



**Exploring Student perspectives Attitudes of Student's  
Towards Physics Education at Hebeno Secondary School  
in Kokosa Woreda , Ethiopia**

**By  
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**A Thesis Submitted to the School of Graduate Studies of Madda Walabu  
Universit Department of Physics in Partial Fulfillment of the Requirements  
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## **Declaration**

I, Birhanu Gameda declare that the thesis entitled Attitudes of Student's towards Physics Subject in Hebeno Secondary School of Kokosa Woreda South East of Ethiopia is my original work. I have carried out the present study independently with the guidance and support of the research advisor Abebe Adugna (Ass.Prof).Any other contributors or sources used for the study have been appropriately acknowledged. Moreover, this study has not been submitted for the award of any Degree or Diploma Program in this or any other Institution.

Birhanu Gameda Signature \_\_\_\_\_ Date\_\_\_\_\_

## **Approval Sheet**

This is to certify that Birhanu Gemeda has carried out his research work entitled Exploring student perspectives Attitudes towards Physics Education at Hebeno Secondary School in Kokosa Woreda South East of Ethiopia for the partial fulfillment of MSE at MaddaWalabu University College of Natural and Computational Science Department of Physics. This study is original and is not submitted for any degree in this university or any other universities and is suitable for submission of Masters of MSC.

**Confirmation By: Abebe Adugna (Ass. Prof) Signature ----- Date -----**

### **Approved by Board of Examiners**

As members of the Board of Examiners of the MSC Thesis Open Defense Examination, we Certify that we have read and evaluated the thesis prepared by Birhanu Gemedu and examined the candidate. We recommended that the Thesis accepted as fulfilling the Thesis requirement for the degree of MSE.

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External Examiner	Signature	Date

Final approval and acceptance of the thesis is contingent upon the submission of its final copy to Council of Graduate studies (CGS) through the candidate`s department or School graduate committee (SGC).

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## **Abbreviations**

CGS	Council of Graduate studies
MED	Master of Education
SGC	School Graduate Committee
TIMSS)	Trend in International Mathematics Science Studied
TEVET	Technical Education Vocational and Entrepreneurship
CGS	Council of Graduate studies
SPSS	Statistical Package for Social Science

## Table of content

Declaration .....	i
Approval Sheet.....	ii
Approved by Board of Examiners .....	iii
Acknowledgement .....	iv
Abbreviations .....	v
List of Tables .....	ix
Abstract.....	ix
1. INTRODUCTION .....	1
1.1. Back ground of the study .....	1
<b>1.2. Statement of the Problem.....</b>	<b>2</b>
1.3. Objectives of the Study .....	4
1.3.1. General Objective of the Study.....	4
1.3.2 Specific Objective of the Study.....	4
<b>1.4. Significance of the study.....</b>	<b>4</b>
1.5. Delimitation of the Study.....	4
1.6. Organization of the Study.....	5
2. LITERATURE REVIEW .....	6
2.1. Concept of Attitude .....	6
2.2. Students Attitudes towards Physics.....	7
2.3. Attitude and Achievement.....	8
2.4. Factors Impacting on Students' Attitude.....	9
2.4.1. Students Themselves on Students' Beliefs to Learn Physics.....	9
2.4.2. Academic self-efficiency beliefs.....	11
2.4.3. Influence of Teachers' Beliefs on Students' to learn Physics.....	13

2.4.4.	Influence of School-Related Issues on Students’ Belief to Learn Physics .....	14
2.4.5.	Learning environment .....	14
2.4.6.	Curriculum .....	15
2.4.7.	School and class size.....	15
2.8.8.	Effectiveness of schools.....	15
2.4.9.	Influence of Cultural Belief on Students’ to learn Physics.....	16
2.4.10.	Gender difference.....	17
<b>2.5</b>	<b>Student's Academic Performance in Secondary School.....</b>	<b>18</b>
<b>2.6</b>	<b>Conceptual frame Work Of the Study.....</b>	<b>20</b>
<b>3.</b>	<b>RESEARCH METHODOLOGY .....</b>	<b>21</b>
3.1.	Description of the Study Area.....	21
3.2.	Research Design.....	21
3.3.	Type and Sources of Data.....	21
3.4.	Population, Sampling Technique and Sample Size.....	21
3.5.	Procedure of Data Collection .....	22
3.6.	Data Gathering Instruments.....	23
3.6.1.	Questionnaire .....	23
3.6.2.	Interview .....	23
3.6.3.	Document Analysis.....	23
3.7.	Data Validity and Reliability.....	24
3.7.1.	Validity .....	24
3.7.2.	Reliability.....	24
3.8.	Methods of Data Analysis.....	24
3.9.	Ethical consideration .....	25
<b>4.</b>	<b>RESULT AND DISCUSSION.....</b>	<b>26</b>
4.1.	Introduction .....	26
4.2.	Characteristics of the Respondents.....	26

4.3. Students' Academic Performance from 2012-2014 E.C Roster Physics Mark ...	<b>28</b>
4.4. The Attitude of Student toward Physics Education.....	<b>30</b>
4.5. Factors Impacting on Students' Attitude toward Physics .....	<b>35</b>
5. SUMMARY, CONCLUSIONS AND RECOMENDATIONS.....	<b>38</b>
5.1. Summary of Findings .....	<b>38</b>
5.2 Conclusions.....	<b>40</b>
5.3 Recommendations .....	<b>41</b>
References.....	<b>42</b>
Appendix I .....	<b>44</b>
Appendix II.....	<b>46</b>
Appendix III.....	<b>47</b>

## List of Tables

Table 3.1: Population and sample of students by grade level .....	22
Table 4.1: Teachers and students background information .....	26
Table 4.2: Academic performance of student's roster physics mark of grade.....	28
Table 4: 3. Respondent's opinion on student feeling towards physics subject.....	30
Table 4.4: Respondent's response on student only hates the calculation aspect of physics .....	31
Table 4.5: Student attitude towards student usually enjoy when physics class is going on .....	31
Table 4.6: Student attitude toward student understand other subject more than physics .....	32
Table 4: 7. student attitude on student does not see the importance of physics in everyday.....	33
Table 4.8: Student attitude toward student has better understanding of practical physics .....	34
Table 4.9: Student attitude toward perception of the subject physics as being too difficult .....	35
Table 4.10: Respondents view on factors impacting on students' attitude toward Physics .....	35
Figure 2.1. Conceptual frame work .....	20

## ***Abstract***

*Students' academic achievement in physics has been lowered by the students' and teacher's interaction and methodology leads to poor attitude the subject matter. Therefore, to overcome this problem, it is necessary to investigate attitudes of student's towards physics subject in Hebeno secondary school of Kokosa Woreda South East of Ethiopia. The data collect from 200 school students and 6 physics teachers. Both primary and secondary data collection instruments used to collect data. Closed-ended questionnaires along with interviews used for the purpose of data collection. The selections of the student any carried out by using simple random samplings techniques in order to avoided bias. The quantitative data generated analyzed with the help of Statistical Package for Social Sciences (SPSS) presented by using descriptive statistics (Mean and Standard Deviations) and percentage. Further, more we have used independent samples t-test to see the mean difference between groups. The document review of four grade level physics roster result indicated in the study the overall response for the four academic years, large number of students has registered satisfactory. The study found male student have the attitude student usually enjoy when physics class is going on, however, the female student disagree the opinion student usually enjoy when physics class is going on. Moreover, the study points out that both male and female students have the attitude student understand other subject more than physics. Similarly it understood that both male and female student have the attitude student does not see the importance of physics in everyday life. The male student have the attitude student has better understanding of practical physics, however, the female students have the attitude student has poor understanding of practical physics. Both male and female student have the attitude student has perception of the subject physics as being too difficult. The study indicated that students have lack confidence, students believe, gender stereotypic beliefs and parents poor awareness impacting students' attitude toward Physics.*

*Key words: Confidence, Physics ability, Parent's awareness, School social interaction, Gender stereotypic beliefs and Academic Performance*



# 1. INTRODUCTION

## 1.1. Back ground of the Study

When literature on physics education is reviewed, it is seen that the most frequently analyzed personal variables relating to achievement are gender, attitude and motivation. Physics is a natural science subject that is admittedly difficult to learn and teach (Mulhall&Gunstone, 2012). The characteristics of physics, which mostly consist of abstract concepts with complex mathematical calculations, make physics devoid of enthusiasts (Duit, Schecker, Dietmar, &Nieddere, 2014). Most high school students consider physics a difficult subject than other branches of science such as biology and chemistry, which worsens when they enter college. As a result, high school students' interest in studying physics has decreased significantly every year (DeWitt, Archer, &Moote, 2019).

Various educational researches shows that students consider physics suitable only to be learned by gifted, smart, and master mathematics students (Guido, 2013). Research conducted by DeWitt et al. (2019) showed students' belief in the characteristics of physics knowledge (ex. rugged, masculine, etc.) made students have a negative attitude that physics is "not for me" and finally choose another route. In Asia, studies conducted by Oon and Subramaniam (2013) show mixed results.

According to Oon&Subramaniam (2013), most Singapore students are interested in studying physics and realize that physics plays a vital role in supporting career and technological development. Even so, the image that physics is complicated remains the primary reason why some students in Singapore do not take physics in their advanced studies (Oon&Subramaniam, 2013). Meanwhile, Susongko and Fatkhurrahman (2017) stated that the achievement of Indonesian students in physics on the Trend in International Mathematics Science Studied (TIMSS) was directly influenced by self-efficacy, interest, and students' attitudes towards physics.

The consensus among education researchers agrees on the importance of affective aspects in learning: student attitudes. As stated by Guido (2013), attitude determines how a person processes incoming information. Furthermore, Guido (2013) explains that negative attitudes can distort perceptions and affect information retention. In the context of learning physics,

students' attitudes describe evaluative reactions expressed by feeling like or dislike the material being studied. Students who have a positive attitude tend to have high motivation, respect teachers, actively learn, and have good physics problem-solving skills (Guido, 2013).

In contrast, students with negative attitudes not only dislike physics material; they also dislike teachers, are passive in learning, and have low learning achievement. Some researchers (Maison, Syahrial, Syamsurizal, & Tanti, 2019) highlighted that the learning environment plays a role, especially in how teachers encourage students to learn, in building students' beliefs and attitudes towards physics.

However, a problem concurrently predominant in schools is that of students' having a poor attitude which makes the teaching learning process seriously done. Therefore, to eradicate this endangering problem, the researcher motivate to investigate students' attitude towards teaching of physics in secondary schools and its effect on student's academic achievement to encourage to the higher education.

## **1.2. Statement of the Problem**

Attitude towards science can be defined as favorable or unfavorable feelings about science as a school subject, (Craker, 2006). The type of science subjects taken, previous science experiences, science teachers, and various other factors can influence these attitudes towards science (Morrell and Lederman, 1998). The impact of a students' attitude towards science especially physics is incredibly important not only in all grades. Recent released work on the attitudes of secondary school students has shown that nearly fifty percent of students may lose interest in science at the schools and mentioned in (Craker, 2006).

Physics a challenging subject, mainly due to the learning processes involved in understanding physics, which subject need the learners to deal with different types of illustrations, such as formulas, calculations, graphics representations, and also a theoretical understanding at an abstract level (Saleh, 2014). Physics is professed as a difficult subject for students from secondary school to University and also for adults in graduate education (Erdemir, 2009). Participation in science is also being affected, as the number of students preparing for a science related career is on the decline. Generally, a negative attitude towards a subject leads to lack of interest to attend and participated any activity related to the subject.

Students' increasing reluctance to choose science courses, and physical science courses in particular, in their final years of secondary education has important implications not only for the continuity of scientific endeavor but also for the scientific literacy of future generations. As a result, development of positive attitudes towards science, scientists, and learning science, which has always been a fundamental of science education, is increasingly a subject of concern (Trumper, 2006).

The importance of science particularly physics in the technological development of a nation cannot be over emphasized. However one cannot lose sight of the fact that in any teaching learning situation, the students, the teachers, the curriculum and the learning environment are the four pilot factors that make learning to be meaningful. However, a problem concurrently predominant in schools is that of students' having a poor attitude which makes the teaching learning process seriously done. A plethora of research has being carried out in recent years concerning attitudes toward science/physics and the relationship between these attitudes and science achievement (Gungor et al, 2007). Several factors have been highlighted as main contributors to the negative attitudes that students possess towards the science subjects. These factors are related to school and science classes; the individual and even external factors relating to the status and rewards that different countries bestow onto physics based careers.

As related to the tenets of this research work, it has been reported that students' academic achievement in physics has been lowered by the students' and teacher's interaction and methodology leads to poor attitude the subject matter. Therefore, to overcome this endangering problem, it is necessary to investigate factors affecting students' attitude towards the teaching of physics in Hebeno secondary school.

### **1.3. Objectives of the Study**

#### **1.3.1. General Objective of the Study**

The general objective of this study is to explore student's perspectives attitudes towards physics education at Hebeno secondary school of Kokosa woreda.

#### **1.3.2. Specific objectives of the Study**

The study has the following specific objectives:

1. To identify the academic achievement of students in physics subject in the study area
2. To identify the attitude of student toward physics education in the study area
3. To compare whether there is gender difference in both attitude toward physics subject
4. To identify factors impacting on students' attitude in the study area

#### **1.3. Significance of the Study**

The study helps the sample school to identify its strength and weakness in the area of attitude toward physics subject. The findings of the study give guide line information for school management teams to improve the existing situation. Particularly, this study assists the leaders of the school to promote strategies that are used to improve student attitude toward physics subject. Further, the school put into practice the findings of this research to build up student attitude toward physics subject. The findings of the study also help leaders at different position in the school to identified and apply in their working for better school performance. On top of this, the results of this study might serve as direction indicator for further broad and detail research in similar areas.

#### **1.4. Delimitation of the Study**

The study delimited to assess factors affecting attitudes of students towards physics. Geographically, the scope of study delimited to Hebeno secondary school in Kokosa woreda only, because conducting a research on all secondary schools is complex, costly, and time taking. Methodologically, the study delimits to descriptive statistics (Mean and Standard

Deviations) and percentage. In respect to the time frame of the study, it delimited to 2022/2023 academic years.

### **1.5. Organization of the Study**

Chapter one present background of the study, statement of the problem, general and specific objectives, research question, and significance of the study, scope of the study, organization of the study and definition of key terms. Chapter two present literature review which considers concepts, theoretical aspects, empirical study and conceptual frame work. Chapter three present research design, methodologies, and data gathering tools. Chapter four present data analyze and presentation. Finally, chapter five present conclusion and recommendations.

## **2. LITERATURE REVIEW**

### **2.1. Concept of Attitude**

Adensina&Kinbobola (2002) describe students/peoples constantly form new attitudes and modify old ones when they are exposed to new information and new experiences. Attitude as a major factor in a subject choice, also consider that attitude as a mental and natural state of readiness, organized through experiences exerting a directive influence upon the individual's responses to all objects and situation with which it is related.

Both attitude (positive and negative) affect learning in physics subject, if students attitude negative towards certain subjects students learning or future career difficult and other side student positive attitudes towards certain subject that students learning extremely correlate with their achievement. In constructivist approach through use of five components of Learning Cycle Model are developing the student's positive attitudes towards physics subject and increase the level of attitude and success in achievements and their goals and students' self-esteem is enhanced and their self-esteem which guide to more significance in the their subject.

Erdemir and Bakirci, (2009) described attitude is tendency for individuals who organize thought, emotions and behaviors towards psychological object. Human beings are not born with attitudes they learn afterwards. Some attitudes are based on peoples own experience, knowledge and skills and some are gained from other sources. However the attitude does not stay the same. It changes in the course of time and gradually. Attitude is considered together with beliefs and emotions that constitute the affective domain of the learners. Attitudes are commonly distinguished from beliefs in the sense that attitudes are moderate in duration, intensity and stability and are linked with an emotional content of the students.

Many theorists have suggested that attitude should be viewed in terms of cognitive, affective and behavioral components (Feldman1983). It is therefore, could be defined as the aggregate product of the interaction of these components. So that: the affective component encompasses the direction and intensity of an individual's evaluation or a kind of emotion experienced toward the objective of attitude. The cognitive component refers to a person's system of beliefs about the attitudinal object. Finally the behavioral component is a

predisposition to act in a certain manner toward the attitudinal objective (Feldman, 1983:120-121). Thus attitude from the psychological point of view refers to the inner most feeling and outlooks of an individual about things in their environments.

According to psychology today attitudes don't have their origin in the object themselves because our attitude can change while their objects remain constant. Concerning this Radom1983:571 point out: The development of attitude is influenced by many factors, emotional association, expectation of reward or punishment, a desire to emulate the attitude of people we respect and admire a need to establish some degree of consistency between what we say, what we believe and what we do. In other words attitude about everything from the break that cereals to nuclear weapons are subjected to many number of influence. Therefore these ideas indicate that attitudes are developed and modified because of social and other external factors.

## **2.2. Students Attitudes towards Physics**

Poor academic performance in Physics has been a concern in many high learning institutions in the last years around the world. Different authors attribute this poor performance to different causes, namely poor learning environment, poor teaching, inexperienced teachers, learning approaches, cognitive style of students, career interest, influence of parents and friends, low ability of the student, socio economic level and so on (Ibeh, 2013; Olusola&Rotimini, 2012). But most of them agree on that the attitude of students toward Physics plays a big role in this poor performance. George (2006) defines the attitude toward science as the positive or negative feelings about science, specifically to science classes. The attitude of a student toward a learning subject has therefore an object of intensive research in the last years to determine its responsibility in poor performance in science in general and in physics in particular.

Akinbobola (2009) introduced cooperative learning to boost student's attitude toward Physics. She found that students taught using cooperative strategies show more positive attitude toward Physics compare to those taught with competitive and individualistic strategies. Marusic and Slisko (2012) opted for active learning to increase the students' attitude toward Physics. A positive shift of attitudes was observed in both groups of the

experiment. In this research, we first investigated the attitude of Physics students at CST toward Physics, before suggesting some strategies to be used to improve this attitude and subsequently improve students' performance in Physics subjects.

Similarly, Negative attitude towards a certain subject makes learning difficult, while positive attitude stimulates students to do effort and leads to the high achievement in that subject (Veloo, Nor, & Khalid, 2015). Relative to Physics, Godwin and Okoronka (2015) showed that a significant relationship exists between students' attitude and their corresponding academic performance in physics. Determining students' attitude towards a subject is therefore a useful task if one wishes to improve the performance of students in that subject. The estimation of students' attitude towards natural sciences has been carried out by many researchers. In the particular area of physics, because of a visible decline in the enrollment in physics and a fall in the interest in physics around the world, many researchers have been made to estimate the attitude of students towards physics at secondary schools and at universities.

Many of them (Akinbobola, 2009; Alimen, 2009; Mekonnen, 2014) came to the same conclusion that the decrease in Physics academic achievement is alarming. The outstanding factor that caused this is the students' attitude towards Physics (George, 2000). A plethora of research has been carried out in recent years concerning attitudes toward science/physics and the relationship between these attitudes and science achievement (Gungor et al, 2007; Papanastasiou&Zembylas, 2002; Reid &Skyabina, 2002). Several factors have been highlighted as main contributors to the negative attitudes that students possess towards the science subjects. These factors are related to school and science classes; the individual and even external factors relating to the status and rewards that different countries bestow onto physics based careers (Woolnough, 1994).

### **2.3. Attitude and Achievement**

The relationship between these two variables is a key issue for consideration permeating much of the literature. For much of the generalized concern and interest in attitudes towards school science is based on a somewhat simplistic notion that the best milk comes from contented cows" (Fraser 1982). However, Gardner's review of the research evidence offered little support for any strong relationship between attitude and achievement.

Writing somewhat later, Schibeci (1984) draws a stronger link between the two, quoting studies that show a correlation of 0.3–0.5. However, he also cites studies that show no relationship.

The current position is best articulated by Shrigley (1990), who argues that attitude and ability scores can be expected to correlate moderately. Like wise, the measures used in the TIMSS study, albeit somewhat unsophisticated, have found a consistent relationship between attitude and achievement (Beaton *et al.* 1996). Weinberg's (1995) meta-analysis of the research suggests that there is only a moderate correlation between attitude towards science and achievement, although this correlation is stronger for high and low ability females indicating that, for these groups, "doing well" in science is closely linked with "liking science. Similar findings have appeared in the major study conducted by Simpson and Oliver (1990), by Jovanic and King (1998) and by Osborne and Collins (2000).

Maria Tinio (2009) conducted a study measuring academic achievement by administering a test called the Academic Engagement Scale for Grade School Students (AES-GS) to 250 sixth and seventh graders in the Philippines. All three subscales (behavioral, emotional, and cognitive) are necessary to measure academic engagement. It is essential to construct such a scale because it could be an avenue of improving the education of a student. With this, it would also help teachers determine what aspects the student is not able to respond to well (Tinio, 2009).

## **2.4. Factors Impacting on Students' Attitude**

From a review of the literature, there are four factors that play vitally impact on students' beliefs in learning physics. These include factors that associated with the students themselves, factors associated with the teachers, and factors associated with the school environment and culture. Each of the factors discussed in the following sections.

### **2.4.1. Students themselves on students' beliefs to learn Physics**

The belief about self refers to student's self-concept and to their confidence and causal attributions in relation the subject (Op'tEynde *et al.*, 2002). According to McLeod (1994), it may include students' self-concept, self-efficacy and confidence for success or failure in the subject. The notion of students' beliefs about the self are categorized under two areas. These

are academic self-concept beliefs and academic self-efficacy. Moreover, it is how an individual thinks and feels about him/herself in relation to learning situations encountered Bong & Skaalvik (2003).

Academic self-concept is important for students because it positively affects subsequent academic achievement and other educational outcomes, such as academic motivation, effort and grades (Marsh, Trautwein, Lüdtke, Köller, & Baumert, 2005). The more students take responsibility by putting much effort into their own learning, and remain persistent, the more likely they are to perform successfully (Fryer & Elliot, 2012).

According to Shavelson, Hubner, and Stanton (1976), belief about the self is formed through the individual's experiences with the environment and is influenced by environment reinforcements. For instance, students normally evaluate their high performance relative to their strong mathematical ability and the quality of their learning process (Zimmerman, 2000). Similarly, their academic self-concept tries to characterize such perceptions as having the cognitive abilities and competences in relation to good academic performance (Bong & Skaalvik, 2003; Chmielewski, Dumont & Trautwein, 2013; Haines & Mueller, 2013).

One particular view of students' self-concept belief can be seen in the form of goal orientation belief. It focuses on reasons why students learn mathematics the way they do. Goal orientation beliefs suggest that students have their goals in learning mathematics (Aldridge, & Fraser, 2011). In Mapolelo's (2009) study he interviewed year-12 high school students to inquire if they were good at mathematics. Findings revealed that most students believed that they enjoyed the challenge and aimed to do better in their mathematics study. In addition students would desire the ability to work harder and to achieve success in mathematics. Their goal in learning mathematics is to gain mathematical knowledge and understanding and to work to achieve better result in mathematics, which demonstrates by capability and cognitive skills (Schunk & Richardson, 2011).

However, from negative experiences of learning, for example, some students believed they have poor mathematical ability and that their performance is far from other excellent students (Garcia, 2012). These students would often find mathematics to be a very difficult subject. Consequently, students with negative self-concept attribute their poor performances to lack

of confidence, effort and ability, and to insufficient strategy Marchis, 2011) to successfully complete the task. A student's negative self-concept, for example, might be expressed as no matter how much time I spend doing mathematical tasks, I cannot get better result.

#### **2.4.2. Academic self-efficiency beliefs**

Self-efficacy is defined as one's capabilities to organize and execute the course of action required to produce a desired outcome Bandura (1983). Schunk and Pajares (2009) said that self-efficacy is a belief that emerges from thinking about what a person can learn or do; it is totally different from knowing what to do (as cited in Schunk & Richardson, 2011). Self-efficacy requires students to reflect on their skills and capabilities and to gain confidence to successfully accomplish a particular task. Self-efficacy is a dynamic aspect of the composition of other elements of the self-system, such as an individual's capacity, their success, their incentives and self-regulation mechanisms (Vardarli, 2005).

Gürcan (2005) defines self-efficacy as the judgments individuals make by using their abilities, but not as a function of their abilities. Self-efficacy contributes to students' success, because it affects their behavior when asking for academic help and their use of learning strategies. Self-efficacy has a bearing on many things, such as academic success, social abilities, stopping smoking, athletic success, career choice, assertiveness, surviving a heart attack and dealing with feared events, among others.

Research carried out in this area shows that students who have high levels of academic self-efficacy are more willing to work in challenging areas of study and show more of an effort in them. They are better at overcoming obstacles, have higher targets and are more confident, and as a result their academic success is higher (Gülten & Soytürk, 2013). A student with higher levels of self-efficacy on physics learning actively participates in the lecture, allocates time for studying physics subjects and develops various learning strategies (İsrael, 2007). Thereby, the most important factor influencing academic success in physics is the level of self-efficacy. It is crucial to take this into consideration when organizing teaching activities for students, in order for them to achieve better learning outcomes (Dowd et al., 2015). Besides, there are studies showing self-efficacy perception towards physics lecture as an indicator of academic achievement of the students (Capri et al., 2012).

Self-efficacy concept in the 1970s, there have been a lot of studies referenced in literature about developing self-efficacy scales and showing the importance of students' academic self-efficacy (Ekici, 2012). Önen and Kaygısız (2013) identified the levels of self-efficacy of science teacher candidates regarding science education, and determined that they were generally "good". In their research, Selçuk et al. (2008) analyzed the change in students' self-efficacy regarding physics related to gender, and found that there was a meaningful difference in favor of male students.

Shaw (2004) investigated the relationship between gender and students' self-efficacy and success for those studying physics at college and university level. Shaw determined that there was a significant difference between self-efficacy scores according to the gender of students, with female students having lower average scores. Mujtaba and Reiss (2014) investigated the factors that influence 15-year-old students' intentions to study physics post-16, when it is no longer compulsory.

The result of the study indicated that extrinsic motivation in physics was the most important factor associated with intended participation. Maskan (2010) identified the self-efficacy levels of teacher candidates, who were still partaking in the physics teacher training programme, and determined that the mean of the self-efficacy score of the fifth grade students was higher than that of the first grade students. In their research, Yener et al. (2012) worked with student science teachers and analyzed the effect of the use of animation and simulation in physics laboratories on students' self-efficacy.

It was determined that when used solely in a laboratory, animation and simulation based learning methods do not change students' self-efficacy in a meaningful way. In their research which examined if taking the course of "Didactic Physics" increase the self-efficacy perception levels of prospective classroom teachers, Juuti, Lavonen and Meisalo (2005) concluded that there is a significant relationship between gender and this course with a minor effect on self-efficacy related with physics. There have been numerous papers and research done on student self-efficacy and its place in the classroom (Aloe, et al., 2014)

### **2.4.3. Influence of teachers' beliefs on students' to learn Physics**

Firstly, person a Clandinin& Connelly, 1991, cited in Richardson) and of parenting (Bullough& Knowles, 1991, cited in Richardson). Secondly, experience with schooling and instruction influences beliefs about children's learning and the role of teacher (Britzman, 1991, cited in Richardson), and are considered to be more powerful influences on beliefs than experiences afforded by teacher education courses (Brousseau, Book, & Byers, 1988).

Lastly, formal knowledge in the context of pedagogical knowledge, although not as powerful as other factors, has been found to influence teacher beliefs (Clift, 1987; Grossman, 1990, cited in Richardson). Teachers' practices were influenced by a network of beliefs they held about language, beginning language learning, and learners Burns (1992, as cited in Borg, 1999). Also Burns (as reported in Borg, 1999) noted that teachers' practices were shaped by beliefs relating to the institutional culture of the school they worked in, their own personal beliefs about language, learners, and learning, and their beliefs about specific instructional tasks and materials.

A recent research on teachers' beliefs explores a significant positive relationship among teachers' beliefs, practices and students' problem solving achievement (Polly et al., 2013). Classroom activities of teachers are guided by their prejudiced assumptions. They do not simply perform as robot. Being a human being, they have their own feelings, emotions and passions about their environments. These attributes appear in their classroom instructional practices. For enhancing the quality of physics teaching and learning, we should understand the ideas held by the teachers and how these ideas or beliefs have reflected in their instructional practices (Boz, 2008).

Teachers' beliefs can be classified into expressed, entrenched and manifested beliefs (Keys, 2003). Entrenched and manifested beliefs are the beliefs that strongly influenced teachers' practice whereas expressed beliefs are espoused and rarely appear in practice (Keys, 2003). Teachers may change their expressed beliefs to entrenched beliefs by participating in professional development programs (Sheffield, 2004). The following types of beliefs affect activities in classrooms and need to be examined in a model of teaching and teacher professional learning: beliefs about the nature of subject matter (in general and with regard to

the specific topic being taught); beliefs about the nature of the learning process (both cognitive and affective); beliefs about the nature of the teaching process and the role of various kinds of instructions; beliefs about particular students and classes of students (Schoenfeld, 1997).

Bryan (1998) classified teachers' beliefs about science teaching and learning into six categories, which include beliefs about: the value of science and science teaching; the nature of scientific knowledge and goals of science instruction; control in the science classroom; how students learn science; the students' role; and the teachers' role.

#### **2.4.4. Influence of school-related issues on students' belief to learn physics**

Several studies have shown a positive correlation between a disadvantaged school environment and learners' achievement at school. For example learners in the Western and Northern Cape provinces, which have large white populations and well-endowed communities and schools, lead in pass rates in grade twelve examinations whereas those in Limpopo Province with its black population majority rank last in this regard (Murray, 1997).

Attwood (2001) also found that grade eight learners in schools situated in economically depressed areas of the Cape Flats have a lower physics achievement than those who come from families with high socio-economic status. Furthermore, a comprehensive study on the status of mathematics and science teachers in South Africa found that black learners were underprovided for and performed worse than their white peer group in these subjects Arnott et al., (1997).

#### **2.4.5. Learning environment**

According to Smith and Ragan (1993) a learning environment comprises teacher, existing curriculum, instructional equipment as well as the institutional and larger learner community. In this regard Shields (1991) stated that the school environment is the broader climate or context of the school that either facilitates or constrains classroom instruction and learning. Ross, Farish and Plukett as cited in Zaaiman (1998) describe the learning environment that is considered disadvantageous for Australian schools by using detailed census-based social profiles of school catchment areas.

A learning environment, particularly the school, was considered as disadvantaged if a high proportion (of the enrolment) of learners came from neighborhoods having certain characteristics known to be associated with a low capacity to take advantage of educational facilities. These characteristics include, among others, a high percentage of persons in low status jobs with low income or with lack of formal educational qualifications. The homes of the disadvantaged tend to be more crowded, lacking in magazines, newspapers, and other objects that are likely to help in the development of the learner. Parents of the disadvantaged learner give little language encouragement to their children, have less direct interaction with them and take less interest in their learning.

#### **2.4.6. Curriculum**

According to Pinar, Reynolds, Slattery and Taubman (1995) the concept of curriculum is highly symbolic; it is what the older generation chooses to tell the younger generation. Beggs (1995) states that curriculum traditionally means a list of content topics in a national or school syllabus and examination prescription, generally referred to as course outline. According to Beggs (1995) a physics curriculum includes: Mathematical content (what mathematicians know) Mathematical processes (what mathematicians do) Mathematical thinking and logical reasoning, problem-solving making connections and using computational tools.

#### **2.4.7. School and class size**

School size and class size have been shown to have an impact on achievement. Lee, Smith and Croninger (1997) observed that larger schools had a negative influence on academic achievement in high school mathematics and science. In contrast, Rutter (1983) found no relationship between the size of the school and scholastic achievement; effective schools can be very small, very large or somewhat in-between. Rutter (1983) further observed that the relationship between the class size and a learner's achievement is not well defined for classes with 20 to 40 learners. Class sizes of below 20 learners have been found to be advantageous for disadvantaged learners. In this respect Rutter (1983) argued that small school size facilitates social interaction and inhabits teacher specialization.

#### **2.4.8. Effectiveness of schools**

Effective school characteristics are what help to create a fertile school culture that facilitates learners' achievement. Several researchers (Henson & Eller, 1999; Berliner, 1990, and

Rutter, 1983) have identified such characteristics. Their findings indicate that learners excel when the following factors are present (Henson & Eller, 1999; Berliner, 1990, and Rutter, 1983): Strong leadership is provided by a principal who works with the staff to communicate the mission of the school; provide reliable support for staff; and meet with teachers and other members of the staff frequently to discuss classroom practices.

High learner achievement is the foremost priority of the school, and the school is organized around this goal as shown by teachers who demonstrate high expectations for learners' achievement and make learners aware of and understand these expectations. Parents are aware of, understand, and support the basic objective of the school and believe they have an important role to play in their children' education. Teachers work together to provide an orderly and safe school environment. Schools use evaluation to measure learners' progress and promote learning

#### **2.4.9. Influence of Cultural Belief on Students' to learn Physics**

Learning is known to be culture dependent (Mwamwenda, 1996). It has been very difficult to explain most natural occurrences and issues in African life using scientific knowledge; this is because most of the people's beliefs have been crowded with mythology and superstitions Okoye and Okeke (2007). It is mostly based on power of witchcraft and evil spirits which is a departure from scientific explanations. This has resulted to divergence between students' daily experience in the classroom and the scientific world with most of the students having significant difficulties in describing, understanding, interpreting and predicting natural phenomena (Engelhardt et al, 2004).

Science educators are now conscious of the need to relate science more closely to the students' cultural environment in order to minimize the possible conflicts that might arise from their view of the world and that of science. This could be done by carefully considering the traditional point of view that has appropriate relation to scientific concepts. Ausubel (2000) have argued that the construction of new knowledge in science is strongly influenced by prior knowledge that is conceptions gained prior to the new learning.

Since Physics is an important science subject taught in secondary schools which relates with physical phenomena and how they are connected to man's daily lives, there is therefore the

likelihood of cultural beliefs exerting influence on learning and manipulation of concepts. It is therefore pertinent that Physics teachers assist their students to use their knowledge in ways that draw on their cultural experiences for meaningful learning to take place. This study therefore aimed at investigating the influence of cultural beliefs and practice on secondary school students' understanding of atmospheric-related Physics concepts.

A major cause of under-achievement has been traced to the influence of misconceptions which students bring to science classroom especially Physics class (Ivowi, 2010). Research had shown that students' explanations of scientific phenomena are controlled by what they perceived from their cultural beliefs (Okebukola, 2002). This is an indication that students come to Physics class with the cultural misconception believe that they hold, this is in consonant with Ododo (2014) who opined that students bring many of their cultural practices that they have heard or held into Biology classes. Furthermore, the studies found that the majority of the students believed that these cultural concepts are true.

Some of them even believed that they are doctrinal issues, stories, cultural, religious, believe of the forefathers and philosophical. According to Yip (2001), personal experience and opinion are related to cultural factors prevalent in the society. This is because cultural situation at home give room for conflicting traditional beliefs and superstitions which cause misconceptions that lead to underachievement in the related subject where misconceptions are held. In addition, Samba (2003) found that students cannot learn new concepts if alternative models that gives explanation about a phenomenon exist in their mind except a platform is made available to them to confront their misconceptions, reconstruct and internalize their knowledge.

#### **2.4.10. Gender difference**

Gender differences in interest emerge when other factors come into play which can compromise self-concept of performance in physics. The gender difference in interest seems to be sufficiently explained by the gender differences of other variables, especially by differences in self-concept Hoffman (2002). In a similar study, Ziegler, Broome, and Heller (1999) found out that interest and achievement in physics are also affected by parental cognition and gender stereotypic beliefs among boy and girls. The burgeoning body of literature regarding the pattern of major choice as a function of gender shows a consistent

pattern. For instance, an earlier study by Boli, Steinkemp, and Maehr (1984, cited in Ethington, 1988) found out that man's achievement and attitude towards science to be higher than women while at the same time noting a discernable pattern of differences between the sexes in motivational orientation in particular areas of science.

Accordingly, females are inclined more to life sciences while males are oriented towards physical sciences. Nonetheless, Boli, Allen, and Payne (1985) indicated that women choosing quantitative fields were likely to major in physics and Engineering. Further, there is evidence to suggest that intervention through curriculum innovation that addresses the interest and experiences of females positively impacted girls' motivation, achievement and interest in physics (Hannover, 1991).

However, Hoffmann (2002) found that interest and motivation to study physics declined with increase in grade level for both sexes. Other studies which applied innovative curriculum that considered female interest and employed constructivist teaching methodology came out with conflicting results. In this connection, unlike Lawrenz et al. (2009) and Lorenzo et al. (2006), a similar study on a relatively larger sample failed to yield consistent results. Lawrenz et al. (2009) further claim that males and females have significantly different prior understandings of physics and mathematics with females less likely to take high school physics and making more negative shifts in attitude towards physics.

## **2.5. Students' Academic Performance in Secondary School**

According to Seshamani & Shalumba, 2010 academic performance is the educational achievement attained over a specific time in school, college and university. According to Galiher (2006) to measure academic performance, it used GPA to measure student performance because they main focus in on the student performance for the particular semester. Some other researchers used test results or previous year result since they are studying performance for the specific subject or year (Hijazi and Naqvi, 2006 and Hake, 1998).

The low performance of students in science and technological fields are problem of both developing and developed countries. This situation is stated by Finn et al (1982) as "in all parts of the world boys are directed into science and mathematics Curricula more actively,

while girls are encouraged or guided toward languages and liberal arts." They also pointed out that, Eastern Europe and Soviet Union are countries where is relatively smaller gender bias careers. But still, in these countries gender differences in science enrollment exists.

In developing countries, where the gender disparity at all levels of education is more pronounced, it is evident that the gender inequality in science fields is more magnified. As Mensch Barbara (1988) indicated, although many developing countries' succeeded in widening the access of education, still female's access to education lags behind males. Many studies showed that in African countries are less likely to go to science and engineering fields, for instance `in South Africa, girls do not have the tendency to enroll in mathematics, pure or applied science fields.

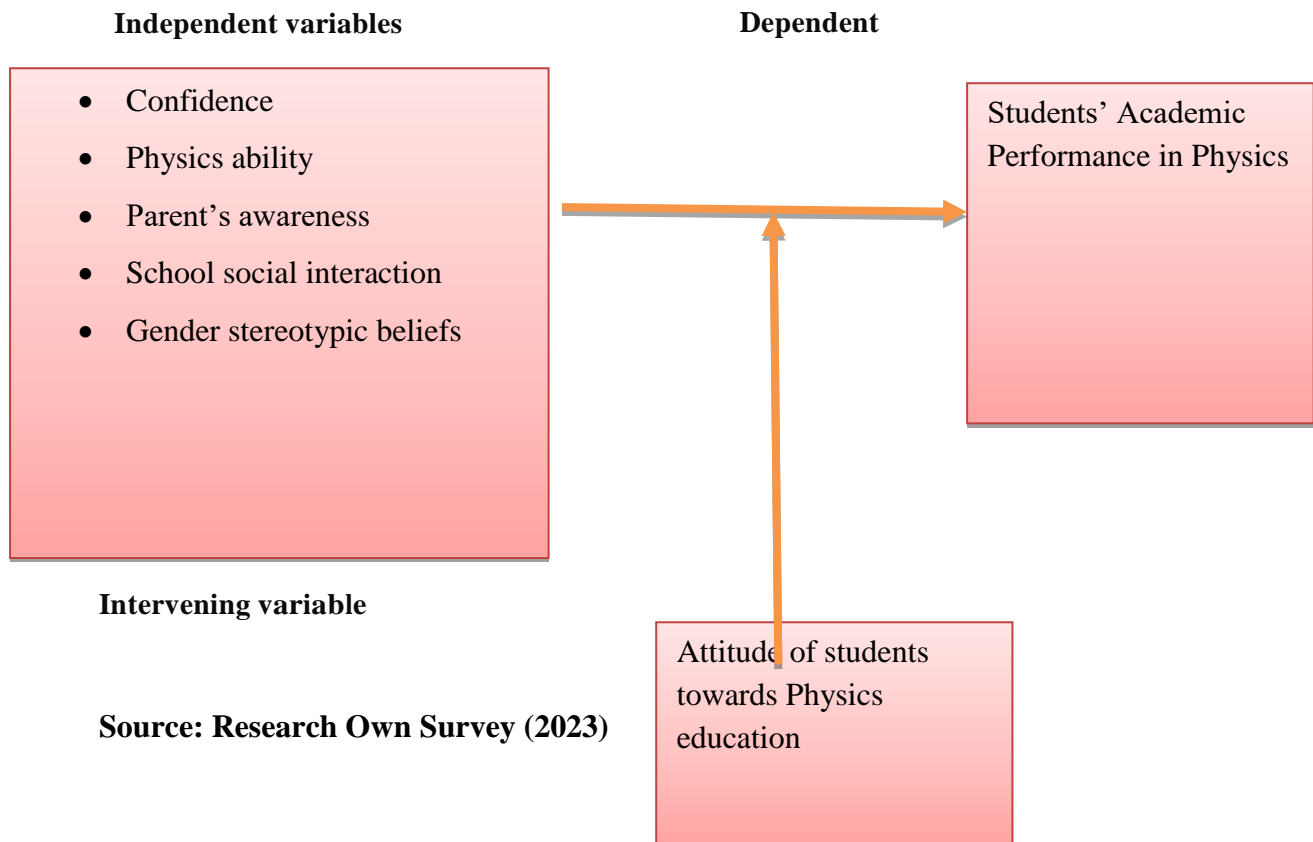
A study in African countries by Macionis and Plummer (2008) on the education of girl children revealed that most societies consider schooling more important for boys than for girls. The study also revealed that girls are lagging behind boys in achievement levels and that they study traditionally feminine subjects such as literature while males pursue mathematics and engineering. This implies that gender disparities are evident in primary enrolment, academic performance and school completion rates (UNGEI, 2009). This contradicts the tenets of feminism that advocate equal rights and equal access to all facets of life including education for all women.

Rao (2004) studied gender equity in the education system in New Delhi and concluded that differences in educational attainments between boys and girls are due to unequal access to education. This is due to the fact that girls are overburdened by household chores that take up most of their study time. The amount of time spent at the library, in group discussions and for reading or study is reduced to almost half the time of their male counterparts (Mathias, 2009; UNESCO, 2003; Evans, 2003). Female students do get time to read or study, they are tired and stressed which affects their concentration (Larson & Simonis, 2005). This is another example of gender inequality in education which is caused by gender roles albeit subtle and difficult to notice (Gaidzanwa, 2012). It is subtle because when the female students fail to perform well, they are always to blame and very few notice that the female student is overburdened by the gendered codes.

## 2.6. Conceptual Framework of the Study

This study adopts five independent variables; these are lack of confidence, poor physics ability, small school social interaction, gender stereotypic beliefs and parent's awareness. The dependent variable is the academic achievement of students in physics subject.

Fig 2.1. Conceptual framework of the study



### **3. RESEARCH METHODOLOGY**

#### **3.1. Description of the Study Area**

The research is conducted in Kokosa woreda. The woreda is located at 275 km away from the capital city of Ethiopia, Addis Ababa. The Woreda has 22 Kebeles with a total of population size of 118,607. Kokosa woreda education office(2022) data indicated that 4 Government high school, 11 Government Primary School (1-4), three private Primary School (1-4), 33 Government Primary School (1-8), one private Primary School (1-8) and one Government TEVET(Technical Education Vocational and Entrepreneurship) are found in the Woreda.

#### **3.2. Research Design**

In this study, the researcher used descriptive research design. In this study, descriptive survey research method is used for it is appropriate and suitable for using instruments such as questionnaires, focus group discussion and document analysis as it allows the writer to explore and identify typical problems that need to be removed in order to enhance better participation and performance of females' education. Further, this design method is adopted for this study as its purpose was describing and analyzing the existing conditions of students' attitudes towards physics.

#### **3.3. Type and Sources of Data**

Primary and secondary source data was used in the study. The primary sources of data included the information collected from the sample school students and teachers. On the other hand, secondary data covered achievement in physics subject in the sample School.

#### **3.4. Population, Sampling Technique and Sample Size**

Regarding the sample technique Hebeno secondary school is chosen purposively, because of researcher work experience. The population of the study is the whole natural science grade 9, 10, 11 and 12 students of school. Further, the target population of the study is 6 physics teachers. Regarding the teachers, all 6 physics teachers are included in the sample by using availability sampling technique since they are few in number. On the other hand, student is included in the study using simple random samplings.

Regarding the sample size determination formula proposed by Bartlett (2000) used:

$$n = \frac{N}{1 + N(e)^2}$$

Where,

N = total population =500

e = precision level (sampling error) Therefore, the desired sample is 222.

$$n = \frac{500}{1 + 500(0.05)^2}$$

Therefore, the sample size for the study is 222. Finally, after the size of students is determine, by proportional probability calculation  $= \frac{n}{N} = 44\%$  of samples selected from each sample grade level.

Table 3.1: -Population and sample of students by grade level

No	Grade level	Population	Sample	Sample size
1	Grade 9	155	68	$= \frac{n}{N}$ $= 44\%$
2	Grade 10	130	57	
3	Grade 11	113	51	
4	Grade 12	102	46	
Total		500	222	

Source: Field Survey (2022)

### 3.5. Procedure of Data Collection

The first step the researcher made a brief orientation about the whole purpose of the study given for the respondents. Further, before the actual data collection started the instruments are given to colleagues to got valuable comment and criticism on the strengths and weakness of the item. In the second step, before begun of all aspects, the researcher contacted teachers and student for consent. After reach on the agreement with the concerned participants on the objective, test administered to sample participant in the selected school. Fifthly, the

researcher closely assisted and supervises them to solve any confusion regarding to the instrument. Finally, the test collected and made it ready for data analysis.

### **3.6. Data Gathering Instruments**

In order to obtain information for this study, the following methods of data collection instruments were used. These are questionnaire, document analysis and focus group discussions.

#### **3.6.1. Questionnaire**

For primary data collection, questionnaires distributed to 222 natural science stream students of secondary school. Questionnaires are taken as a preferable data-gathering tool for this research because of the fact that the researcher used to collect information on facts and attitudes from a wide range of sources. Thus, the researcher adopted questionnaire from review literature through little modification, which is not standardized tool. The questionnaire was applied the Five Likert scaling technique and it is a widely used rating scale which requires the respondents to indicate a degree of agreement or disagreement with each of a series of statements or questions. This rating scale is easy to respondents to give their response.

#### **3.6.2. Interview**

The interview permits greater depth of response which is not possible through any other means. Thus, the purpose of the interview is to collect more supplementary opinion, so as to stabilize the questionnaire response. Semi structure items prepared for the above respondents. The reason behind the semi-structured interview items are the advantages of flexibility in which new questions could be forwarded during the interview based on the responses of the interviewee. With this in mind, interview conducted with 6 physics teachers of selected sample school.

#### **3.6.3. Document Analysis**

Document analysis was review natural science students of year's 2014 rosters analysis to examine the status of students' physics academic performance of grade 9- to 12. Student achievement test results are collected from physics stream. Then relationship between achievement result and their response compared using percentage qualitative description are given.

## **3.7. Data Validity and Reliability**

### **3.7.1. Validity**

This study used content validity which determined through advisor opinion. Further, to make the data more valid and also to avoid ambiguity and unclear statements, pilot test conducted on 10 natural science teachers which do not included in the study. Accordingly, based on suggest idea some modification on uncertain word in the questionnaire corrected. To make the data more valid and also to avoid uncertainty and unclear statements, the draft questionnaire were reviewed.

### **3.7.2. Reliability**

Chronbach's Alpha reliability is the most popular test of consistency reliability is applied to measure the strength of the correlation and coherence between questionnaire items. For testing the reliability of the data instrument, Cronbach's Alpha calculated to test the reliability of the research instrument. According to Zikmund, Babin and Griffin, (2010) scales with coefficient alpha between 0.8 and 0.95 are considered to have very good quality, scales with coefficient alpha between 0.7 and 0.8 are considered to have good reliability, and coefficient alpha between 0.6 and 0.7 indicates fair reliability. Accordingly, using the Cronbach's alpha coefficient, reliability was measured, thus, coefficient alpha value for this study was 0.83, so the instrument was reliable to apply for the current study.

## **3.8. Methods of Data Analysis**

In this study descriptive statistics was used. Accordingly, the demographic profiles analyzed using simple statistical tools such as tables and percentages. Charts also used to describe the general characteristics of respondents. Further, in analyzing and reporting the data, mostly, the descriptive method used to analyze the information collected using different instruments from different sources. Information obtained from questionnaires and documents analyzed quantitatively using mostly descriptive statistics (Mean and Standard Deviations) and percentage. Information obtained from interview analyzed through qualitative description. Further, in order to compare whether there is gender difference in both attitude toward physics subject, independent samples t-test used to see the mean difference between groups.

The dependent variable is students' academic performance in Physics, whereas the independent variables are identified as confidence, physics ability, parent's awareness, school social interaction, and gender stereotypic beliefs. On the other hand, the qualitative data collected from the respondents through interviews questions analyzed using descriptive narrations through concurrent triangulation strategy.

### **3.9. Ethical Consideration**

In order to keep the confidentiality of the data that is gathered from the respondents, the respondents are not required to write their name and they are assured the anonymity and confidentiality of their response. The purpose of the study is disclosed in the introduction part of the questionnaire. Furthermore, the researcher tries to avoid misleading statements in the questionnaire. Lastly, the questionnaires are hand out up on their consent only. All research works that have contributed in any way to this study properly acknowledged and appreciated. Moreover, a piece of information from university showed for the participant and organization that needs to know about the detail information of the research.

## 4. RESULT ANDDISCUSSION

### 4.1. Introduction

The general objective of the study is to assess factors affecting attitudes of students towards physics in Hebeno secondary school of Kokosa woreda. For primary data collection, questionnaires were distributed to 222 secondary school students, 200 questionnaires were filled completely and returned. The remaining 22 questionnaires were not returned due to the reluctance of the respondents. Therefore, the return rates of the questionnaires were 90 %. According to Mugenda (2003) and Kothari (2004) a response rate of above 50% is adequate for a descriptive study. Thus the response rates under this study were very good. Therefore, based on the responses obtained from the respondents, document analysis and interview analysis and interpretations of the data were made in relation to the basic research questions.

### 4.2. Characteristics of the Respondents

Understanding about the overview of the respondent's demographic characteristics was important for further analysis of their responses. Hence, attempt was made to describe the background of the respondents which directly or indirectly related to the objectives of the study. Accordingly, the demographic characteristics of the respondents, such as sex, work experience, educational level and age analyzed and discussed in terms of frequencies and percentage as follows.

Table 4.1: Teachers and students background information

S. N	Item	Background information	Teacher		Student	
			F	%	F	%
1	Sex	Male	6	100	133	66.5
		Female	-	-	67	33.5
2	Age	16-25	-	-	195	97.5
		26-35	2	33.4	5	2.5
		36 to 45	3	50	-	-
		46 and above	1	16.4		
3	Work experience	1-10 years	2	33.4	-	-
		11-20 years	3	50	-	-
		21-30 years	1	16.7	-	-
		>31 years	-	-	-	-
4	Qualification	2 <sup>st</sup> degree	1	16.7	-	-
		1 <sup>nd</sup> degree	5	83.3	-	-
		Diploma and below	-	-	-	-

Source: Data obtained by researches during the survey (2023)

As shown in table above, all 6 (100 %) of physics teachers were male, while 124 (62 %) of students were male, the remaining 76 (38%) of students were female. This shows that there is significance difference between teacher and student's genders i.e. male is more than of female at both position of student and teacher. This can be resulted from the lower female participation in the education sector. Thus, it needs attention to increase women participation in education sector. This is another example of gender inequality in education which is caused by gender roles albeit subtle and difficult to notice (Gaidzanwa, 2012).

As shown in table 2, the majority 3(50 %) of the teachers were in between the age ranges of 36-45 years, followed by 2(33.4 %) were in between the age ranges of 26-35 years. The rest 1(16.4 %) of teachers were above 46 years. On the other hand, 195(97.5 %) of the students were in between the age ranges of 16-25 years, while 5 (2.5 %) of the students were in between the age ranges of 26-35 years. So, one can concluded that the majority of student were in line to Ethiopia education policy and all teachers fall within the active population group (thus the working class) of which the age(s) range between 16-25 years records the highest number.

In terms of qualification, as it indicated in table above, 5 (83.3 %) of teachers were first degree. This implies that majority of teachers have first degree in physics. The rest 1 (16.7 %) of teachers were second degree. This shows that majority of teachers had first degree; it is in line with the guidelines of Ministry of Education that secondary school teachers should have a minimum of first degree holder in education.

In table above, the majority 3(50 %) of teachers have teaching experience in between 11-20, while 2(33.4 %) of teachers have teaching experience in between 1-10 years, the remaining, 1(16.7%) of teachers have teaching experience in between 21-30 years. Hence the majority teachers were in between 11 to 20 years. Hence, it can be inferred that majority of teachers were matured to provide use full suggestions and recommendations regarding factors affecting student's attitudes towards physics learning.

### 4.3. Students' Academic Performance of 2014 E.C Roster Physics Mark

This section was intended to document review on academic performance of grade 9, 10, 11 and 12 students roster physics mark of 2014 E.C of Hebeno secondary school of Kokosa Woreda. Descriptive statistics, frequency and percentage were employed, which was measured using the Four-Point Likert Scale. Thus, the views of the respondents were presented in table below.

Table 4.2. Academic performance of student's roster physics mark of grade 9 -12 of 2014 years

Mark range	Sex	Grade level of 2014							
		Grade 9		Grade 10		Grade 11		Grade 12	
		F	%	F	%	F	%	F	%
Not passing (0-49)	M	8	20	4	12.9	4	12.9	3	10.7
	F	3	16.6	5	26.3	3	17.64	2	12.5
	T	11	18.96	8	16	7	14.58	5	11.3
Satisfactory (50-60)	M	24	60	21	67.74	20	64.51	20	71.4
	F	11	61.1	11	57.89	11	64.7	11	68.7
	T	35	60.3	33	66	31	65.58	31	70.4
good (65-74)	M	5	12.5	4	12.9	4	12.9	3	10.7
	F	3	16.6	2	10.52	2	11.76	2	12.5
	T	8	13.79	6	12	6	12.5	5	11.3
Very good (75& above)	M	3	7.5	2	6.45	3	9.69	2	7.14
	F	1	5.55	1	5.26	1	5.88	1	6.75
	T	4	6.89	3	6	4	8.33	3	6.61

Source: Hebeno Secondary School Record Office (2023)

As it indicted in a table above, the document review of grade 9<sup>th</sup> physics roster result in the year 2014, the result indicate that the majority 24(60%) of male students and 11(61.1%) of female students have registered satisfactory (50-60), while 5(12.5 %) of male students and 3(16.6%) of female students have registered good (65-74). Further, 8(20%) of male students and 3(16.6%) of female students were not passing (0-49). The remaining 3(7.5%) of male

students and 1(5.5%) of female students have registered Very Good (75& above). So one can concluded ,both the majority male and female student perform satisfactory achievements in the study area, however, there is a gap in physic academic performance of the academic year of 2014more female students were in the range of not passing (0-49).

Further, as it indicted in a table above, the document review of grade 10<sup>th</sup> physics roster result in the year 2014, the result indicate that the majority 21(67.74%) of male students and 11(57.89%) of female students have registered satisfactory (50-60), while 4(12.9 %) of male students and 2(10.5 %) of female students have registered good (65-74). Further, 4(12.9%) of male students and 5(26.3%) of female students were not passing (0-49). The remaining 2(6.45%) of male students and 1(5.26%) of female students have registered Very Good (75& above). So one can concluded, both male and female student perform satisfactory achievements in the study area, however, the document review indicated still large female students were not passing (0-49).

As it indicted in a table above, the document review of grade 11<sup>th</sup> physics roster result in the year 2014, the result indicate that the majority 20(64.5%) of male students and 11(64.7%) of female students have registered satisfactory (50-60), while 4(12.9 %) of male students and 2(11.76 %) of female students have registered good (65-74). Further, 4(12.9%) of male students and 3(17.64%) of female students were not passing (0-49). The remaining 3(9.67%) of male students and 1(5.88%) of female students have registered Very Good (75& above). So one can concluded, the majority male student have registered good, however, large percentage of female students were not passing (0-49).

As it indicted in a table above, the document review of grade 12<sup>th</sup> physics roster result in the year 2014, the result indicate the majority 20(71.42%) of male students and 11(68.75%) of female students have registered satisfactory (50-60), while 3(10.7 %) of male students and 2(12.5%) of female students were not passing (0-49). Further, 3(10.7%) of male students and 2(12.5%) of female students have registered good (65-74). The remaining 2(7.14%) of male students and 1(6.25%) of female students have registered Very Good (75& above). So one can concluded, the majority both grade 12 male and female student perform satisfactory achievements in the study area, however, still there is gender gap in physic academic

performance of grade 12 student in year 2014.

As it indicated in table above the overall response for the four academic years, large number of students has registered satisfactory. In support with the finding Boyuk (2011) the estimation of students' attitude towards natural sciences has been carried out by many researchers, in his research came to the conclusion that students positive attitudes towards science highly correlate with their achievement in science. In the particular area of physics, because of a visible decline in the enrollment in physics and a fall in the interest in physics around the world, many researchers have been made to estimate the attitude of students towards physics at secondary schools. Many of them (Mekonnen, 2014) came to the same conclusion that the decrease in Physics academic achievement is alarming.

#### 4.4. The Attitude of Student toward Physics Education

This section was to assess the attitude of student toward Physics education. For this purpose, descriptive statistics (Frequency, Mean and Standard Deviation) were employed, which was measured using the Five-Point Likert Scale. Thus, the views of the respondents were presented in the tables below.

Table 4.3. Respondent's opinion on student feeling towards physics subject

Respondents	Student feeling towards physics subject											T value	Sig. (2-tailed)
	SD		DA		MA		AG		SA		Mean		
	F	%	F	%	F	%	F	%	F	%			
Male	19	14	21	16	24	18	58	44	11	8	3.1579	4.755	.000
Female	14	21	31	46	9	13	12	18	1	1	2.3284		

Source: Data obtained by researches during the survey (2023)

We can observe from table above of item 1, the majority 58(44%) of male students agreed the opinion student have a good feeling towards physics subject, while the majority 31(46 %) of female students disagreed the opinion student have a good feeling towards physics subject. Moreover, the t test indicated that there is significance difference in mean score of male (M=3.1579) and female (M=2.3284) with p value 0.000. So one can concluded that male student have a good feeling towards physics comparing with female students.

Table 4.4. Respondent's response on student only hates the calculation aspect of physics

Respondents	Student feeling towards the calculation aspect of physics											T value	Sig. (2-tailed)
	SD		DA		MA		AG		SA		Mean		
	F	%	F	%	F	%	F	%	F	%			
Male	19	14	24	18	26	20	55	41	9	8	3.0827	4.587	.000
Female	17	25	28	42	9	13	12	18	1	1	2.2836		

Source: Data obtained by researches during the survey (2023)

We observe from table above of item 1, the majority 55(41%) of male students agreed the opinion student only hates the calculation aspect of physics, while the majority 28(42 %) of female students disagreed the student only hates the calculation aspect of physics. Further, the t test indicated that there is significance difference in mean score of male (M=3.0827) and female (M=2.2836) with p value 0.000. So one can concluded that male student have the attitude student only hates the calculation aspect of physics, however, the female student have the attitude student hates both the calculation aspect and theoretical of physics.

Table 4.5. Respondent's response on student attitude towards student usually enjoy when physics class is going on

Respondents	Student usually enjoy when physics class is going on											T value	Sig. (2-tailed)
	SD		DA		MA		AG		SA		Mean		
	F	%	F	%	F	%	F	%	F	%			
Male	19	14	22	17	29	21	55	41	8	6	3.082	4.712	.000
Female	18	27	20	29.	9	13	19	18	1	1	2.2687		

Source: Data obtained by researches during the survey (2023)

We see that from table above of item 1, the majority 55(41%) of male students agreed the opinion student have the attitude student usually enjoy when physics class is going on, while the majority 27(40 %) of female students disagreed the opinion student have the attitude student usually enjoy when physics class is going on. In addition, the t test indicated that there is significance difference in mean score of male (M=3.082) and female (M=2.2687) with p value 0.000. So one can conclude that male student have the attitude student usually enjoy when physics class is going on, however, the female student disagree the opinion

student usually enjoy when physics class is going on.

Table 4.6. Respondent's response on student attitude toward student understand other subject more than physics

Respondents	Student understand other subject more than physics											Mean	T value	Sig. (2-tailed)
	SD		DA		MA		AG		SA					
	F	%	F	%	F	%	F	%	F	%				
Male	16	12	26	20	34	26	35	26	22	17	3.1579	1.273	.204	
Female	13	19	12	18	12	18	20	30	10	15	2.9104			

Source: Data obtained by researches during the survey (2023)

From table above of item 1, the majority 35(26%) of male students agreed the opinion student understand other subject more than physics, while the majority 20(30 %) of female students agreed the opinion student understand other subject more than physics. Moreover, the t test indicated that there is no significance difference in mean score of male (M=3.1579) and female (M=2.9104) with p value 0.204. So one can conclude that both male and female student have the attitude student understand other subject more than physics.

Table 4.7. Respondent's response on student attitude toward student does not see the importance of physics in everyday life

Respondents	Student does not see the importance of physics in everyday life											Mean	T value	Sig. (2-tailed)
	SD		DA		MA		AG		SA					
	F	%	F	%	F	%	F	%	F	%				
Male	11	8	18	14	41	31	56	42	7	5	3.2256	1.639	.103	
Female	10	15	14	21	20	30	15	22	8	12	2.9552			

Source: Data obtained by researches during the survey (2023)

We can observe from table above of item 1, the majority 58(44%) of male students agreed the opinion student understand other subject more than physics, while the majority 20(30 %) of female students agreed the opinion student understand other subject more than physics. Furthermore, the t test indicated that there is no significance difference in mean score of male (M=3.2256) and female (M=2.9552) with p value 0.103. So one can conclude that both male and female student have the attitude student does not see the importance of physics in everyday life.

Table 4.8. Respondent's response on student attitude toward student has better understanding of practical physics

Respondents	Student has better understanding of practical physics											Mean	T value	Sig. (2-tailed)
	SD		DA		MA		AG		SA					
	F	%	F	%	F	%	F	%	F	%				
Male	13	10	15	11	34	26	54	41	17	13	3.3534	2.756	.006	
Female	11	16	19	28	13	19	18	27	6	9	2.8657			

Source: Data obtained by researches during the survey (2023)

As we observe from table above of item 1, the majority 54(41%) of male students agreed the opinion student has better understanding of practical physics, while the majority 19(28 %) of female students disagreed the opinion student has better understanding of practical physics. Further, the t test indicated that there is no significance difference in mean score of male (M=3.3534) and female (M=2.8657) with p value 0.006. So one can conclude that male student have the attitude student has better understanding of practical physics, however, the female students have the attitude student has poor understanding of practical physics.

Table 4.9. Respondent's response on student attitude toward perception of the subject physics as being too difficult

Respondents	Student has perception of the subject physics as being too difficult											Mean	T value	Sig. (2-tailed)
	SD		DA		MA		AG		SA					
	F	%	F	%	F	%	F	%	F	%				
Male	11	8	19	14	35	26	60	45	8	6	3.2632	1.097	.274	
Female	12	18	12	18	9	13	27	40	7	10	3.0746			

Source: Data obtained by researches during the survey (2023)

We can observe from table above of item 1, the majority 60(45%) of male students agreed the opinion student has perception of the subject physics as being too difficult, while the majority 27(40 %) of female students agreed the opinion student has perception of the subject physics as being too difficult. Moreover, the t test indicated that there is no significance difference in mean score of male (M=3.2632) and female (M=3.0746) with p value .274. So one can conclude that both male and female student have the attitude student has perception of the subject physics as being too difficult.

Respondents through interview respond that majority of female students appears to be disinterested in studying science fields. The respondents added that females tend to avoid natural science fields; that they have been traditionally considered as male domains. The respondents contained that since science is viewed as a masculine image, it is considered hard, cold and an analytical discipline, female do not anticipate higher performance in science subjects. The respondents added that negative attitude towards a Physics subject makes learning difficult, due to students do not stimulates to put in the adequate effort that often leads to high achievement in that subject.

In general different research results indicated students believed Physics as the most problematic area to learn within the realm of science, and it attracts fewer pupils than other natural science like chemistry and biology. The finding of (Schiefele and Csikszentmihalyi, 1995) attitude in the subject is the special predictors for the students' participation and success in the subject. According to Hendrickson, attitudes are the best predictor for estimation of students' success (Hendrickson, 1997). Relative to Physics, Godwin and Okoronka (2015) showed that a significant relationship exists between students' attitude and their corresponding academic performance in physics.

#### 4.5. Factors Impacting on Students' Attitude toward Physics

This section was to assess respondent opinion on factors impacting on students' attitude toward Physics. For this purpose, descriptive statistics (Frequency, Mean and Standard Deviation) were employed, which was measured using the Five-Point Likert Scale. Thus, the views of the respondents were presented in the tables below.

Table 4.10. Respondents view on factors impacting on students' attitude toward Physics

Item	Response scale											
	SD		DA		MA		AG		SA		Mean	SD
SN	F	%	F	%	F	%	F	%	F	%		
1 Student lack confidence for success in the subject	11	5.5	21	10.5	38	19.0	115	57.5	15	7.5	3.510	.97192
2 Students believed they	23	11.5	23	11.5	42	21.0	95	47.5	17	8.5	3.300	1.1430

	have poor physics ability and that their performance is far from other students												
3	Physics are affected by gender stereotypic beliefs among boy and girls	11	5.5	19	9.5	38	19.0	116	58.0	16	8.0	3.535	.96615
4	Parents poor aware of, understand, and support the basic objective of the school	24	12.0	35	17.5	36	18.0	79	39.5	26	13	3.240	1.2328
5	Small school facilitates, social interaction and teacher specialization	22	11.0	20	10.0	45	22.5	76	38.0	37	18.5	3.430	1.2175
												3.403	.83647
Grand Mean													

Source: Data obtained by researches during the survey (2023) We can observe from table above of item 1, the majority 115(57.5 %) of students agreed the opinion student lack confidence for success in the subject impact students' attitude toward Physics. Further on likert scale, the responses had a mean value of 3.510 which is in the range of agree scale, so one can conclude that significant student agreed the opinion student lack of confidence for success in the subject impact students' attitude toward Physics.

As we observe from table 4.10 above of item 2, the majority 95(47.5 %) of students agree the opinion students believe they have poor physics ability and that their performance is far from other students impact students' attitude toward Physics. Moreover on likert scale, the responses had a mean value of 3.300 which is in the range of moderate agree scale, so one can conclude that average student agreed the opinion students perception poor physics ability and their performance far from other students impact students' attitude toward Physics.

As we observe from table 4.10 above of item 3, the majority 116(58%) of students agree the opinion Physics are affected by gender stereotypic beliefs among boy and girls. Further on likert scale, the responses had a mean value of 3.535 which is in the range of agree scale, so one can conclude that significant student agreed the opinion student attitude toward Physics are affected by gender stereotypic beliefs among boy and girls.

As can be seen from table 4.10 above of item 4, the majority 79 (39.5%) of students agree the opinion parents poor awareness of understand and support the basic objective of the school.

Further on likert scale, the responses had a mean value of 3.240 which is in the range of moderate agree scale, so one can conclude that average student moderately agreed the opinion parents poor awareness of understand and support the basic objective of the school impact students' attitude toward Physics.

As can be seen from table 4.10 above of item 5, the majority 76(38%) of students agree the opinion small school size facilitates, social interaction and teacher specialization impact students' attitude toward Physics. Further on likert scale, the responses had a mean value of 3.430 which is in the range of agree scale, so one can conclude that significant student agreed the opinion small school size facilitates, social interaction and teacher specialization impact students' attitude toward Physics.

As it indicated in table 4.10 above, the overall response for the five items indicated the mean value is 3.403. The higher the mean score, the more that respondent agreed with the statement and vice versa. Therefore; the result based on mean classification, the mean score was in the range of agree, so one can concluded that student lack confidence students believe, gender stereotypic beliefs and parents poor awareness impacting students' attitude toward Physics.

In support with the finding, respondents through interview respond that Physics lessons being held in the classroom on the sole theoretical basis is one of the factors that influence attitude of the students toward these lessons in a negative manner. According to their view, physical topics consist abstract concepts, majority of teachers not lectured in the students' daily life, together with simulations, animations and other videos to keep the attention of the students alive. The respondents added that teachers failed to use various methods and techniques according to the content. A major cause of under-achievement has been traced to the influence of misconceptions which students bring to science classroom especially Physics class (Ivowi, 2010).

## 5. SUMMARY, CONCLUSIONS AND RECOMENDATIONS

### 5.1. Summary

The document review of grade 9<sup>th</sup> physics roster result in the year 2014, indicate that the majority 24(60%) of male and 11(61%) of female students have registered satisfactory (50-60), while 5(12.5 %) of male and 3(16.6%) of female students have registered good (65-74). Further, 8(20%) of male students and 3(16.6%) of female students were not passing (0-49). The remaining 3(7.5%) of male students and 1(5.5%) of female students have registered Very Good (75& above). Further, the document review of grade 10<sup>th</sup> physics roster result in the year 2014, indicate the majority 21(67.74%) of male students and 11(57.89%) of female students have registered satisfactory (50-60), while 4(12.9 %) of male students and 2(10.5 %) of female students have registered good (65-74). Further, 4 (12.9%) of male students and 5(26.5%) of female students were not passing (0-49). The remaining 2(6.45%) of male students and 1(5.26%) of female students have registered Very Good (75& above).

The document review of grade 11 th physics roster result in the year 2014, indicate that the majority 20(64.51%) of male students and 11(64.7%) of female students have registered satisfactory (50-60), while 4(12.9 %) of male students and 2 (11.76 %) of female students have registered good (65-74). Further, 4(12.9%) of male students and 3(17.6%) of female students were not passing (0-49). The remaining 3(9.67%) of male students and 1(5.88%) of female students have registered Very Good (75& above). The document review of grade 12 th physics roster result in the year 2014, the result indicate the majority 20(71.4%) of male students and 11(68.75%) of female students have registered satisfactory (50-60), while 3(10.7 %) of male students and 2(12.5%) of female students were not passing (0-49). Further, 3(10.7%) of male students and 2(12.5%) of female students have registered good (65-74). The remaining 2(7.14%) of male students and 1(6.25%) of female students have registered Very Good (75& above).

The study indicated the majority 58(44%) of male students agreed the opinion student have a good feeling towards physics subject, while the majority 31(46 %) of female students disagreed the opinion student have a good feeling towards physics subject. Further, the t test indicated that there is significance difference in mean score of male (M=3.1579) and female

( $M=2.3284$ ) with  $p$  value 0.000. Further, the majority 55(41%) of male students agreed the opinion student only hates the calculation aspect of physics, while the majority 28(42 %) of female students disagreed the student only hates the calculation aspect of physics. Further, the  $t$  test indicated that there is significance difference in mean score of male ( $M=3.0827$ ) and female ( $M=2.2836$ ) with  $p$  value 0.000. The majority 55(41%) of male students agreed the opinion student have the attitude student usually enjoy when physics class is going on, while the majority 27(40 %) of female students disagreed the opinion student have the attitude student usually enjoy when physics class is going on. Further, the  $t$  test indicated that there is significance difference in mean score of male ( $M=3.082$ ) and female ( $M=2.2687$ ) with  $p$  value 0.000.

The majority 35(26%) of male students agreed the opinion student understand other subject more than physics, while the majority 20(30 %) of female students agreed the opinion student understand other subject more than physics. Further, the  $t$  test indicated that there is no significance difference in mean score of male ( $M=3.1579$ ) and female ( $M=2.9104$ ) with  $p$  value 0.204. The majority 58(44%) of male students agreed the opinion student understand other subject more than physics, while the majority 20(30 %) of female students agreed the opinion student understand other subject more than physics. Further, the  $t$  test indicated that there is no significance difference in mean score of male ( $M=3.2256$ ) and female ( $M=2.9552$ ) with  $p$  value 0.103. The majority 54(41%) of male students agreed the opinion student has better understanding of practical physics, while the majority 19(28 %) of female students disagreed the opinion student has better understanding of practical physics. Further, the  $t$  test indicated that there is no significance difference in mean score of male ( $M=3.3534$ ) and female ( $M=2.8657$ ) with  $p$  value 0.006. The majority 60(45%) of male students agreed the opinion student has perception of the subject physics as being too difficult, while the majority 27(40 %) of female students agreed the opinion student has perception of the subject physics as being too difficult. Further, the  $t$  test indicated that there is no significance difference in mean score of male ( $M=3.2632$ ) and female ( $M=3.0746$ ) with  $p$  value .274. The study indicated student lack confidence, students believe, gender stereotypic beliefs and parents poor awareness impacting students' attitude toward Physics.

## 5.2. Conclusions

Accordingly the document review of four grade level physics roster result indicated that: Both male and female student perform satisfactory achievements, there is a gap in physic academic performance of the academic year 2014. Further, the document review of grade 10<sup>th</sup> physics roster result in the year 2014, indicated, both male and female student perform satisfactory achievements in the study area, still there is a gap in physic academic performance of the academic year 2014. The document review of grade 11<sup>th</sup> physics roster result in the year 2014, also indicated, the majority both male and female student perform satisfactory achievements. As it indicted in a the study, the document review of grade 12<sup>th</sup> physics roster result indicted, the majority both grade 12 male and female student perform satisfactory achievements, still there is a gap in physic academic performance of grade 12 student in year 2014. As it indicated in the study the overall response for the four academic years, large number of students has registered satisfactory, however, there is slight gender gap between male and female on academic achievements.

The study indicated that male student have a good participation towards physics comparing with female students. Furthermore, the study concluded that male students have the attitude student only hates the calculation aspect of physics, however, the female student have the attitude student hates both the calculation aspect and theoretical of physics. The study also found that male student have the attitude student usually enjoy when physics class is going on, however, the female student disagree the opinion student usually enjoy when physics class is going on. Further, the study points out that both male and female student have the attitude student understand other subject more than physics. Similarly it under stood that both male and female student have the attitude student does not see the importance of physics in everyday life. The male student have the attitude student has better understanding of practical physics, however, the female students have the attitude student has poor understanding of practical physics. Both male and female student have the attitude student has perception of the subject physics as being too difficult. The study indicated student lack confidence, students believe, gender stereotypic beliefs and parents poor awareness impacting students' attitude toward Physics.

### 5.3 Recommendations

From the result obtained and conclusions made we would like to forward the following recommendations.

- For the better achievement in Physics, willingness and positive reaction are important. Attitude can negatively influence the achievement of student. So changing the attitude of the students is vital. Thus, awareness creation for students on student attitude towards Physics education should be carried out continuously with all concerned bodies.
- Males are relatively better achiever than females in Physics in all grade level of sample secondary school. That is, the differences in student attitude towards Physics and achievement in science are based on gender were confirmed. A lot need to be done to fill this gender gap in Physics achievement. Female's students should be informed of the importance of Physics that it is the basic tool for further education.
- Thus all concerned bodies should try to change the attitude of the students towards Physics, motivate students to participate in the Physics educations.
- Create conditions in which students learn to participate in Physics educations. As a result, student can develop confidence in Physics. Once they acquire the interest to participate in different science education activities, they can easily involve in practicing different Physics related fields
- The secondary school should conduct follow-up study on a regular basis in order to identify problems that influence the students' attitude toward and achievement of Physics educations.
- Generally in order to develop attitude of students towards Physics education and to minimize the gender gap in achievement in Physics subjects, government and all concerned bodies should give special attention for female students starting from elementary school level up to higher education and should work hard and effectively individually as well as cooperatively.

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**Appendix I**  
**MaddaWalabu University**  
**College of Natural and Computational Science**  
**Department of Physics**

**Questionnaire for grade natural science stream students**

Dear Respondent, first of all I would like to thank you for taking your time to read and fill this questionnaire. I am conducting a research in partial fulfillment of the requirements for Master’s Degree in physics. This questionnaire is to be used solely for the research I am undertaking in order to fulfill my thesis work required to complete my study. The aim of the research is to identify student’s attitudes towards physics learning in Hebeno secondary school of Kokosa woreda. Your participation is invaluable and remains anonymous. Therefore, this is to kindly request you to take some of your time and fill the questionnaire.

Dear respondent you are not required to write your name to give you freedom, to respond confidently and to keep your secret safely. Please put  $\surd$  mark in the place provided for you in box for both open and close questions. If you are required to provide specific data, please write it on the space given.

**Section 1: Background Information**

1. Sex 1. Male  Female

**Section 2: Attitude of students towards Physics subject**

Please using the scale below; indicate the extent of your level of agreement on the attitude of students towards Physics subject by putting a tick mark ( $\surd$ ) besides each statement where SA- Strongly Agree, AG-Agree, MA– Moderate, DA– Disagree and SD– Strongly Disagree.

SN	Attitude of students towards Physics subject	Response				
		SD	DA	MA	AG	SA
1	Student have a good feeling towards physics subject					
2	Student only hate the calculation aspect of physics					
3	Student usually enjoy when physics class is going on					
4	Student understand other subject more than physics					
5	Student do not see the importance of physics in everyday life					
6	Student have better understanding of practical physics					
7	Perception of the subject physics as being too difficult					

### Section 3: Factors impacting on students' attitude

Please using the scale below; indicate the extent of your level of agreement on the factors impacting on students' attitude by putting a tick mark (√) besides each statement where SA- Strongly Agree, AG-Agree, MA- Moderate, DA- Disagree and SD- Strongly Disagree.

SN	Factors affecting female student physics performance	Response				
		SD	DA	MA	AG	SA
1	Student lack confidence for success in the subject					
2	Students believed they have poor physics ability and that their performance is far from other students					
3	Physics are affected by gender stereotypic beliefs among boy and girls					
4	Parents poor aware of, understand, and support the basic objective of the school					
5	Small school size facilitates social interaction inhibits teacher specialization					

## **Appendix II**

**MaddaWalabu University**

**College of Natural and Computational Science**

**Department of Physics**

### **Interview for physics teachers**

Dear Respondent, first of all I would like to thank you for taking your time to respond this interview. I am conducting a research in partial fulfillment of the requirements for Master's Degree in physics. This interview is to be used solely for the research I am undertaking in order to fulfill my thesis work required to complete my study. The aim of the research is to identify student's attitudes towards physics learning in Hebeno secondary school of Kokosa woreda. Your participation is invaluable and remains anonymous. Therefore, this is to kindly request you to take some of your time and respond the interview.

***Thank you in advance for your cooperation***

1. What is the level of academic achievement of students in physics subject in the study area?
2. What is the attitude of student toward physics education in the study area?
3. Is there gender difference in both attitudes toward physics subject?
4. What are factors impacting on students' attitude in the study area?

**Appendix III**  
**MaddaWalabu University**  
**College of Natural and Computational Science**  
**Department of Physics**  
**Document Analysis Check list**

Regarding document analysis, review natural science students of years of 2014 rosters of Hebeno secondary school of Kokosa woreda

Mark range	Sex	Grade level of 2014							
		Grade 9		Grade 10		Grade 11		Grade 12	
		F	%	F	%	F	%	F	%
Not passing (0-49)	M	8	20	4	12.9	4	12.9	3	10.7
	F	3	16.6	5	26.31	3	17.64	2	12.5
	T	11	18.96	9		7	14.58	5	11.3
Satisfactory (50-60)	M	24	60	21	67.74	20	64.5	20	71.4
	F	11	61.1	11	57.89	11	64.7	11	68.7
	T	35	60.3	33	66	31	65.5	31	70.4
good (65-74)	M	5	12.5	4	12.9	4	12.9	3	10.7
	F	3	16.6	2	10.52	2	11.76	2	12.5
	T	8	13.79	6	12	6	12.5	5	11.3
Very good (75& above)	M	3	7.5	2	6.45	3	9.67	2	7.14
	F	1	5.5	1	5.26	1	5.88	1	6.25
	T	4	6.89	3	6	4	8.33	3	6.8