many countries, there has been a decline in the number of students wishing to continue with physics.

In Ethiopia fewer students elect physics at the undergraduate levels, the majority of students assigned to study physics were blamed for lack of interest, low achievement and lacks academic success **[6]**, and low academic self-concept **[7],** even as compared to their counterparts assigned to Biology, Chemistry, and Mathematics **[8].** The reason for the problem is listed by different scholars like the subject physics is considered a difficult subject for students from secondary school to University and also for adults in graduate education **[9]**. The Ethiopian National learning assessments also showed that compared to other subjects students' performance in physics to be the least in all grade levels **[10], [11].** Of course, many factors may influence students' performance. However, according to **[12]**, one's teaching effectiveness may greatly increase depending on one's ability to make a choice of appropriate teaching method. Recent research report from Ethiopia also confirmed the teachers' ignorance to implement student-centered instruction including other factors resulted students in poor physics achievement at higher institutions **[13]** and also at preparatory school **[14]**. As this has to take into account every stakeholder, the researcher was initiated to identify challenging problems in relation to pre-university school students' academic achievement in physics on grass root.

1.2. Statement of the problem

Scientific literacy and the need for technological advancement in any society are a major ground for physics, needing to be part of any program of lifelong learning. The foundation of this lifelong learning should therefore be well grounded in our Country. In preparatory schools, science curriculum is organized as three distinct subjects: Biology, Chemistry and Physics. Compared to other natural science subjects, physics attracts fewer students to study it. Despite the numerous career opportunities related to physics and the crucial role it plays in the development of technology and advancement of the country's economy, there is a general poor academic achievement in Physics both in secondary and preparatory schools.

Now days, the attention given to this subject is very low by preparatory school students which is reflected by their achievement in both national and international examination results. Consequently, in 2017 G.C. or 2009 E.C the Ethiopian University entrance examination result also shows that only 28.76% of grade 12 Natural science students were achieved university entrance point in West Wollega zone. (Zone Education Office Document of 2017 G.C). Based on the above discussion, the study aim to find the challenging problem related to physics that can contribute low academic achievement of physics students in West Wollega zone in selected Mene sibu, Nedjo and Ghimbi preparatory schools.

1.3 Objective of the study

1.3.1 The general objective of the study

The general objective of the study is to investigate problem challenging the academic performance of physics students' in preparatory schools in the selected areas, West wollega zone Mane sibu,Nedjo and Ghimbi preparatory school .

1.3.2 The specific objectives of the study

The specific objectives of the study are;

1. To identify Problem challenging the academic achievement of physics students in preparatory school
2. To find the significant relationship between the students attitude and their academic achievement.
3. To investigate the impact of physics teacher attitude on the student's academic Performance.
4. To assess the effect of instructional resources on students' achievement in physics.

1.4. Research Questions

The research was conducted to assess the problem challenging the academic performance of students in physics education in preparatory school. This study will be guided by the following research questions.

1. Is there significant relation between the students' attitudes and the academic achievement in physics?
2. Is there significant difference between physics teacher attitude and students' academic achievement in physics?
3. How do school principals' attitudes towards physics affect the academic achievement students in Physics?
4. Is there any significant gender difference between students in academic achievement in physics?
5. Is there availability of sufficient teaching materials for teaching physics and physics laboratory in the School?

1.5. Significance of the Study

The study may be significant in the following regards

- The study can help as the source of information about the students' attitude and other challenges in physics education and implication on students' academic performance.
- It helps the physics teachers to enhance their students' attitude and make the subject attractive.
- It enables school principals and other stake holders to allocate school budget on physics instructional facilities.
- The study may help in giving appropriate solutions for the students, physics teacher and other concerned bodies to take measurements to overcome the problem of the their students' academic achievements.
- This study may contribute to knowledge about the relationships of the factors that influence students' decisions in regard to making subject choices.

1.6. Delimitation of the Study

There are 17 (Seventeen) government and one non government preparatory school in west wollega zone. This study is delimited to the selected preparatory schools in Ghimbi, Nedjo and Mane Sibu town. The researcher wants to assess and address the challenging problem in physics education and the academic performance of physics students in the selected preparatory schools.

1.7. Limitation of the Study

While conducting the study especially during the collection of data, the researcher was faced the following challenges;

- Permission and co-operation of school principals and educational experts.
- Physics teachers were not interested to give all the information (especially the interview) honestly.
- Students were delayed to give crucial information on their issue. I was stayed for more than one week in each of the sampled school.
- There was political instability in the zone so that all grade level of students was not in a good condition to reflect their idea confidently.

CHAPTER TWO

REVIEW OF THE LITERATURE

2.1. The Concept of Academic Performance/ Achievements

Academic performance has been described as the Scholastic standing of a student at a given moment **[15].** This scholastic standing could be explained in terms of the grades obtained in a course or groups of courses. The scholastic standing is an argued that performance is a measure of output and that the main outputs in education are expressed in terms of learning, that is, changes in knowledge, skills and attitudes of individuals as a result of their experiences within the school's system **[16].** Academic performance is regarded students' performance in an examination as being depended on his cumulative grade point average **[17].** Student's success is generally judged by examination performance while the best criterion of performance is the sum of the student's academic performance in all the subjects taken. On the other hands, Poor academic performance is a performance that is adjudged by the examinee and some other significant as falling below an expected standard **[18]**. The interpretation of this expected or desired standard is better appreciated from the perpetual cognitive ability of the evaluator of the performance**.**

2.2. Definitions of Attitude

Attitude is a mental predisposition towards people, objects, subjects, events, situations or ideas. An attitude may be considered as a mental state of readiness to respond that is organized through experience and will exert a direct influence on behavior. An attitude entails organization of concepts, beliefs, habits and motives associated with particular persons, objects, subjects, events, situations and ideas. They make one to react in consistent way, favorably or unfavorably to a more or less predictable degree to particular situations. Attitudes consist of satisfaction and dissatisfactions and form the basis of ideas and feelings we bring to these situations they are the core of our likes and dislikes for certain people, groups, situations, objects and intangible ideas such as freedom of the press **[19]** .

The concept of attitude links to internal characteristics of people to the external characteristics of situations. Attitudes are thus internal private events whose existent we infer from our own introspection or from some of the behavioral evidence. This happens when they are reflected in word or in deed. Since an

individual's attitudes are inferred, this means that they cannot be measured directly as skills, facts and concepts **[20].** It can be noted that attitudes are very important to the learning. Attitudes refer to how one thinks, feels about, or act towards objects or ideas. In this connection then, attitudes will definitely affects our ways of learning. Attitudes is defines as "positive or negative feelings that an individual holds about objects, persons or ideas **[21].**

2.3. Students' Attitudes towards Physics education

Perceptions of a subject's difficulty, is related to students' subject choices. Measurements of subject difficulty are contentious because of the shortcomings of available statistical treatments. According to Physics was shown to be one grade more difficult than non-science subjects, and more difficult than chemistry, biology and mathematics **[22]**. These findings were confirmed by analyses of national data-sets. According to **[23]**, a study done for UK government by ACOST (Advisory Committee on Science and Technology) concluded that many students had negative attitudes towards science because they perceived their science courses as being difficult and dull, impersonal and abstract, irrelevant to their lives and requiring them to be passive in their learning. However, students welcomed the active learning and the project work that was being encouraged in some of their courses. **[24],** further indicated that physics was "perceived as difficult, dull un interesting subject ..." and that they had very low confidence in their own ability to pass in physics.

Attitude that students come with into class may influence what they learn in the physics course. There is some difference between individual and intrinsic interest and situational and extrinsic interests. Situational and extrinsic interest is stimulated by contextual factors such as good teaching that stimulate interest and engagement. The role of situational interest is highly significant in classroom or courses where students are not interested in the course or are not at all motivated academically**[25]**. The study **[26]**, indicates that student' interests in science affects their motivation, will to learn science and their past history of science learning affects how they perceive their skill. Teachers should make an effort to tie information to students' interest. Teachers can present information by incorporating real life applications or uses. Students should also be taught to associate information with future goals. Teachers should also reflect on their role as teachers and on the main educational objectives that they would like their students to accomplish

2.4. Teachers' Attitude towards Physics Curriculum

At school, science teachers play an especially crucial role in the formation and reorganization of students" conceptions and attitudes towards science and scientists **[27].** In particular, teachers" conceptions and attitudes towards science and scientists establish a "hidden curriculum" and determine to a large extent their teaching practices **[28].** Teachers" inadequate understanding of the nature of science may pose difficulties in

introducing coherent and compelling teaching practices addressing their students" interests and experiences and perpetuate to implement traditional, teacher-centered instruction **[29]**. Hence, the teachers" views and attitudes towards science have an impact on the respective views and attitudes of their students. Previous studies have confirmed that teachers with a positive view towards science tend to inspire analogous positive stances in their students. On the other hand, many teachers have been found to adopt stereotypic images of scientists identical to those of students **[30]**, which often go hand in hand with negative attitudes towards science. These teachers are expected to have a negative impact on the ways their students conceive of science and scientists **[31],** as well as on the students' likelihood of selecting and pursuing school science courses and, accordingly, of opting for a future career related to science **.**

2.5. Gender differences and academic performance in physics

Many researchers have investigated the reason for low enrolment and achievement in science among the girls. Some of the reasons given were that; ' in developing countries, boys were likely to be involved in outdoor activities such as herding animals, fishing and hunting, while the girls' activities are likely to be domestically oriented involving washing and cooking.' These activities disadvantage the girls from pursuing science related courses as they do not "tinker" **[31].** It is with this in mind that claimed that the idea of cars for boys and dolls for girls should be discouraged since it placed the girls at a risk of failing to pursue science oriented courses **[32]**. Girls in most cases opt to take subjects that do not require high order thinking skills such as secretarial, home science and catering. The girls, especially those in day schools are likely to be involved in helping their parents afterschool and may therefore not have enough time for study **[33].**

Parents in African societies allocate more house work to their daughters than to their sons **[32].** Girls seem to shy away from physics due to the perception that the subject has many 'risky' experiments **[33].**Perhaps the essential 'maleness' of the subject puts the girls off. Girls seem to view physics as a male subject thus opting for biology and chemistry**.** However, all the sciences require performance of experiments and practical lessons to aid students' psychomotor and acquisition of science process and manipulative skills. Enrolment and Performance in physics and other sciences may be affected by among other factors ability or inability to develop psychomotor skills good enough to handle practical examinations **[34].** Girls poor performance in key subject especially those in day schools was due to the fact that they had other chores that they perform at home after they leave school thus limiting their study**[35]**. Students perceive physics oriented courses such as engineering and architecture to be masculine while biology is viewed to be feminine. This image is also perpetuated in schools where physics teachers and students are predominantly male **[36]**. There is higher spatial visualization ability among the boys than among the girls **[37].** This could explain the reason why boys perform better in sciences than girls. In fact, given a choice, most girls opt to study biology.

2.6. Students Back Ground and Their Academic Performance

Science has been regarded as the bedrock of modern day technological breakthrough is built. Nowadays, countries all over the world, especially the developing ones like Nigeria, are striving hard to develop technologically and scientifically, since the world is turning Scientific and all proper functioning of lives depend greatly on Science. Science is a dynamic human activity concerned with understanding the workings of our world. This understanding helps man to know more about the universe. Without the applications of science, it would have been difficult for man to explore the other planets of the universe. Science comprises the basic disciplines such a Physics, Chemistry, Mathematics and Biology. Many investigations have shown that secondary school students are exhibiting dwindling interest in Science **[38].** Besides, Physics as one of the Science subjects remains one of the most difficult subjects in the school curriculum according to the Nigeria Educational Research and Development Council (NERDC) **[39]**.

Studies have revealed that the academic performance of Nigerian students in Ordinary Level Physics was generally and consistently poor over the years. Physics is an important science subject that makes immense academic demands on the students in its learning. The learning of the physics is difficult at best and almost impossible at worst but because of its enormous importance to science and technology, there is huge interest in student's achievement in physics. In the light of this, the relationship between the background and classroom environments and students achievement in physics has generated a great deal of discussion for a long time. The family background should be an environment in which children have the opportunity to succeed and be happy **[40].** A conducive home influence manifests itself further in the school environment. It helps plan, execute and evaluate child's school experiences. In relation to level of maturation and mental health of the child in order to help him/her excel academically. Furthermore it has been x-rayed that some factors, which are attributed present in family contributes greatly to the academic performance of students. Among these are parental educational background, income, exposure, parental relationship with each other, strength of the family population, religion, sex differentiation, occupation etc. the interplay of these factors in the family determines to great extent the readiness of child to learn. Never less, the influences of others factors like mental and physical disabilities can account for poor academic performance in physics.

In the whole the family background being an umbrella in the initiation of the child into the world should provide favorable conditions, which will improve the academic performance of child irrespective of the constraints encountered in his academic pursuits. Most of subjects offered in secondary school have some factors, which affects their assimilation by students.

Physics is no exception. Students come from different home and as a result have different challenges to contend with **[41].** In addition to this, Students' educational outcome and academic success is greatly influenced by the type of school which they attend. The school one attends is the institutional environment that sets the parameters of a students' learning experience. Depending on the environment, a school can either open or close the doors that lead to academic achievement. The type of school a child attends influences educational outcomes **[42].** On the other hand, there is evidence that, students from urban backgrounds had significantly better academic and research indicators than those from rural and remote backgrounds **[43].**

2.7. Resources (Institutional Facilities) and Academic Performance

Generally education deals with the development of humankind in so many ways. In this process, education is being given to students with different methods namely Teaching, Demonstration, Laboratory Practice, Field Study and etc. The struggle to study is the main aim of the students in the Teaching Learning processes most effective **[44]**. However, for this achievement, students need so many infrastructure facilities at university to acquire sufficient knowledge in their field **[45]**. In the same time, University is a place for good training and to provide facilities to students like effective teaching, suitable atmosphere, sufficient library and laboratory.

Generally Students rely on the lecture notes, reference and text books study materials at large to maintain good performance in their studies now a day's, students' number in all Universities have been increased by Ministry of education but in the same time basic facilities are not being increased at the same rate. In this scenario, the rapid growth of students' number in each University, it is observed, certainly affects the availability of basic facilities on the other hand, Poor academic achievement in Physics could be attributed to many factors among which teacher's strategy itself was considered as an important factor **[46]**. This implies that the mastery of Physics concepts might not be fully achieved without the use of instructional materials. The teaching of Physics without instructional materials may certainly result in poor academic achievement **[47]**. Also the findings stressed that a professionally qualified science teacher no matter how well trained would unable to put his ideas into practice if the school setting lacks the equipment and materials necessary for him or her to translate his competence into reality.

2.8. Principals' Attitudes towards Physics education

The school principal, deputy principal, head of academic department and the career counselor are expected to play major role in educational institution. The principal is in charge of all that goes on in the school ranging from human resource management, financial management to curriculum implementation **[48]**. He or she interprets the policy on behalf of the ministry of Education, executes curriculum programmes, ensures

provision of equipment, physical facilities and maintains effective school community relations. According to **[49]**, high school principals play pivotal role in school decisions, and that the decisions the principals make are based on their perceptions and attitudes. Due to their leadership role, principals' perceptions and attitudes about a curriculum could either result in increased educational opportunities for students or in limited efforts to enhance curricular change.

In many schools the academic department is mandated to conduct the form three students' subjects' selection exercise after ensuring that the curriculum requirements have been understood by all students. However a number of past research studies revealed that this is one of the areas that students are not fully involved but rather hurriedly coerced into subjects choices that may not enable them to join the aspired careers. For example **[50]**, found that some students who had dropped physics, expected to pursue courses such as Biology, language, social science and many others fields. A study by **[51],** on the effects of head-teachers' management styles on performance in physics, found that performance in physics, indirectly depends on the management styles of the head teachers and is highly affected by their management characteristics such as acquisition of text books, equipments, qualified teachers, proper guidance and counseling to change the attitude towards the subject and poor teachers motivation.

2.9 Students' Interest Towards physics

Interests are considered to be the most important motivational factors in learning and development. In regards to the relevance of science, students view scientific knowledge as an important component of their education, acknowledging its value for explaining everyday experience. However, they primarily stress the instrumental value of science (e.g. for pursuing a career) than its intrinsic interest **[52]**. More particularly, students" interest in science involves three dimensions **[53]**: a) interest in a particular context in studying science; b) interest in a particular content connected with that context; and c) interest in a particular activity a student is engaged in, in conjunction with that content.

Therefore, the context in which science is studied is a powerful predictor of students" interest. Contexts that stimulate interest involve science as a: means to promote practical competence; socio-economic enterprise; vehicle to enhance emotional experience; intellectually challenging endeavor; and a vehicle to qualify for professional life. Students' interests and attitudes related to science are significantly differentiated according to age and gender, as well as to socio-economic and cultural background **[54]**. These factors combined with the classroom environment and science teaching practices employed are considered as particularly important in shaping students multiple and fluid identities **[55]**. As they advance from primary to secondary education, students rapidly lose their interest in science and cease seeing it as a viable option for their future, or associating it with their success aspirations.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1. The Research Design

The study adopted a descriptive survey research design. This is a method of collecting information by interviewing or administering a questionnaire to a sample of individuals. It can be used when collecting information concerning current status of the subject of the study. This research design was preferred because the researcher only gathered data on existing state of affairs in the target population, in order to assess the problem challenging the academic achievements of physics students in West Wollega Zone, Preparatory schools.

3.2. Research Area

The study was conducted in the Oromia region West Wollega zone:-Mendi town , Nedjo Town and Ghimbi Town. Mendi, Nedjo and Ghimbii located at the Western Wollega Zone part of Ethiopia and 520km, 445 km and 346 km far from the capital city of Addis Ababa successively. The entire district town has only one governmental preparatory school. The research was accomplished from September 2010 E.C to August 2010

3.3. Source and population of the study

In order to achieve the desired goal of this study the researcher is used various information to collect data. The study were focused on problem challenging the academic performance of the preparatory school students in physics, interests in physics class, enrollments out of school about physics and the environment of the school in physics education to assess on the challenging problem on physics education and the academic performance of preparatory school students in west Wollega zone Oromia region. The sources of the population are all preparatory school students, physics teachers and preparatory school principals.

3.4. Sampling Size and Sampling Techniques

To make the sample area manageable and representative, 3 preparatory schools were selected purposively on the assumption that they are relevant source for the case under study. There are about 11 physics teachers in the 3 selected schools were taken as sample and in addition to these there are also six (6) preparatory school principals, physics department heads, all are participated in the study as shown in the table 1.

Table 3. 1. Sample size of population in terms of their school

Name of school	**Grade 12 Preparatory school students in 2017/18**						**Physics teacher**						**Principals**					
	Total students			Sample size			Total			Sample size			Total			Sample size		
	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T
GPS	218	240	458	22	24	46	5	-	5	4	-	4	3	-	3	2	-	2
NPS	310	250	525	30	24	54	5	-	5	4	-	4	2	-	2	2	-	2
MSPS	278	236	514	27	23	50	3	-	3	3	-	3	2	-	2	2	-	2
Total	830	661	1491	79	71	150	13	-	13	11	-	11	7	-	7	6	-	6

Because, of disproportional size of the students in the three targeted school the stratified techniques were applied to select students as a sample in this study.

Table 3. 2. Sample size and percentage in terms of gender

Male Sampled	Female sampled	Total sample size	Percentage		
			M %	F%	T%
96	71	167	11.6	9.8	21.4

3.5. Data Collection Instruments

Attitude scale Test towards physics subject was developed by the researcher. This questionnaire consists of 20 items in 5 points Likert Scale. The responses will be specified: Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree respectively allocate each value point of as 5, 4, 3, 2 and 1 a for positive and reverse sort for negative responses. Observation and interview were made during the data collection to strength the evidences obtained through questionnaire. These tools were given to all population of the study in the sampled school to find the relationship between dependent & independent variables that contribute low achievement in physics.

3.6. Questionnaire

The structured questionnaires were designed to investigate the problem challenging the academic performance of preparatory school students in West Wollega Zone. They are preferred in this study because they will give respondents complete freedom of response. The questionnaires were range from 15- 20 constructed for participants.

3.6.1 Questionnaire for Students

The researcher prepared a questionnaire for three preparatory school students who are included in the sample. The first part included the student's demographic information, that is, their gender, woreda of the school they are currently learning. The second part collected data on the problem challenging the academic achievement of students in physics. This part of the questionnaires included the impacts of students' gender difference on the academic performance, the students' interest in learning physics, students' attitude toward physics and other related factors, such as teacher attitude, and instructional facilities.

3.6.2 Questionnaire for Physics Teachers

These questionnaires are in two sections. The first section sought to find out demographic information of the teacher like age, gender, working experience and level of education. The second section collected data on physics teachers' attitudes towards physics, methods of teaching and interests in teaching physics and the implication on the students' academic performance.

3.6.3 Questionnaire for Principals

The researcher was constructed questionnaire for principals that sought to find out the background information about their schools. It also sought to find out principals' attitudes towards physics.

3.7. Observational Check List

The observational check list were taken from the record data about the students attitude toward physics and their participation in the classroom and it is most commonly involves insight or visual data. Here the researcher was used his naked eyes to observe supplementary situation to strength the information that will be found in questionnaire and interview

3.8. Interview

The interview was constructed for physics department heads of preparatory schools targeted area. The interview was focused more on the questionnaires which do not give expressions. Here face to face questions were asked, department heads, physics teachers, and directors of preparatory schools to achieve the objective of the study and to strengthen the responses given by the sampled population.

3.9. Data collection procedures

Before distributing and administrating the questionnaire a brief explanation and guidance were given for the participants about the purpose of the study. The respondents were advised to provide genuine response. The questionnaire were filled out by the participants in the presence of data collector under restrict exam like discipline to minimize the risk of exchanging information. And also the information were collected using interviews from the participants (students, physics teachers, and school principals). As questionnaire and interview completed, the researcher was also used observational check list and document analysis to strength the information obtained through questionnaire and to find related problem.

3.10. Data Analysis

Data from questionnaires was collected, sorted, edited, classified and analyzed using a computerized data analysis package known as Statistical Package for Social Science SPSS 20.0. The ANOVA test was used to compute to test association between the dependent variable and independent variables. In addition to this the percentage analysis of the case summary test was used to determine the relationship between dependent variable and the independent variables; resources like laboratory materials, interest, teacher methodology, students back ground and academic achievement. Moreover, the percentage analysis was used to describe some data that are impossible to analyze using statically procedure like ANOVA. Finally, T-test were used to find the significant gender difference on academic achievement in physics.

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSIONS

4.0 Introduction

This chapter deals with analysis, results and discussions. The main purpose of the study was to analyze Problem challenging the academic performance of preparatory school students in physics in West Wollega Zone. The chapter is arranged into sections as follows:- demographic information, distribution of sampled of the population, analysis of the questionnaires from:- students, physics teachers and school principals analysis of sample T-test and discussion of the findings. Data was collected from, six principals, 11 Physics teachers and 150 grade 12 natural science students (47 from GPS, 54 from NPS and 50 from MSPS), giving a total of 167 respondents. All the questionnaires were returned, therefore making a 100% return rate. This response was high enough to provide credible findings on problem of low achievement in physics education in preparatory school in West Wollega Zone.

4.2. Data analysis of Principals' Attitudes and students achievement in physics

The first objective of the study was to determine the principals' attitudes towards offering of Physics in their schools. To respond this objective, school principals were provided with statements measuring their attitude towards offering of Physics in schools. They were require to indicate their agreement levels on a five point Liker scale; strongly agree, agree, disagree, strongly disagree and neutral having the value 5, 4, 3, 2, and 1 respectively.

4.2.1. Principal rate in terms of the school.

Table 4.1. Percentage and frequency distribution of principals in terms of school

Name of school	Frequency	Percent	Valid Percent	Cumulative Percent
MSPS	2	33.3	33.3	33.3
NPS	2	33.3	33.3	66.7
GPS	2	33.3	33.3	100.0
Total	6	100.0	100.0	

The results in the table above shown, in the three sampled preparatory school 2 (two) principals (33.3 %) from each preparatory school were involved in the study.

4.2.2 Statistical analysis of principal responses

The descriptive statistics of mean and the standard deviation of the independent variables of the principal responses were given below.

Table 4.2. Descriptive statistics of principal data.

S.N	Item	N	Minimum	Maximum	Mean	Std. Deviation
1	I involve physics teacher during purchasing of teaching and learning material	6	2	5	2.83	.753
2	I ensure there is physics laboratory in my school.	6	2	5	2.83	.753
3	I reward best performing students in physics	6	3	4	2.17	1.169
4	Physics plays an important role in science and technology today	6	1	5	2.67	1.211
5	I encourage student's choice of Science in my school	6	1	5	2.50	1.049
6	physics is boring subject it is impossible to make students successful	6	2	4	2.67	.516
7	I ensure physics teacher attend in service training	6	1	4	2.00	.632
8	I organize academic trips for Science students.	6	1	2	1.67	.516
	Grand mean				**2.41**	

In table 4.2. The result revealed, the grand mean value of the total item was 2.41. The variables;' I reward best performing students in physics, Physics plays an important role in science and technology to day, I encourage students choice of science in my school had scored better on average and more spread out from the value 2.41 with std. deviation 1.169, 1.211 and 1.049 respectively. While, the rest of the whole items had the more consistence score and less spread out from the mean 2.41 with a std. deviation range .516 to .753 shown in the table.

4.2.3 Analysis of principal attitude using ANOVA test.

ANOVA is used to test for significant difference between groups. It can be used to test differences in three or more groups. The study adopted multiple independent variables and the number of principal is limited to six, thus to determine the relationship between the principal attitude and the students' academic achievement in physics one way ANOVA was used in the analysis of the data.

Table 4.3; ANOVA-Test between principal's attitude and academic achievement in physics

I DV		Sum of Squares	df	Mean Square	F	Sig.
1	BG	7.000	2	3.500	10.500	.044
	WG	1.000	3	.333		
	T	8.000	5			
2	BG	4.333	2	2.167	13.000	.033
	WG	.500	3	.167		
	T	4.833	5			
3	BG	4.333	2	2.167	2.600	.221
	WG	2.500	3	.833		
	T	6.833	5			
4	BG	1.000	2	.500	1.500	.354
	WG	1.000	3	.333		
	T	2.000	5			
5	BG	8.333	2	4.167	25.000	.013
	WG	.500	3	.167		
	T	8.833	5			
6	BG	1.000	2	.500	.333	.740
	WG	4.500	3	1.500		

	T	5.500	5			
7	BG	1.000	2	.500	.333	.740
	WG	4.500	3	1.500		
	T	5.500	5			
	BG	1.333	2	.667	1.333	.041
8	WG	1.500	3	.500		
	T	2.833	5			

Results depicted in table 4.3. revealed that the independent variables; (1) I involve physics teacher during purchasing teaching- learning materials of physics education in preparatory school, (2) I ensure there is physics laboratory in the school where the students can carry out physics experiments, (5) I organize academic trips for physics students with physics teachers, (8). Lack of instructional facilities and physics laboratory in the school had significant difference at 0.044, 0.033, 0.013 and 0.041 respectively. This showed that principal attitude had significant relationship with students' academic achievement in physics. However; the independent variables: (3) I reward best performing students in physics, (4) I ensure physics teacher attend in-service training, (6) I encourage student's choice of physics in my school and (7) Physics is a subject of male not for female students had no significant, p value =0 .220, 0.354, 0.740 and 0.740 respectively which are greater than the alpha value 0.05. From this result we concluded that, having significant value greater than 0.05, these items are unrelated (no significant difference) with students academic achievement in physics.

4.3.Data Analysis of PT attitude and students academic achievement in physics

4.3.1 Demographic information

Table 4.4. frequency and percentage distribution in terms of their school

Name of school	Frequency	Percent	Valid percent	Cumulative percent
MSPS	3	27.3	27.3	27.3
NPS	4	36.4	36.4	63.7
GPS	4	36.4	36.4	100.0
T	11	100.0	100.0	

From the results of the above table, 3 (30%) of the physics teachers were involved from MSPS and GPS, while 4(40%) of physics teachers were involved from NPS in this study.

Fig. 1 Physics teacher rate of participation

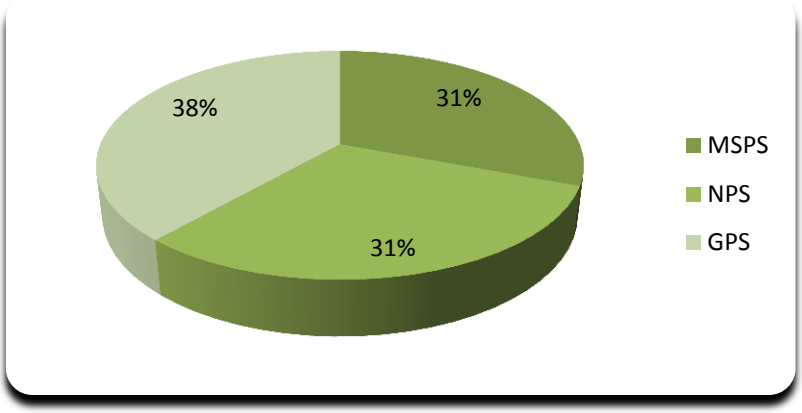


Table 4.5 Percentage and frequency of physics teacher level of qualification.

qualification	Frequency	Percent	Valid Percent	Cumulative Percent
Msc.	4	36.4	36.4	36.4
BEd.	7	63.6	63.6	100.0
Total	11	100.0	100.0	

From the results of the above table, only 36.4% of the physics teacher is qualified in Msc. degree in physics and currently teaching grade 11 and grade 12 students in the sampled PS. The largest percentage (63.6%) of preparatory school physics teachers is qualified in BSc. degree in teaching physics in the sampled PS. This is also shown in figure below;

Fig.2 physics teacher academic level of qualification

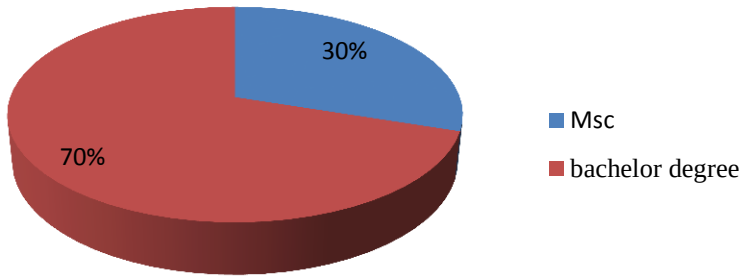
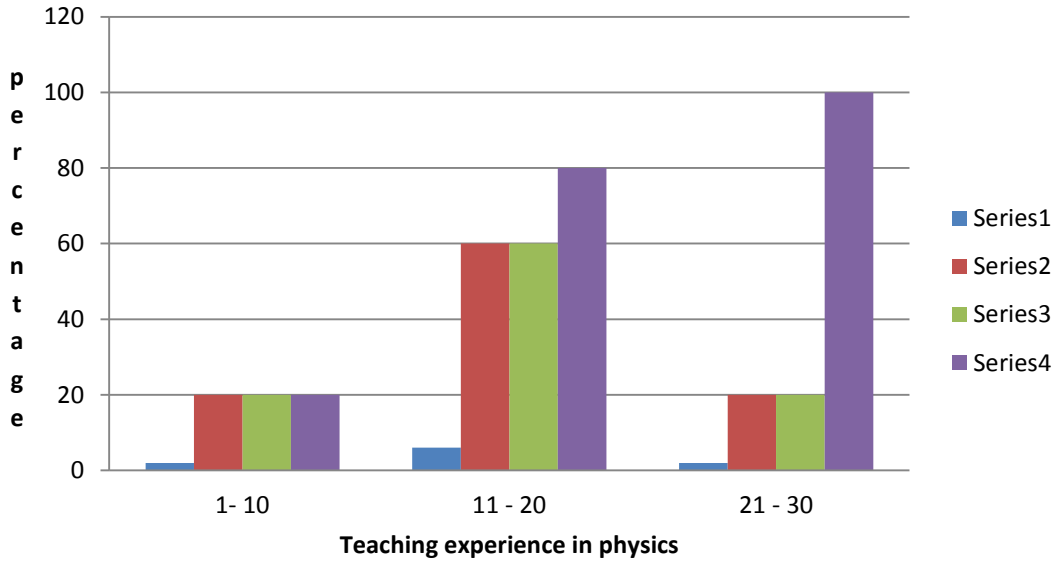


Table 4.6 The percentage and frequency of physics teacher teaching experience

Experiences	Frequency	Percent	Valid Percent	Cumulative Percent
1- 10	2	20.0	20.0	20.0
11 - 20	6	60.0	60.0	80.0
21 - 30	2	20.0	20.0	100.0
Total	10	100.0	100.0	

From Table 4.6, it can be observed that sixty (60 %) of the teachers had taught Physics for a period of 11- 20 years, 2 (20 %) had taught for 1-10 years , another 2 (20 %) had served as physics teachers for more than 21 years. It is obvious that students taught by more qualified and experienced teachers in terms of knowledge of the subject matter perform better than those taught by less qualified but experienced teachers. This is also shown in fig. below.

Fig. 3 Physics teacher teaching experience



4.4.1. Statistical Analysis of PT response

The data collected from physics teachers were tabulated step by step as given below. The mean value, the std. deviation of the teacher responses were stated in table 7.

Table 4.7 Descriptive Statistics of teacher data

S.N	Item	N	Minimum	Maximum	Mean	Std. Deviation
1	I enjoy teaching physics	11	1	5	2.27	1.104
2	Most topics in physics are challenging to teach	11	3	5	2.36	1.286
3	Teacher methodology can affect academic achievement of students in physics	11	3	5	3.00	1.265
4	Few students choose physics.	11	2	5	3.09	.701
5	I really like physics	11	1	5	3.27	.905
6	I think in service training would assist me in improving my skill for teaching physics	11	2	5	3.36	.674
7	Physics is very interesting	11	1	5	3.27	1.104
8	I find some mathematical concept very difficult to explain	11	1	5	2.82	.982
9	Physics is a domain for boys	11	1	5	2.82	.874
10	The facilities for teaching physics are adequate in my school	11	1	2	1.55	.522
	Grand Mean				**2.47**	

From the results in table 4.7, the grand mean value of the whole item was 2.47.The independent variables 1, 2, 3 and 7 had scored better on the average and more spread out from their respective mean value. However, the rest of independent variables had more consistence score and less spread out from their respective mean value. Item 10 was the least mean value indicated that it was negatively responded by physics teacher.

4.3.3 Analysis of teacher attitude using ANOVA test.

Table 4. 8 ANOVA-Test between Teacher attitudes' and academic achievement in physics

I DV.		Sum of Squares	Df	Mean Square	F	Sig.
1	BG	.515	2	.258	.177	.841
	WG	11.667	8	1.458		

	T	12.182	10			
2	B G	5.879	2	2.939	2.205	.173
	W G	10.667	8	1.333		
	T	16.545	10			
3	B G	6.682	2	3.341	7.636	.014
	WG	3.500	8	.438		
	T	10.182	10			
4	B G	3.765	2	1.883	2.347	.158
	W G	6.417	8	.802		
	T	10.182	10			
5	B G	6.682	2	3.341	7.636	.014
	WG	3.500	8	.438		
	T	10.182	10			
6	BG	2.015	2	1.008	1.307	.323
	WG	6.167	8	.771		
	T	8.182	10			
7	B G	4.795	2	2.398	5.115	.037
	WG	3.750	8	.469		
	T	8.545	10			
8	BG	6.682	2	3.341	4.860	.042
	W G	5.500	8			
	T	12.182	10	.688		
9	BG	3.765	2	1.883	6.232	.023
	W G	2.417	8	.302		
	T	6.182	10			
10	B G	4.250	2	2.125	2.194	.174
	WG	7.750	8	.969		
	T	12.000	10			

The results of the above table indicated that, physics teacher had negative attitudes toward physics education in preparatory school. The dependent variables; (1) I enjoy teaching physics. (2) Most topics in physics are challenging to teach, (4) Teacher methodology can affect both the interest and academic

performance of students in physics, (6) I really like physics. (10) I am under terrible strain in physics class are nonsignificant. Provided that the significant value of these items are greater than 0.05.This revealed that there is positive relationship between physics teacher attitude and students academic achievement in physics. However; (3), boys often perform better than girls in physics, is significant ($\rho = 0.014 < 0.05$) provided that, there is a gender difference between male and female students in academic achievement. (5). Few students choose physics because there are few carriers related to the subject is significant at $\rho = 0.014 < 0.05$. This showed that there is significant relationship between teacher attitude and students academic achievement in physics. (Item 7) I think in-service training would assist me in improving my skill for teaching physics is significant at $\rho = 0.037$ less than the alpha value 0.05.This indicated that there is significant relationship between teacher attitude and students academic achievement. (Item 8) Physics is very interesting is significant at 0.042 which is less than the alpha value 0.05. This value suggests that there is significant relationship between the interest of physics teacher and students academic achievement in physics. (Item 9) The facilities for teaching physics are adequate in my school is also significant at 0.023 which is less than 0.05.This value implied there is significant relationship between instructional facilities of teaching physics and the students' academic achievement in physics.

4.4. Analysis of students' attitude towards physics and academic achievement in physics

The third objective of the study was to find out students' attitudes towards the physics education. To respond to this objective, Natural science students were presented with 15 Items on a 5-point likert scale. The scale ranged from 1 to 5, with, 1 denoting strongly disagrees, 2 representing disagree, 3 denoting neutral (undecided), 4 denoting agree and 5 representing strongly agree. The researcher wants to analyze the individual item responses to identify the problem over the study area. Therefore, instead of ANOVA the percentage analysis of the case summary report were used to find the exact relationship between the independent variables and the academic achievement of students in physics.

4.4.1 Reliability Statistics

Reliability is the internal consistency or the degree to which the chosen set of item measure for what it was designed. The item was constructed a single direction and its reliability is examined using the Cronbach's alpha value criterion computed following the specification below.

Table 4.9. Reliability (internal consistency)

Cronbanch's alpha	Cronbanch's alpha based on standardized item	N of itms
0.802	0.802	20

A reliability analysis was applied to each variable of the instrument. The reliability of the measures was examined through SPSS of the Crobanch's Alpha coefficients. For scale commonly cited as acceptable the Crobanch alpha coefficient is 0.7. If each domain obtains the value greater than 0.7 but less than or equal to one, it means that the item in each domain are understood by most of the respondents. The result in the above table revealed that 80.2% of the variance in the scores was reliable variance. Hence, 0.802 is greater than the accepted alpha value 0.7, the items had internal consistence to measure for what it was supposed.

Table 4.10 Descriptive statistics of students' data

S.N	Items	Mean	Std. Deviation	N
1	boys perform better in physics than girls	2.82	1.010	150
2	we often work in groups in physics class	2.28	.923	150
3	lack of good background in physics in lower grades.	2.87	1.053	150
4	If there were no practical examination i would pass better in physics	2.31	1.229	150
5	Lack of interest during enrollments in physics.	2.93	.890	150
6	I believe i can get good grade in physics	2.65	1.064	150
7	I think studying physics will be useful to my carrier	2.77	.973	150
8	physics is an interesting subject	2.33	.995	150
9	I enjoyed physics experiments	2.68	.970	150
10	teacher way of teaching ,evaluation system in physics.	2.89	1.023	150

11	I think physics is for students with special talents	2.43	1.120	150
12	I like physics more than other subject	2.26	.949	150
13	Physics is difficult subject	2.89	.898	150
14	I am very happy if physics is my field of study in higher institute	2.63	.931	150
15	Lack of resources and laboratory in the preparatory school.	3.19	.871	150
	Grand mean	**2.66**		

In the table 4.10**,** the result showed the mean value of the students response ranged from 2.28 to 3.19.the least ranked item is (2) says; we often work in groups in physics class. The highest ranked item (15) says; lack of instructional facilities, lab and lab equipments are major challenges to my academic performance in physics. The highest the dispersion value the more it spread out from the mean and the lower the dispersion value the more consistency and less spread out from the mean value

Table 4.11 Case Summaries-Analysis of students' attitude toward physics

Item	**SA**		**A**		**DA**		**SDA**		**NO**		**N**
	F	%	F	%	F	%	F	%	F	%	
1	42	28	62	41.3	31	20.7	11	7.3	4	2.7	150
2	11	7.3	53	35.3	67	44.7	10	6.7	9	6	150
3	48	32	62	41.3	24	16	12	8	4	2.7	150
4	39	26	59	39.3	35	23.3	11	7.3	6	4	150
5	28	18.7	77	51.3	31	20.7	8	5.3	6	4	150
6	41	27.3	64	42.7	27	18	12	8	6	4	150

7	23	15.3	56	37.3	48	32	13	8.7	10	6.7	150
8	35	23.3	56	37.3	37	24.7	17	11.3	5	3.3	150
9	28	18.7	43	28.7	58	38.7	12	8	9	6	150
10	32	21.3	84	56	23	15.3	6	4	5	3.3	150
11	21	14	56	37.3	50	33.3	9	6	14	9.3	150
12	45	30	65	43.3	29	19.3	9	6	2	1.3	150
13	30	20	70	46.7	36	24	5	3.3	9	6	150
14	30	20	69	46	23	15.3	16	10.7	12	8	150
15	9	6	50	33.3	74	49.3	5	3.3	12	8	150

In table 4.11 Item 1 says "boys perform better in physics than girls". As it can be seen, 28% of the students responded strongly agree, 41.3% of them responded agree, 20.7% of them were responded disagree, 7.3% of them responded strongly disagree and 2.7% of them responded no opinion. From this analysis 69.3% of the students gave their agreements to the statements boys perform better in physics than girls. We concluded that there is a gender differences in academic achievement in physics in preparatory school.

Item 2 says "we often work in groups in physics class" .In this variable, 7.3% of the students responded strongly agree, 35.3% of them responded agree, 44.7% of them were responded disagree, 6.7% of them responded strongly disagree and only 6% of them responded no opinion. The majority 51.4% of the students responded their disagreement to this item. From this result we concluded that students do not work in groups in physics class.

Item 3 says "lack of good background in physics when I was high school students can affect my academic performance in physics "In this analyzed result 32% of the students were answered strongly agree, 41.3% of them responded agree, 16% of them answered disagree, 8% of them responded strongly disagree and 2.7% of

them were answered neutral. From these results we concluded that, the highest percent 73.3% of the students agreed that the lack of good background in physics in lower school affect their academic achievement in physics.

Item 4 says "Lack of interest during enrollment in physics is one of the main problems in learning physics". According to this item 26% of the students responded strongly agree, 39.3% of them answered agree, 23.3% of them were answered disagree, 7.3% of them were answered strongly disagree and 4% of them responded no opinion. The majority of the students, 65.3% gave their agreement to this item. This showed that students had no interest of enrollment in physics activities in classroom outside the class.

. Item 5 says "I believe I can get good grade in physics" as indicated in the table above, 18.7% of the students answered strongly agree, 51.3% of them answered agree, 20.7% of them responded disagree, 5.3% of them were responded strongly disagree and 4%. As it can be seen, from this analysis the majority 70% of the students agreed to this item. This showed that students had positive attitude toward physics.

Item 6 says "I think studying physics will be useful to my carrier" as it was indicated in table above 27.3% of the students were answered strongly agree, 42.7% of them were responded agree and 18% of them responded disagree, 8% of them responded strongly disagree, 4% of them responded neutral. We provided from this result 70% of the students were agreed studying physics will be useful for their future carrier. This suggested that, students had positive view of physics to study in higher institute.

Item 7 says "physics is an interesting subject". This item was supported by the majority of the students. 15.3% of the students were answered strongly agree, 37.3% of them were responded agree, 32% of them responded disagree, 8.7% of them answered strongly disagree and 6.7% of the total students were responded neutral. This showed that, 52.6% gave their agreements to this item. Implied that students had positive attitude toward physics.

Item 8 says "teacher way of teaching, evaluation system can affect my academic performance in physics" As indicated in table above, 23.3% of the students were responded strongly agree, 37.3% of the students responded agree, 24.7% of the students responded disagree, 11.3% of them answered strongly disagree and 3.3% of them were gave their response neutral. From this analysis we concluded that, the majority percent 60.6% of the students gave their agreement to this item. This implies that teacher way of teaching and the evaluation techniques he/she used in physics affects students' academic achievement.

Item 9 says "I think physics is for students with special talents". From the analyzed results of data in table above 18.7% of the students responded strongly agree, 28.7%% were responded agree, 38.7% of them gave

their response disagree, 8% of them were responded strongly disagree and 6% of them were responded no opinion. With this evidence 47.4% of the students gave their agreement to this item. This results revealed that students had negative attitude toward physics.

Item 10 says "Physics is difficult subject". This statement was supported by the majority of the students. 21.3% of the students gave their responses strongly agree, 56% of them were responded agree, 15.3% of the students answered disagree, 4% of them answered strongly disagree and 3.3% of them gave their responses neutral. This revealed that students' perceived physics as difficult subject which is negatively affect their achievement in physics.

Item 11 says "my physics teacher is well qualified in teaching physics "as indicated in the table above, 14% of the students were responded strongly agree, 37.3% of the students answered agree, 33.3% of them answered disagree, 6% of the students responded strongly disagree and 9.3% of them responded the no opinion. The majority, 51.3% of the students gave their agreement to this item. Implies that, preparatory school physics teacher had enough knowledge of the subject in teaching physics.

Item 12 says "Lack of resources, laboratory equipments and practical room in the school are major challenges to my academic performance in physics". As indicated in the table, 30% of the students were responded strongly agree, 43.3% of them responded agree, 19.3% of them responded disagree, 6% of them answered strongly disagree, 1.3% of them responded neutral. The highest percent 73.3% of the students gave their agreements with this item. This showed that there is no instructional resources, no physics laboratory in the school that help students to work through practical activities.

Item 13 says "I enjoy physics experiments". As it can be seen in table above, 20% of the students were strongly agree, 46.7% of them responded agree, 24% of them responded disagree, 3.3% of them responded strongly disagree 6% of them responded neutral. From this data analyzed, the majority 66.7% of the students gave their agreement to this item. This implies that preparatory students enjoy physics experiments.

Item 14 says "If there was no practical examination I would pass better in physics" from the data analyzed in table above, 20% of the students were responded strongly agree, 46% of the students answered agree, 15.3% of them responded disagree, 10.7% of them responded strongly disagree, 8% of them responded no opinion. From this result of data analysis 66% of the students gave their agreements to this item. This showed that students would pass better in physics for theoretical parts of physics examination.

Item 15 says "I like physics more than other subject" As it was observed in table 4.10 above, 6% of the students were responded strongly agree, 33.3% of them responded agree, 49.3% of them responded disagree,

3.3% of them responded strongly disagree and 8% of them were responded neutral. Provided that this item was supported by 39.3% of the students. The majority of 52.6% of the students were disagreed to this item. Implied that the students do not like physics more than other subject.

4.5. Sample T-test (gender differences in Academic achievement in Physics)

Research question 4: Is there significant difference between male and female students' academic achievement in physics?

Table 5. One Sample T-test; Gender difference in academic achievement in physics

	Test Value = 0					
					95% Confidence Interval of the Difference	
Gender	T	df	Sig. (2 tailed)	Mean Difference	Lower	Upper
female students score	12.669	19	.000	8.200	6.85	9.55
male students score	21.069	19	.000	11.800	10.63	12.97

The results in Table 5, above, suggest that there is significant difference between academic achievement of male and female students in physics. This is proved by sig = 0.00, which are less than alpha = 0.05. The conclusion therefore there is significance gender difference in academic performance between male and female students even they enrolled with their interest or without interest (preference) to natural science department.

4.5 Discussion of Finding based on research question

The main objective of the study was to find out problem challenging the academic achievement in physics students in Oromia region West Wollega Zone the case of MSPS, NPS and GPS. Data for the study was collected from six Preparatory school principals, 10 physics teachers and 150 preparatory school students (96 Male and 71 Female students), giving a total of 167 respondents. The following are the main study findings of the study:

4.5.1 Principals' Attitudes towards Physics education in Schools

Research question 3; how do school principals' attitudes towards physics affect the academic achievement students in Physics?

Regarding this objective, the study findings revealed that school principals had negative attitude towards Physics curriculum. As it was indicated in table 4.5, preparatory principals do not involved Physics teachers during purchasing of teaching and learning materials which had significant value of 0.044. Principals also ensured schools had no Physics laboratories and there were no instructional facilities that enable students understanding of physics practical activities. This had significant value of .033 and 0.041.Preparatory school principal in west Wollega zone also had not organized academic trips for science students that encourage students to see application of physics. This had significant at 0.013.

4.5.2 Physics Teachers' Attitudes towards Physics Curriculum

Research question **2;** Is there significant difference between physics teacher attitude and students' academic achievement in physics?

The study established that majority of the Physics teachers had negative attitude towards Physics curriculum. Physics teacher perceived that boys often perform better than girls in physics and also felt that both female and male students were not capable of performing equally in Physics (sign. value of .014).Physics teacher agreed as few students choose physics because there few carriers related to it(sign.at .014) This result revealed physics teacher had not encourage students to choose physics, they assumed there was few job opportunity if they choose physics. Most of the teachers felt that in-service training would assist them in improving knowledge and skills necessary for teaching Physics (sign. Value 0.037).Physics teacher had no interest in physics (significant difference of .042). if the teacher loose his/her interest in teaching physics, they would not prepared themselves for the students learning and they are not happy to teach. This imposes in the minds of the students' negative attitude. The majority of students' low achievement in physics in national and international examination arises from lost of an interest of both the teacher and students in physics. The results of the study also revealed that, there were no instructional resources in preparatory school for teaching physics which makes physics an easy and observable.

4.5.3 Students' Attitudes towards the Physics education

Research question 1. Is there significant relation between the students' attitudes and the academic achievement in physics?

In relation to this objective, the study found out that majority of the students had negative attitude towards the subject physics.77.3% of the students' perceived physics as difficult subject (item 10).This implied that preparatory school students believed their mind unable to work and had no motivation to participate in physics activities. Besides, 69.3% of students convinced themselves physics as a domain for boys (item 1). They agreed that female students do not perform well in physics equally with male students. This result

revealed there is gender difference in academic achievements of physics students' in west wollega zone. Also, 66% of the students dislike the calculation aspects of physics curriculum. The students more interested if the physics examination excluded the calculation parts and they are able to pass only for theoretical parts.

4.5.4 Lack of Instructional facilities and laboratory in the school

Research question 5. Is there availability of sufficient teaching materials for teaching physics and physics laboratory in the school?

In West Wollega zone there about 17 preparatory schools. The schools are on the same standard in providing the instructional facilities for their students and no physics laboratory in the school. The preparatory school students learn physics like that of social science. The results of the study found, 73.3% of the students responded the lack of instructional resources and physics laboratory in the school significantly affect their academic achievement in physics. In modern science curriculum, students need to be encouraged to learn not only through their eyes or ears but should be able to use their hands and head to manipulate apparatus. The observation and the interview made in the sampled preparatory school during data collection also showed the school had no laboratory and teaching materials.

4.5.5 Students interest toward physics

The interest toward the subject is a feature indicator of achievement in any subject. The result of this study indicated 65.3% of preparatory school students had no interest during enrollment in physics activities both outside and inside the school (item 4).The researcher also interviewed the head department of physics in the sampled school. The result of the interview indicated students had no interest to stay in classroom during physics lesson; they had not volunteered to participate in physics during discussion, they are not willing to do the home work and the problem given at home. Due to these facts, students' physics achievement document of both the internal and external examination shows very low compared to other natural science (observation result). There is evidence that students who find a subject interesting tend to choose it for further study, [50], "Why aren't secondary students interested in physics"}

4.5.6 Lack good background in physics in secondary school.

Students who were taught by good teacher have good background in physics. A good physics teacher is who encourage his/her students toward physics, who is able to use proper methods of teaching, who have knowledge of the subject matter. The results of the finding showed that the majority 73.3% of the students had no good back ground in physics. The secondary school physics curriculum is related with the preparatory

school physics. If the students are unable to understand the lower level physics curriculum they also failed to achieve good grade in physics in their preparatory level physics curriculum.

4.5.7 Teacher methodology of teaching & academic achievement in physics.

The means or strategies employed by teachers in an attempt to impact knowledge to the learner are referred to as methodology. The role of teacher is very important in any teaching exercise especially since his/her direct participation can range from complete control over what is learned to minimal intervention. Teacher is the source of all knowledge that children acquire in class. Teacher can impact students learning in different regards. However, among this the way how he delivers the subject or methodology he/she implement is directly related to learners' academic achievement. Based on the study finding, about 60.6% of the preparatory school students were agreed that the low academic achievement in physics subject is due to the methodology the teacher used in the classroom.

CHAPTER FIVE

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusion

There are several factors (problems) challenging the academic performance(achievement) of physics students in preparatory school .This study only focused on some of parameters: the principal attitude, physics teacher attitudes, background of students, instructional resource(facilities), and teachers method of teaching , interest to subject matter. Based on the finding, the following conclusions are drawn:

- Physics teachers have a great role in fostering positive or negative attitude to subject matter.
- There is significant gender deference between male students and female students in academic achievements of physics in preparatory school.
- The p values 0.044, 0.033, 0.013 and 0.041 for sampled principals from MSPS, NPS, and GPS are less than the alpha (α) level of significance of 0.05 dependent variables (academic achievement). Therefore, there is a strong association between academic achievement of physics students and the school principals:
- The p values 0.014,.037,0.042 and 0.023 for sampled physics teachers in the targeted schools are less than the alpha (α) level of significance of 0.05 of dependent variable(the academic achievement). This showed that there is strong relationship between the students' academic achievement in physics and physics teacher attitudes.
- The lack of instructional facilities (of resources) ,the lack laboratory and lab. equipment's , lack of interest to subject matter, the lack of good back ground in physics were the prior problem that has been seen in MSPS, NPS and GPS. In addition, lack of good communication between students and physics teachers, class missing and lack of motivation from teacher side, was prior problem seen in the sampled preparatory school during data collection.

5.2 Recommendations of the Study

In the light of the research findings, the following recommendations were made;

I. The school principals should develop the positive attitude toward science subject especially physics.

II. The school administrators should allocate budget for purchasing instructional resources in teaching physics and should involve physics teacher when purchasing.

III. The school principal must advice the concerned body (government, NGOs) to establish physics laboratory in preparatory school. This would help to improve students' hands-on ability and experience besides triggering an inquisitive and analytical mind.

IV. Owing to the fact that majority of the students had negative attitude towards Physics and perceived physics as difficult subject, then effort should be made to improve the students' attitude towards Physics.

V. The study established that Physics teachers' played a great role in influencing students' attitude towards Physics. The government through Ministry of Education should ensure that Physics teachers are Provided with in-service training. This would help them to improve their teaching methodologies and to develop their educational qualification.

VI. Physics teacher should use the appropriate method of teaching physics education. this helps the students to develop positive attitude toward physics and improve their achievement in physics.

VII. Female students should be encouraged through counseling to see physics as one of the subjects and they are able to do equally with male students.

VIII. The school environment should be conducive and attractive for the students to stay in the school and to work in groups through difficult problems.

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APPENDIX A

PRINCIPALS' QUESTIONNAIRE

I am interested in finding the problem challenging the academic performance of physics students in West Wollega zone. Please give the accurate information that will assist come up with credible and valid results. The information given will be treated with confidentialities and will not be used for any other purposes other than this study. Insert a tick **(√)** in the most appropriate column.

Name of the school _____

Highest academic qualification_____

Gender : male ☐ Female ☐ Work experience ☐

Use the key : *SA=strongly agree, A=Agree, D=Disagree, SD=strongly agree*

S.N	Items	SA	A	NO	DA	SDA
1	I involve physics teacher during purchasing of teaching and learning materials.					
2	I ensure there is physics laboratory in the school where students can carry out an experiment.					
3	I ensure physics laboratory is well equipped with the apparatus					
4	I reward best performing students in physics					
5	I ensured physics teachers attend in service training					
6	I organize academic trips for physics students and physics teacher.					
7	physics plays an important role in science and technology today					
8	I encourage students' choice of physics in my school					
9	physics is a boring subject it is impossible to make students successful.					
10	The lack of instructional facilities in the school affect students achievements in science					

APPENDIX B

TEACHER QUESTIONNAIRES

You are kindly requested to state your level of agreement in relation to each of the given items on a Five-point likert scale. Insert a tick **(√)** in the most appropriate column.

Name of the school _____

Teaching subject: Major _____ minor _____

Highest qualification level_____

Gender: male ☐ female ☐ Teaching experience ☐

Key: SA=strongly agree, A=Agree, D=Disagree, SD=strongly disagree

S.N	Items	SA	A	NO	DA	SDA
1	I enjoy teaching physics					
2	My students always achieve low marks in physics					
3	Most topics in physics are challenging to teach					
4	The school leaders are not active on providing teaching learning materials					
5	Boys often perform better in physics than girls					
6	The way of delivering the lesson to the students can affect both students interest and achievement in physics					
7	Few students choose physics because there are few careers related to the subject					
8	Physics attracts fewer students than other natural science subject.					
9	I really like physics					
10	I think in-service training would assist me in improving my skill for teaching					
11	1. Physics is very interesting					

APPENDIX C

STUDENTS' QUESTIONNAIRE

Instructions

You are kindly requested to state your level of agreement in relation to each of the given items on a Five-point likert scale. Insert a tick **(√)** in the most appropriate column. Please answer the entire question honestly. Do not write your name on this paper.

School _____

Grade ☐ sex; Male ☐ Female ☐ academic year ☐

Key: SA=strongly agree, A=Agree, D=Disagree, SD=strongly disagree

S.N	Items	SA	A	NO	DA	SDA
1	Boys perform better in physics than girls					
2	Our physics teacher allow us to actively participate in physics class					
3	We often work in groups in physics activities					
4	Lack of good back ground in physics when I was high school students affect my achievement in physics					
5	If there were no physics practical examination, I would pass better in physics					
6	Our physics teacher patiently takes us through difficult problems					
7	Our physics teacher show us different techniques of solving physics problem					
8	Lack of interest during enrollments is one of the main problem of poor achievement in physics					
9	I believe I can get good grades in physics					
10	I think studying physics will be useful to my carreer/job					
11	Physics is an interesting subject					
12	I enjoy physics experiment					
13	Teacher way of teaching, evaluation techniques have an impact on students academic performance					

14	I think physics is for students with special talents					
15	I like physics more than the other subjects					
16	Physics is difficult subject					
17	Lack of instructional resource, laboratory equipments and practical room in the school are highly affect my achievement in physics.					

APPENDIX D

INTERVIEW FOR PHYSICS HEADS OF DEP'T

1. How do you rate your student' entry attitude toward physics?

   _____

2. According to you, is there a positive or negative attitude towards physics in the school? By;
   a. i. Physics teacher_____
      ii. Other teachers _____
      iii. school administration _____
      iv. preparatory students _____
   b. If negative what is done by the teachers/school leaders to improve the attitude?

      _____

3. Are physics students encouraged to take a keen interest in mathematics and other sciences?

   _____

4. How often do you check teachers' schemes of work and lesson plans?

   _____

5. How often do you asses students in science department?

   _____

6. Which teaching approach/ method is often employed by teacher in your dep't?

   _____

7. How does physics teacher find out whether the students have learned what was intended?

   _____

8. How do you assess your teachers attitude toward teaching physics?

   _____

9. In your opinion what mechanism should physics teachers follow to improve the achievement of students in the school?

   _____

10. What are the most significant factors that affect students' achievement in physics in preparatory school?

    _____

    _____

    _____