EVALUATION OF THE APPLICATION OF THE STUDENT CENTERED METHOD OF TEACHING AND ITS IMPLEMENTATION IN PHYSICS TEACHING (THE CASE OF SHAMBU, SAKALA AND TULU WAYU PREPARATORY SCHOOLS)

BY FANTA WORKU GUDETA

A THESIS SUBMITTED TO APPLIED PHYSICS DEPARTMENT, SCHOOL OF APPLIED NATURAL SCIENCE, IN PARTIAL FULFILLMENT FOR THE REQUIRMENT FOR THE DEGREE OF MASTER OF SCIENCE IN PHYSICS.

OFFICE OF GRADUATE STUDIES

ADAMA SCIENCE AND TECHNOLOGY UNIVERSITY

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GRADUATE STUDIES PROGRAM

ADVISOR'S APPROVAL SHEET

(Submission sheet-1)

As advisor, I certify that I have read and evaluated this thesis entitled " Evaluation of the philosophy of student centered method of teaching and its implementation in physics teaching (The case of Shambu, Sakala and Tuluwayu preparatory schools") by **Fanta worku Gudeta** under my guidance and supervision. I hereby recommend it could be submitted for defence as it fulfills the requirements for Degree of masters of science in physics.

Advisor **Alemu Kebede(PhD)**

Signature……..

Date…….

ADAMA SCIENCE AND TECHNOLOGY UNIVERSITY

GRADUATE STUDIES PROGRAM

BOARD OF EXAMINERS APPROVAL SHEET

(Submission sheet-2)

As members of the board of Examiners for the Degree of Masters of Science in Physics, Thesis open Defence Examination of **Fanta worku Gudeta,** I certify that I have read and evaluated his thesis entitled " Evaluation of the philosophy of student centered method of teaching and its implementation in physics teaching (the case of Shambu, Sakala and Tuluway preparatory schools'') and examined the candidate. I therefore, recommend that the thesis could be accepted as it fulfills the requirements for Degree of Masters of science in physics.

Chairman…….Signature……..Date……..

Advisor……Signature……..Date……..

Internal
Examiner……..Signature……Date……...

External
Examiner……..Signature……Date……...

SGS approval…….. Signature…….Date……..

DECLARATION

I hereby declare that this MSC Thesis dissertation is my original work and has not been presented for a degree in any university, and all sources of material used for this thesis dissertation have been duly acknowledged. This thesis is submitted to Adama Science and Technology University in partial fulfillment of the requirments for Degree of Masters of Science in physics.

Name **Fanta worku Gudeta**

Signature……..

Date of Submission…….

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ACRONYMS

ASTU- Adama Science and Technology University.

CPD- Continuous Professional Development

E.C. - Ethiopian Calander

EUEE- Ethiopian University Entrance Examination.

ENLA- Ethiopian National Learning Assesments.

ICDR- Institute for Curriculum Development and Research.

ICT- Information and Communication Technology

MOE – Ministry of Education

MSC- Masters of Science

NAE – National Agency for Examination

NERDC- National Educational Research and Development Center.

NGO- Non Governmental Organization

NGSS- Next generation science standards

PER – Physics Education Research

PBL- Problem Based Learning

PHY- Physics

SCL - Student Centered Learning

SIP- School Improvement Program.

SPSS-Statistical package for the social science.

TGE-Trasitional Government of Ethiopia.

TPD- Teachers Professional Development.

ABSTRACT

The purpose of this study was to evaluate the implementation of student centered method of teaching in physics teaching in preparatory schools. The study was conducted in Horo Guduru Wollega zone preparatory schools in Oromia region in Ethiopia (the case of Shambu, Sakala and Tuluwayu preparatory schools). Simple random sampling method was used to select the respondents and the data were collected from 7 physics teachers and 130 Grade 11 and 12 Natural Science Students. Descriptive survey method was used in this research to explain the opinions, attitudes and suggestions of respondents. The main instruments of data collection were Questionnaire, Observation and Document Analysis. Both qualitative and quantitative data analysis were employed in this study. The data collected through questionnaries was computed by using SPSS version 20 and the descriptive values were obtained. The analyzed data were described by using tables and graphs. The findings of this study shows that among teaching methodologies lecture method was dominating teaching method in which 4 (57.1%) teacher respondents and 71 (54.6%) of student respondents response with average mean value 4.35 indicates always applied. Question and Answer method, Group discussion and Solving sample problems were applied mostly in the class room in physics teaching as the average Mean value of the respondents response 3.70, 3.50 and 3.80 respectively shows mostly applied. But problem solving method, project method, Modeling method, Cooperative learning, Game based learning, Discovery method and Student presentation with average Mean value of respondents response was 2.58, 2.53, 1.94, 2.46, 2.18, 2.21 and 2.30 respectively shows rarely employed. In the case of Experiment in the laboratory 4 (57.1%) of teacher respondents and 93 (71.5%) of student respondents response with average mean value 1.49 shows never used due to absence of laboratory room, equipment's and laboratories are not functional. lack of instructional materials, the failure of schools to satisfy students need effectively and efficiently, Teachers choice of simpler methods, lower involvement of students in their lesson, lack of skills how to apply the materials in the active learning process and lack of mathematical skills and language barrier of students were factors affecting the implementation of student centered method of teaching seen in teaching physics. Little or absence of active involvement of students in student centerd approach lead to poor score of academic achievement results.

Keywords: Student centered learning, implementation, academic performance.

1. INTRODUCTION

1.1 Background of the Study

Education enables individuals and societies to become all round thinkers by providing knowledge, ability, skill and attitude. There by it strengthens their problem solving ability so as to achieve this, the student should be taught in a way that enables them to really engage themselves in the process [1]. The purpose of teaching at any level is to bring a fundamental change in the learner. Such changes may be in the form of acquiring intellectual skills, solving problems and inoculation of desirable attitudes and values [2]. Teaching-learning process is the most important activity for students and teachers in the school. It helps the students to have mental development and behavioral change. Teaching-learning activities are carried out by teachers and students. In this process teachers play a great role in accomplishing process or making student active learners. Teachers facilitate learning by providing students with information's and teaching aids they need to learn. They interact with students to guide them in best way of learning [3]. To facilitate the process of knowledge transmission, Teachers should apply appropriate teaching methods that best suit specific objectives and level exist outcomes.

Science education is also in the developing of technologically literate citizens who understand how science and technology influence and who are able to use this knowledge in their everyday activities [4]. The study of science is important because it has the potential for improving the quality of people life and gives control over their lives by providing path ways for finding answers to questions**.** The technological element's (computer software, internet, laboratory, media, electronic communication tools etc.) need the knowledge of science to use in our everyday life. Information and communication technology (ICT) skill helps to assist practical work in physics with computer based soft ware applications. ICT is used to assisted instructions using image, sound animation and other means to stimulate the sensory of students. This indicates that science education plays a crucial role in developing human resources necessary for science and technology advancements [5]. Science education is crucial for addressing challenges in the modern world such as securing clean water, avoiding and curing diseases, ensuring availability of food and dealing with global environmental changes [6].

Effective science teaching requires creativity, imagination and innovation. Science teaching involves teaching students to use their knowledge, beliefs, cognitive and affective domains through process to generate new, fruitful and transferable conceptions that have personal and every day meaning significance. These effective science teaching equip the students with the ability that motivates them to solve problems scientifically, carryout scientific investigation, develop self-confidence, ability to work honestly and cooperatively [7].

Physics education is also aimed to equip the individual learner with knowledge, skills and attitudes that will enable him to live a meaningful and fulfilled life by contributing positively to the development of the society from which he or she can derive maximum social, economic and cultural benefits [8]. Physics is an active subject and its concept find application in everyday life. So it is an essential part of the intellectual life of man at the present day in the age of science and technology. Most forms of technology resulted from advances in Physics. Physics plays a vital role for our countries economic development by diffusing science and technology into the society.

Teaching physics focuses on provided students learning activities that resulted in students constructing models of the physical world based on experimental design and observation. Physics has grown new discoveries and inventions and this requires a lot of creativity. It is possible to foster creativity through physics teaching using the method of learning by doing in the student centered approach. For this teachers are expected to impart physics instructions in a such away that students are activily involved in activities in student centered method of teaching and it places a good deal of responsibility on physics teachers [9]. Physics is an important base of science and technology because, it is concerned with natural phenomena and help people understand the increasingly changing technological society. Physics also plays a key role in the future progress of human kind.

The purpose of physics teaching in preparatory schools is to enable students to grasp systematically the basic knowledge of physics needed for the further study of modern science and technology and to understand its applications. It also enables students in order to strengthen quantitative reasoning and problem solving skills that are valuable in areas of physics [10]. It contributes to the technological infrastructure and provides trained personnel needed to take advantage of scientific advances and discoveries. It improves our quality life by providing the basic understanding necessary for developing new instrumentation and techniques for medical applications [11].

Many physics curriculum projects have been worked on the hypothesis that science and technology can contribute to the solution of some of the problems facing humanity. The most recent physics curriculum projects have given increasing emphasis not only to approaches that lead to understanding and to building up of inquiring minds but also to problem solving approach. There is emphasis given to science education to encourage students in their learning [12]. But still there are many instances where insufficient attention had been paid to the applications to daily life of the science learnt at school. To correlate science leaning at school with environment it is still difficult [13]. There were many challenges in the implementation of student centerd method in teaching science. In most schools of Ethiopia until the examination of EUEE, Students were taught each and every things from books prescribed by lecture methods only.

Therefore, great care would be taken to teach physics in schools in order to cultivate responsible citizens and to make suitable life conditions for the next generation. This needs the full involvement of students in their lesson actively in order to solve problems in their life in the development of skills, knowledge and attitudes [13]. However, currently the performance of the students in physics was poor in preparatory schools. Most of students feel "fear" to learn physics and their attitude toward physics learning is low. Because of this in the Ethiopian university entrance examination (EUEE) Physics result is least as compared to other subject [14].

Some researcher shows that the poor academic performance of the majority of the students is linked to the application of ineffective teaching methods. Teaching approaches that a teacher adopts affects students achievement. For instance, most teachers adopted lecturing approach to teach in the schools leading to poor mastery of the subject content matter [15]. The Ethiopian, National learning assessments (ENLA) also showed that compared to other subjects student's performance in physics to be the least in all grade levels, of course, many factors may influences student's performance [13]. But one of the main factors that contribute to this poor academic achievement of students in physics is the failure of implementation of student centered approach in teaching Physics. Therefore, to identify the problem the researcher was interested in the study of how techniques of active learning activities are implemented in student centered methods in preparatory schools.

1.2 Statements of the Problem

The problem of applying student centered approach is one of the major challenges in the improvement of quality of education in Ethiopian schools [16]. The most series problem in teaching physics is that mostly the mode of delivery in the class room is teacher centered especially the lecture method. In this method of teaching the teacher uses chalk and talk method of teaching in which the teacher is active whereas, students are relatively passive. Lecture method is characterized to the whole class instruction, over reliance on text books and recall of factual informations and students success in schools was measured only by passing examinations. This leads the students to the memorization of information and facts from their text books and notes. But this is the lowest level in the development of cognitive abilities of the learner. Lecture method of teaching does not encourage students to actively participate in the teaching learning process and ineffective at helping students develop a conceptual understing of Physics. So, Students become passive recipients of information's and there is no place for learning by doing [17]. Teaching approach that a teacher adopts directly affects student's achievement. For instance, most teachers of physics in Ethiopia had adopted lecturing approach to teach in secondary schools leading to poor mastery of the subject content matter. The study conducted by [18] was also show that the Ethiopian schools were unsuccessful in their efforts to improve the teaching and learning of physics and Students physics achievement is low. As a result, majority of students in secondary schools have no interest to learn physics and this resulted in low achievement in national examination.

A wealth of evidence from physics education research (PER) suggests that students who are taught physics by traditional methods fail to learn essential physics concepts. Method of teaching is one of the problems observed in the teaching learning of physics in the Ethiopian schools [19].Therefore due to lack of participations, students get bored and some of them sometimes may sleep in the class during lesson. In this way, poor understanding concepts, low achievement, lack of application of science are the major problematic issues seen on students in physics teaching. Because of these conditions, their attitude toward learning decreased gradually [20]. If this condition continues it will be risk to the students learning promotion as well as in the learning by doing. Also if the lesson becomes theory dominated the students may hate physics at all. So the researcher set out to evaluate the application of student centered method of teaching and its implementation in physics teaching in preparatory schools.

Research questions: Briefly this research would be attempts to answer the following questions.

1. What was the effective way of teaching approach in physics?
2. What challenges are there to implement student centered approach in teaching physics?
3. How student centered method was implemented in physics class room?
4. To what extent teachers use a veriety of teaching approaches in physics teaching?
5. What are instructional materials are provided for implementation of SCL in physics teaching?

1.3 Objectives

1.3.1 General Objective

The main objective of this study was to evaluate to which extent student centered approach is practiced and implemented in teaching physics in Horo Guduru Wollega zone preparatory Schools (The case of Shambu, Sakala and Tuluwayu preparatory schools)

1.3.2 Specific Objectives

- To identify the effective way of teaching approach in physics teaching.
- To determine which method of active learning is used by the teachers in the class room.
- To identify the explicit learning obstacles that impeded the implementation of student centered approach in physics teaching.
- To identify the problems that physics teachers faced in implementing student centered approach in teaching physics in preparatory school.

1.4 Significance of the Study

The finding of this study can be useful in physics curriculum development and instructional improvement toward student centered approach. This study provides information for teachers, student and relevant decision makers about the implementation of student-centered approach in physics and also gives information for further research work related to alleviating the problems of applying student centered approach in teaching physics in the study area. The researcher believes that it contributes the following importance:

- It show that the level of the practical implementation of student centered approach in teaching physics in those preparatory schools.
- Benefit teachers in teaching process and students in learning process.
- Change the attitudes of students and teachers toward student centered approach and they uses attentively in their lesson in the future.
- The study may serve as a supporting document for further study in this area.
- The study help curriculum developers and education officers to take appropriate measures to fill gaps identified in this study.

1.5 Delimitation of the Study

This study focused on improving the implementation of student centered approach in teaching physics in preparatory school of Horo Guduru Wollega zone. Currently, there are ten (10) Government preparatory schools in this zone. This study is delimited to three preparatory schools. Those are Shambu, Sakala and Tuluwayu preparatory schools in order to manage the study with in the given time scope. It was possible to include other preparatory schools and high schools in the Horo Guduru Wollega zones. But to cover large area it includes a large population size that leads to get more information. But, due to time constraint and capacity of the researcher it would be limited to three preparatory schools. (Shambu, Sakala and Tulu wayu).

1 .6 Limitation of the study

A limitation is any aspects that hinders the findings of this study. This study was not free from limitations. Thus, there are different things that influences its progress and effectiveness of this study. It is extremely difficult to describe all the possible types of research limitations.But some of these limitations may be:

- Lack of experience of the researcher.
- Transportation problems in study area.
- Lack of up dated information. .
- Limitation of time and work over loaded of the researcher in school.
- Unwillgness of some sample student and teacher respondents to give proper response etc.

1.7 Operational Key Terms

Academic achievement: Student performance in physics education.

Active learning: refers to active involvement of the students on different learning tasks with in and out of the classroom. It includes group work, role-playing and discussion.

Attitude: The view or feeling of teachers or students on the implementation of student centered method of learning.

Constructivism: is a theory that suggests that learners construct knowledge out of their experiences which is associated with pedagogical approaches that promote learning by doing or active learning that focus an independent learning creativity, critical thinking and Problem solving.

Implementation: is how teaching-learning activity is put into practice in or out of classroom by Students and teachers in educational institutions.

Instructional materials: refers to the device used in the instructional process.

Observation: is the purposeful,systematic and selective way of watching and listening to an interaction or phenomenon as it takes place.

Practical activities: a way to learn with understanding at the same time, engages in a process of constracting knowledge by doing science.

Teaching approach: refers to strategy or way that teachers use to teach.

Teacher centered approach: the traditional method of teaching in which teachers talk and Students listen.

Student centered approach: a way of classroom instruction that focuses on individual students.

2. REVIEW OF RELATED LITERATURE

2.1 Teaching Approach (Methodology of Teaching)

Teaching approach refers to the strategy or the way that teachers used for instruction to achieve the desire learning in students. There can be no teaching and learning process without the systematic selection and application of methods and techniques in the overall strategy of implementing curriculum. Teaching approaches are the various techniques used by the teachers to facilitate the students with different learning styles .The different teaching strategies help teachers to develop critical thinking among students and effectively engaging them in the classroom. Teaching approach can be broadly classified into two categories. These are teacher centered and student centered [21].

2.1.1 Teacher Centered Method of Teaching

Teacher centered methodology of teaching is the traditional method of teaching in which teachers talk and students listen. In this approach the teacher used the lecture method "chalk and talk," method of teaching and the students remain passive. This method of taught only serve to receive information from their teacher [22]. In this method of teaching, teachers have main authority and students are viewed as "empty vessels" whose primary role is to be passively receive information from their teacher. So in this approach of teaching teachers are the primary sources of knowledge and students are passive listener and put all of their focus on the teacher. It involves teacher talking most of time, telling students what they need to know and gives notes that prepare them to rehearse the information on a quiz or test [23]. Teacher centered method of teaching inhibits active participation and research ability of the students. Under this method, students simply obtain information from the teacher without building their engagement level with the subject being taught. The approach is least practical and more theoretical. It does not apply activity based learning to encourage students to learn real life problems based on applied knowledge. Since the teacher controls the transmission and sharing of knowledge .The teacher may attempt to maximize the delivery of information while minimizing time and effort. Students do not learn to collaborate with others and may lack of proper communication. In this method of teaching teachers are heavily work loaded in the instruction. Participation of students is restricted only to asking questions and responding to the questions [24].

2.1.2 Student Centered Method of Teaching

Student centered methodology of teaching is the learner centered method of teaching in which the instruction focuses on an individual learner. In this method of teaching students learn to direct their own learning by complete tasks independently. It provides opportunities for the learners to meaningfully talk, listen, write, read and reflect their ideas, issues and concerns of the academic lesson. In its characteristics student centered method engages students in the hard work of learning including explicit skill instruction, reflect on what they are learning and how they are learning it and also encourages collaboration [25]. In student centered approach of teaching most of the process of learning is carried out by the students. The teacher simply giving guidance and provides learning materials and also gives conclusions at the end of the lesson. This method of teaching includes active learning in which students solve problems, answer questions, write, report, discuss, debate, explain, construct, experiment and demonstrate etc. in their lesson actively. Students who are actively engaged will learn better than students listen to lectures [26].

According to [1] there are five characteristics of teaching that make it student centered.

1. Student centered teaching engages students in the hard work of learning.
2. Student centered teaching includes explicit skill instruction and active participation.
3. Student centered teaching encourages students to reflect on what they are learning.
4. Student centered teaching motivates students by giving them some control over learning
5. Student centered teaching encourages collaboration.

Student centered learning also broadly encompasses methods of teaching that shift the focus of instruction from the teacher to the student. In original usage, student centered learning aims to develop learner autonomy and independence by putting responsibility for the path in the hands of students. Learning requires the individual to be active and to be engaged in the construction of one's own mental models [27]. Student centered method of teaching provides students with opportunities to work with concepts at higher cognitive levels. Students master at the application level when they can use a concept in new concrete situation. The students have the responsibility for learning. It is the learner who decides their level of learning activity through thoughtful consideration. Student centered instruction focuses on skills and practices that enable lifelong learning and independent problem solving [28].

Student centered learning theory and practice are based on the constructivist learning theory that emphasizes the learners critical role in constructing meaning from new information and prior experience. Student centered method of teaching refers to forms of instruction. Because it gives students opportunities to lead learning activities, participate more actively in discussions, design their own learning projects. Explore topics that interest them and contribute to the design of their own course of study. Students have the responsibility for learning [29]. The student centered approach of teaching is based on the hypothesis that students who are given the freedom to explore areas based on their personal interests and who are accompanied in their striving for solutions by a supportive, understanding facilitator not only achieve higher academic results but also experience an increase in personal values such as flexibility, self-confidence and social skills [30]. In a student centered class room, students choose what they will learn, how they will learn and how they will assess their own learning. This needs students to be active, responsible participants in their own learning and with their own pace of learning. Student centered learning process put students at the center of the learning process and active learning is strongly encouraged [31]. Student centered approach is characterized by innovative methods of teaching which aim to promote learning in communication with teachers and other learners and which take students seriously as active participants in their own learning and foster transferable skills such as problem-solving, critical thinking and reflective thinking [32]. In the process learner centered teaching, students move from being passive recipients of knowledge to being participants in activities besides, developing skills values and attitudes.

According to [33] the values of student centered approach for the students are:

1. Empowers students and creates independence and owenership of learning.
2. Forces students to think about themselves as learners
3. Fosters collaborative learning and Encourages creativity.
4. Creates a rich learning environment inside and outside the classroom.
5. Lessons become interesting and students take part in the lesson attentively.
6. Fosters new skills – problem solving, critical thinking, etc.

Students who are actively engaged will learn better than students listen lectures. Actively engaging students motivates deeper thinking about the lesson content, brings additional energy to a class room [34].

2.2 Method to Implement Student Centered Approach in Teaching Physics

The current National trend in Science Education in the learning- teaching process is toward active learning and constructivism. Constructivism is the student centered philosophy that emphasizes hands on learning and students actively participating in the lessons. Constructivist believes that students should be able to discover lessons in their own activity. Because it is the most effective ways of learning and it is considered to be true learning. According to constructivist learning is an active acquisition of ideas and knowledge construction rather than a passive process [35]. Traditional lecture based teaching is ineffective at helping students to develop critical thinking of physics. Student centered teaching should be preferred educational method in science learning such as physics [36]. Since physics is the practical science, it needs learning by doing. The learner must construct their own knowledge by explore ideas related to the topics under discussion. The students are guided to discover physical principles by further discussion and experimentation. So physics teaching requires students to do meaningful learning activities such as discussion, construction, analysis, synthesis, explanation, experimentation etc [37].

An effective teaching method can ensure effective learning by allowing students to reflect their own ideas. This can be done by preparing an environment which gives them a chance to discuss their learning with other students and their teachers. Hence, students must talk about what they are learning, write about it, relate it to past experience and apply it to their daily lives. They must make what they learn part of themselves [38]. Since it is quite evident that the active involvement of students in the teaching learning process improves their achievement scores, it is essential to make students learn in a cooperative manner. Effective teaching and learning require the use different methodologies and strategies to meet the demands of the learners. Curriculum that supports this type of learning is a curriculum design that has constructive alignment. Constructivism emphasizes the active role of the learner and the significance of current knowledge and understanding in mediating learning. Constructivist theory argue that the knowledge cannot be imposed from others, it has to be formed inside learners. This is because individuals constract knowledge based on their beliefs and experiences [39].

Constructivists claim that learning takes place when learners are able to use the knowledge and skill they have constructed in real world of work. The main goal of constructivist's instruction is making the students intelligent problem solvers, making students intelligent citizens. Conceptual change occurs due to real life and active engagement in their lesson. Attitudes and success of the students are effectively increased by using active learning [39].

In the physics classroom environment, the class room should create impression that the learners entering a world science. This implies that lesson going to lead to scientific enquiry brings the microscopic and macroscopic world of science alive. Students achieve a strong level of formal thinking or thinking that requires the synthesis of knowledge, abstract reasoning, inquiry skills and the application of knowledge to variety of contexts and situations [40].

In class rooms where student centered teaching is implemented and active learning techniques are used, it is observed that the lessons become more interesting to the students and they take part in the lesson attentively, success and the interest of the students are highly improved and attitudes of the students are effectively increased. It has already been clear that physics is an experimental science. Physics has grown through new discoveries and inventions. These require lot of creativity. It is possible to fulfill the creative urges of students if physics is taught to them using the method of learning by doing. For this the teacher is expected to impart physics instructions in such a way that students are actively involved in all activities. Physics is a subject that is essential in the training of most science and engineering diciplines. Physics education generates fundamental knowledge needed for the future technological developments. Physics was an active subject and its concept find application in everyday life. In this age of science and technology, application of physics easy to come by, physics in action is a most effective way of communicating science concepts, principles and laws. Teaching physics focuses on provided students learning activities that resulted in students constructing models of the physical world based on experimental design and observations. It is possible to foster creativity in students if we apply student centered approach in physics teaching [41].

2.3 Instructional strategies in the implementation of Student Centered method in teaching physics

Instructional strategies and methods utilized in the student centered class room suggest the Utilizing of time variable and flexible ways to match students need, gives students increasing responsibilities for the learning process and providing questions and tasks that stimulate students thinking. Teaching strategies are the various techniques used by the teachers to facilitate the students with different learning styles. The different teaching strategies help teachers to develop critical thinking among students and effectively engaging them in the class room. The selection of teaching strategies depends on the concept to be taught and also on the interest of the students [42].

Learning is the process that involves investigating, formulating, reasoning and using appropriate strategies to solve problems. Teachers should realize that it becomes more effective if students are tasked to perform rather than just asked to remember some information. Students build a better understanding the concepts of the lesson more effectively when they are engaged in the active learning techniques in the student centered approaches [43]. Application of student centered method in physics teaching could be encouraged by employing different learning strategies (such as problem based learning, inquiry learning, project method, experimentation, Group discussion, demonstration, and presentation and debating etc.). These strategies would enable students to develop their ability to solve problems, think critically, self-direct their learning, work in teams and acquire lifelong learning skills. As a result change may come step by step [44].

The heart of effective teaching is active involvement of students in their lesson. The students are expected to take full responsibility for their own learning. To be effective in teaching physics, different active learning methods are engaged in order to implement student centered approach in the class room. Active learning is generally defined as any instructional method that engages students in the learning process. The three core principles of student centered learning was student engagement, participation and deep learning. Active learning requires students to do meaningful learning activities. Therefore student centered learning approach empower learners to become more actively engaged in their lessons [45].

2.3.1 Group Discussion

Discussion is one of the active learning methodology in which group members can share their idea, knowledge, information, attitudes and perception using speaking, listening and nonverbal processes in order to achieve instructional objectives. Discussion involves solving problems and requires students to find their own concepts, principles and solutions. Discussion in the class room is an important kind of active learning strategy to facilitate learning .This strategy gives classroom for the students to exchange, explore and share their views. However, it need to be managed and organized well to be effective. The purpose of discussion is to examine information in order develop a deep and broader understanding a topic. However, students should have prior knowledge and experience with a current topic for discussion to be successful. So, through discussion there is an opportunity for higher order thinking and increased interaction among all students. Discussion method is suitable for those of topics in physics which can not be easily explaiened by demonstration or other methods [46].

2.3.2 Demonstration Method

Demonstration is a teaching approach that links explanation with practice. A good demonstration exercise helps students to understand the lesson very clearly, since they combine the sense of sight, hearing and touching while learning. That is the technique of teaching concepts, principles or real things by combining oral explanation with handling or manipulation of real things. So, demonstration is an approach of instruction which combines presentation and investigation .It is a technique of teaching concepts, principles or real things by combining oral explanation with the handling or manipulation of real things. Demonstration increases students understanding of concepts and also increases student's enjoyment of the class. It should be also possible to involve students in the demonstration and be required to reflect and analyze the process [47]. Lecture-demonstration method is used by teachers for imparting physics lesson in class room. By using this method it is possible to easily impart concrete experiences to students during the course of a lesson when the teacher wants to explain some abstract points. This method combines the instructional strategy of information imparting and showing how.

2.3.3 Discovery method (Heuristic method)

The discovery method of teaching is fashioned from the constructivists view where the students construct and creates his or her knowledge by assimilating it with existing knowledge. it is possible to use discovery experiment method to generate new knowledge [47]. It is a pure discovery method of learning physics in independent of teacher. Students are put in the place of an independent discoverer. Thus no help or guidance is provided by the teacher in this method. Discovery learning is an approach to teaching that encourages students to learn concepts and principles through their own explorations and to solve problems on their own. This requires that students participate in making many of the decisions about what, how and when learning is to be learned and even play a major role in making much decision. This method requires the student to solve a number of problems experimentally. Each student is required to discover everything for himself and is to be told nothing. The students are led to discover facts with the help of experiments, apparatus and books. A discovery method of teaching develops the habit of inquiry and investigation among students, develops habit of self-learning, self-direction and develops scientific attitudes among students [48].

2.3.4 Project Method

Project is a problematic act carried to its completion in its natural setting. Project method is based on the learning by doing, learning by living and students learn better through association, cooperation and activity. The projects may be broadly classified as Individual projects and team projects. Learning by living may be a better meaning of project method, because life is full of projects and individuals carry out these projects in their every day life [49].

2.3.5 Problem Solving Method

Solving a problem means to find or create new solutions for the problem or to apply the new rules to be learned. Problem solving includes integration of concepts with skills to get over the unusual complete situations. Problem solving method of teaching is seen to be an essential part of physics learning and enhances student's conceptual understanding and improves student's achievements. Problem solving plays an important role in the study of physics [50].

In problem solving method , students learn by working on problems. This enables the students to learn new knowledge by facing the problems to be solved. The students are expected to observe, understand, analyze, interpret and find solutions that leads to a holistic understanding of the concept. Students need to develop systematic, organized ways of investigating all type of problems. For example: rearranging and manipulating formulas, developing mathematical skills. PBL is the process of keeping students mentally and often physically active in their learning through activities that involve them in gathering information, thinking and problem solving. Problem based learning is an instructional approach that offers the potential to help students develop flexible understanding and lifelong learnings. This way of learning has been recommended in science education since it improves students achievement [50].

2.3.6 Scientific Method

The two basic aims of teaching physics are development of scientific attitude and training in scientific methods. Ascientific method is a method which is used for solving a problem scientifically. Scientific method of teaching in physics is based up on the process finding out the result by attacking a problem in a number of definite steps. It is possible to train the students in scientific method. In this method students involved in finding out the answer to a given scientific problem. Scientific method is the well sequenced and structured method for finding through experiments. Scientific method help to develop in students the power of reasoning critical thinking and application of scientific knowledge. It also helps in developing positive attitudes among the learners. Science is accumulative and endless series of empirical observations which result in the formation of concepts and theories, With both concepts and theories being subject to modification in the light of further empirical observation. Science is both the study of knowledge and the process of acquiring and refining knowledge. From this it becomes quite clear that student of physics be exposed to the scientific method of finding out [51].

2.3.7 Experiments in the Laboratory

Use of Experiment as a teaching method for physics in secondary school is crucial for successful concept delivery by the subject teachers and concept mastery by the learners. Experiments are the basis and sources of new knowledge if well interpreted.

This implies that to improve the teaching of physics experimental approach should be emphasized to promote the learners understanding of concepts [52]. Therefore, teaching is the continuous process that involves bringing about desirable changes in learners through appropriate methods. Some researcher indicated that in order to bring desirable changes in students, teaching methods used by teachers should be best for subject matter. Any course which does not provide opportunities for laboratory or practical work is incomplete from the point of view of effective teaching. Learning by doing can be achieved only by doing experiments. Students can be taught scientific facts and theories but without experiments they can not experience the reality of physics. By doing experiments students motivated to know more wonders of science. As [53] quoted that " The best way to learn Science is by doing practical activities in the laboratory. This makes Science learning and teaching more tangible, interesting and unforgetable and it contributes to widen the skill and knowledge of the students." Teaching Science with out practical activities is incomplete and Science students are not fully trained. So learning by doing can be achieved only by conducting experiments. Well-equipped laboratories play an important role in efficient physics teaching. Students learn good habits like hard working, inttiative and mutual cooperation and also learn to handle and operate materials. Physics teacher who is dealing with the theoretical part can not impart the clear picture of the course to his students without allowing them to do some experiments. Therefore laboratories are not only supportive of the theoretical part of science but also an important part of the course [54].

2.4 Role of Teachers in the Implementation of Student Centered Approach in Teaching Physics

Teacher's role is not only standing in front of the classroom and lecturing the lesson. Teachers play a crucial role in the implementation of student centered approach in teaching physics. Teachers adopt different approach to help students to acquire knowledge, skill and experience. Teachers can play important role by planning, motivating, initiating students in participation and their knowledge of the subject matter in facilitating the process taking into account the need of the learner. An effective teacher plans lessons with specific learning out comes by using different pedagogical approaches. Teachers choose what the students will learn, how the students will learn, and how students will be assessed on thier learning.

Some of role of teachers are as follows [55].

1. Teachers should assign tasks to individual students or groups of students.
2. Teachers facilitate or create conductive environment and relate new information to prior knowledge by providing students with information and tools they need to master the subject.
3. Teachers are models, or shares taught about something or demonstrating in every situation.
4. Teachers are coaching, means giving hints or clues beside that providing feedback redirecting student's efforts and helping them.
5. Teachers should provide questions and activities that stimulate students thinking beyond rote memorization.
6. Teachers should be select contents and method and evaluate the learning progress.
7. Teachers should enable students to develop positive attitudes toward learning physics.
8. Teachers provide students with information and tools to facilitate learning.
9. Teachers evaluate student's abilities through formal and informal assessments providing suggestions for improvement and assigning grades.
10. Teachers facilitates and provides students with experiences that allow them to use the Science process skills such as observing ,measuring, classifying, communicating, inferring, using number, using space and time relationship.
11. Teachers acts like tutors, working with small groups of students or individual students with in the classroom or after class.

2.5 Role of Students in the Implementation of Student Centered Approach in learning Physics

In new approach to modern education, students not only receive information from lectures and text books. But collect information and record it systematically, discuss it, compare it, analyze it and finally draw conclusions from it and communicate about it. For learning to take place effectively and for students to become successful, they should be ready and motivated to learn materials offered by their teachers. Student's readiness and motivation refers to the extent to which they are willing to do assignments and participate in practical projects and other tasks [56].

Motivation can be enhanced through teaching methods that actively involve students. A motivated learner performs well. A teacher has the ability to influence the student's motivation to learn through a variety of teaching decisions and approaches. It is important that a teacher adopts a teaching approaches that will enhance the four dimensions of motivation namely attention, relevance, confidence and satisfaction to learn academic subject matter. So, teaching method is a major factor that affects student's motivation to learn physics. Student centered approach empower learners to become more actively engaged in their learning process. It provides opportunities to draw on their experiences to construct learning and to take greater responsibility for their learning. Student's responsibility and independence help to develop characteristics of lifelong learner's motivation, self-evaluation time management and skills to access information [56].

Physics course require strong physics background. It needs to motivate students towards studying physics so that the learner can perform and acquire knowledge and skills that will be relevant in the future. Students are categorized as academically motivated when they are able to maintain a high ability and are competent in their work. Learning requires the individual to be active and to be engaged in the constructions of one's own mental models [56].

According to [57] some of the roles of students in the implementation of student centered in learning physics are: Ready and motivated to learn physics effectively, Study hard and follow his or her lesson carefully, Ask to do something actively and creatively with information's given from their teacher or text books, Reflect up on their discoveries, read, write, discuss or to be engaged in solving problems, Carry out scientific investigations, Work cooperatively, learn from each other and helping each other, Participate in practical tasks and other projects and explains results scientifically, Do their assignments, home work, class work and communicating with their teachers, participating in group discussion, Searching information from various kind of resources including library, reference materials and internet services.

3. RESEARCH DESIGN AND METHODOLOGY

3.1 Research Design

The research design is the plan and the procedures for the study providing the overall frame work for collecting data. It provides guide lines for systematic sampling techniques, the sample size, instruments and data gathering decisions from broad assumptions to detailed methods of data analysis. In order to evaluate implementation status of student centered in teaching physics at preparatory schools, the researcher used descriptive survey method. Because descriptive survey method helps to explain educational phenomena in terms of conditions or relationship that exist, opinion that held by students and teachers. Descriptive survey is the means through which opinions, attitudes, suggestions for educational practices can be obtained. Descriptive survey method is a study designed to depict the participants in an accurate way and this method is appropriate which enables to make an assessment and investigation of the events [58].

3.2 Study Area

The research would be conducted in Oromia regional state in the Horo Guduru Wollega zones preparatory schools approximately situated at 314 km from Addis Ababa capital city of Ethiopia in western part of Ethiopia. This study was carried out in the case of three preparatory schools namely, Shambu, Sakala and Tulu wayu preparatory schools. Shambu preparatory school is found in shambu town, the capital city of the zone. Sakala and Tulu Wayu preparatory schools are found in Horo Buluk and Dongoro woredas respectively.

3.3 Sources of Data

In order to strengthen the findings of the research the relevant data for the study generated from both primary and secondary sources. The sources of primary data would be generated from students and physics teachers of these preparatory schools. In addition class room observation would be used as a primary source. Secondary data was gathered from record office documents, relevant books, previous studies and internet sources. In this study both quantitative and qualitative methods are used in order to evaluate the implementation of student centered approach to validate the data. Qualitative method of research is the non-numerical examination and interpretation of observations for the purpose of discovering patterns and relationships [59]. As the researcher used in this study, class observations is used as the qualitative tool to explore the attitudes of the students and teachers towards the implementation of student centered method in teaching physics.

3.4 Sampling Technique and Sample Size

3.4.1 Sampling Technique

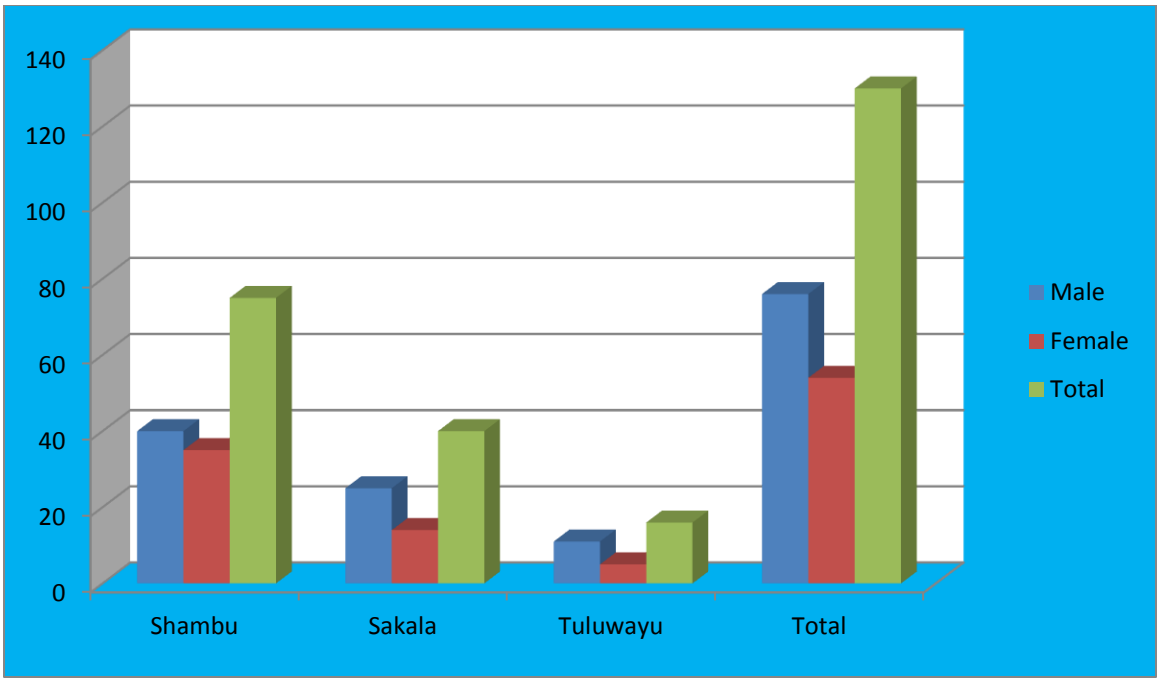
The study was conducted in Horo Guduru Wollega zone preparatory schools in the case of shambu, sakala and Tuluwayu preparatory schools. There are a total of about 10 preparatory schools in Horo Guduru wollega zones. In order to gain insight into the implementation of student centered approach in physics teaching in preparatory schools, three schools (Tuluwayu, Shambu and Sakala preparatory schools) was selected for this research work as representative randomly. To select sample student respondents from these three preparatory schools from both grade 11 and 12, simple random sampling method was used. Because, in a simple random sampling technique, every individual has equal chance of being selected and the chance of one individual does not affect the chance of another individual [60].

3.4.2 Sample Size

This study was confined to less coverage of population and area due to time and resource constraint and restricted on the implementation of student centered approach in teaching physics. The data was collected from randomly selected respondents of all physics teachers and 10% of the total Natural Science students of both grade 11 and grade 12 Students of these three preparatory schools.

Table 1: Total population and sample student respondent for questionnaires**.**

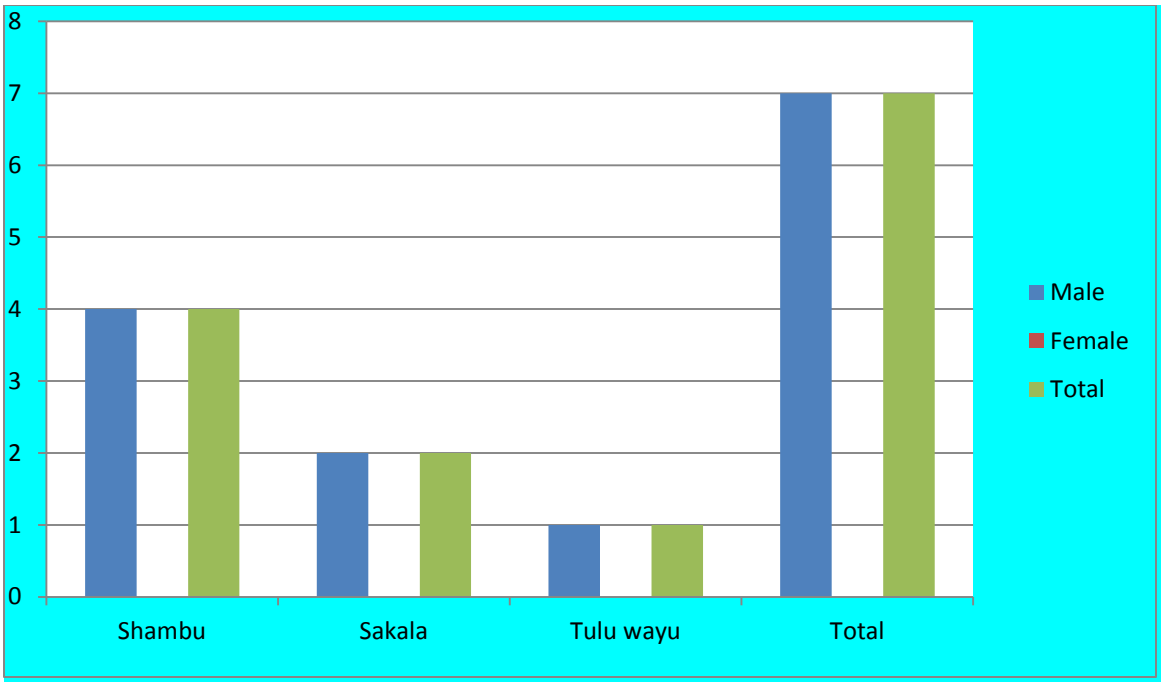
No	School name	Grade	Total number of students			Sample of students selected for questionnaires		
			male	female	total	male	female	total
1	Shambu	11	208	167	375	20	18	38
		12	197	173	370	20	17	37
		11 and 12	405	340	745	40	35	75
2	Sakala	11	159	64	223	15	7	22
		12	101	84	185	10	8	18
		11and 12	260	148	408	25	15	40
3	Tulu Wayu	11	35	14	49	5	2	7
		12	37	20	57	6	2	8
		11and 12	72	34	106	11	4	15
	Total	11	402	245	647	40	27	67
		12	335	277	612	36	27	63
		11 and 12	737	522	1259	76	54	130



Graph 1: Students respondents selected for questionnaires.

Table 2 Physics teachers selected for questionnaires.

No	School name	Total number of teachers selected for questionnaires			Remark
		male	female	total	
1	Shambu	4	-	4	
2	Sakala	2	-	2	
3	Tulu wayu	1	-	1	
	Total	7	-	7	



Graph 2: physics teachers selected for questionnaires

3.5 Instruments of Data Collection

The data for this study was collected using three data collecting instruments namely questionnaires, observation and document analysis.

3.5.1 Questionnaires

Questionnaires are widely used in educational research to obtain information, conditions and practices [61]. Based on this fact questionnaire was used to collect relevant information's from student and teacher respondents. The items of the questionnaires were mainly closed ended questions in order to easily handle and simpler for respondents to answer with in a short period of time. The items in the questionnaires were divided into the following four main parts. The first part of the questionnaires is intended background information's of the teacher and student respondents. The second part of the questionnaires consists of items that intended about the implementation of different methodology of teaching used in physics classes. The third of the questionnaires was on the issues related with instructional materials used in the implementation of student centered in physics teaching. The last part of the questionnaires is used to examine the student's participation in the implementation of student centered approach in physics teaching. Therefore, the respondents indicated the extent of their engagement to a particular behavior or practice likert scale choosing one of the five point scale ranging from 5 to 1.

3.5.2 Observation

Observation is the purposeful, systematic and selective way of watching and listening to an interaction or phenomenon as it takes place. Observation is useful to indicate how the lesson is divided into a variety of activities such as group work, role playing, discussion and others [62]. In this study, the observation method of data collection was used. This could practically evaluate the status of implementation of student centered learning approaches in the classrooms.

3.5.3 Document analysis

To indicate the achievements of students in physics EUEE (2007- 2009 E.C.) physics result document analysis was done. Also, teachers annual and weekly lesson plan was observed in order to evaluate how physics teachers plan in their lesson preparation to use different active learning methodologies inorder to implement student centered learning approach.

3.6 Procedures for Data Collection

The researcher has gone through following steps to collect relevant data.

1. In the first step questionnaires was prepared and distributed for student and teacher respondents. Sufficient time was allowed for respondents and questionnaires were collected after they have filled.
2. The data gathered using questionnaires were coded appropriately and analyzed for quantitative data. The items in the questionnaire are measured separately by using Likert scale to determine respondent's attitudes about the items. likert scale item is simply a statement that the respondents are asked to evaluated by giving a quantitative value of any kind of dimension with the level of agreement or disagreement. Likert scale are used to measure respondents attitudes to a particular question or statements [63].
3. SPSS Version 20 software was used to analyze Statistical quantitative data.SPSS software is the popular statistical packages which can perform highly complex data manipulation and analysis with simple instructions [64].

3.7 Methods of Data Analysis and Interpretation

The process of data analysis was begun after data collection is finished. During the analysis stage several interrelated procedures will be performed to summarize, categorize, and rearrange the data by editing and coding. The data collected through closed ended questions and observation conducted using a checklist are structured data. The data collected through structured way was easily classified and tabulated.The data collected through closed ended questions involves sets of alternatives which are easier to be coded.

The descriptive survey with quantitative and qualitative data analysis method was used. First the gathered data by questionnaires and class room observation were analyzed quantitatively and tabulated numerically. The collected data with the above mentioned instruments were presented by placing responses used by percentages and frequency. In the case of the analyses of the qualitative data, descriptive statements were used and finally, SPSS software were used for the statistical data and Exel software used for drawing Graphs. Because Exel soft ware is convenient for data entry and for quickly manipulating rows and columns prior to statistical analysis and to draw graphs [65]. Finally, the data was analyzed and interpreted using percentage and mean value. The mean value were analyzed according to the following standards. To determine the minimum and the maximum length of the 5 point likert type scale, the range is calculated by **(5 - 1 = 4)** then, divided by 5 as it is the greatest value of the scale **(4 ÷ 5= 0.80).** Afterwards, number one which is the least value in the scale was added inorder to identify the minimum of this range **(1 + 0.80= 1.80)** [66]. The length of the range is determined below.

Range	level of agreement and disagreement	Level of activities applied	level of participation.
1.00- 1.80	Strongly disagree	Never used	Very low
1.80- 2.60	disagree	rarley	low
2.61- 3.40	Neutral	Sometimes	medium
3.41- 4. 20	Agree	Mostly	high
4.21- 5.00	Strongly agree	Always	Very high

4. DATA ANALYSIS, RESULT AND DISCUSSION

In this chapter the researcher discussed, presented and interpreted the data collected through questionnaires,classroom observations and Document analysis with the help of tables and graphs.

4.1 Characteristics of the Respondents

The characteristics of teacher respondents in terms of sex, age, experience and qualification were presented. Also The characteristics of student respondents in terms of sex, and grades presented in the following tables.

1. Characteristics of teacher respondents

variable	Category	Teacher respondents		
		Total population	Sample	Percentage
Sex	Male	7	-	100%
	Female	-	-	
	total	7	-	100%
Age	Less tha 25	-	-	
	26 - 30	-	-	
	31 - 40	7	4	57%
	Above 40	7	3	43%
Experience	Less than 10	-	-	-
	11-20	7	4	57%
	21-30	7	2	29%
	Above 31	7	1	14%
Qualification	Diploma	-	-	-
	First degree	7	6	86%
	MSC	7	1	14%
	PhD	-	-	-

2. Characteristics of student respondents

Variable	Category	Student respondents		
		Total population	sample	Percentage
Sex	Male	737	76	10%
	Female	522	54	10%
	Total	1259	130	10%
Grade	11	649	66	10%
	12	610	64	10%
	Total	1259	130	10%

Table 3: Characterristics of the respondents

As presented in table 3, 7 (100%) of the respondents were male physics teachers. In these three preparatory schools there were no female physics teachers. 76 (58%) student respondents were male and 54 (42%) student respondents were females. from this, one could understand that the number of female students in these preparatory schools is lower than male students.

Regarding to the age of the teacher respondents, 1 (14.3%) was between 21-30 years. 4 (57.1%) between 31-40 years. 2 (28.6%) were above 40 years. This indicates the majority of teachers was at middle age. Therefore, this helps the teacher to work actively and facilitate the teaching learning process.

Regarding qualification of respondents, accordingly, only one teacher (14.3%) has 2^{nd} degree. The great majority of teachers do not hold the minimum requirement of qualification to work at the preparatory school level. Six of them (86%) have 1^{st} degree. One of the important indicators of quality of education is the number of qualified teachers. Internal efficiency in education is influenced by qualifications of the teacher and teaching styles. According to the education and training policy, the minimum qualification requirement for teachers at preparatory school (11-12) is that teachers should have obtained a 2^{nd} degree in the subject they are assigned to teach.

Regarding to work experience table 3, shows that 3 (42.9%) of them were between the experience range of 11-20 years, and 2 (28.6%) of them have 21-25 years, 1 (14.3%) has the experience between 26-30 years. The remaining 1 (14.3%) of teacher respondents have above 31 years of experience. Experience is the best type of teaching so teachers provide as many real life experiences. Teachers that have worked for a long time have strong instructional skills. They are capable of raising student's achievement. It could be possible to conclude that, the majority of the teachers have medium experience which indicates that they have enough experience to teach physics in the preparatory schools.

Regarding to student respondents 58% of the respondents was males and 42% of the respondents were females. The respondents were selected from both grade 11 and 12 natural science students by simple random sampling method. So, every members of grade 11 and 12 natural science students has an equal chance to be selected for the respondents. 51% of the students are selected from grade 11 and 49% of the respondents are selected from grade 12.

4.2 Results obtained from Questionnaires

4.2.1 Implementation of different methodology of used in physics classes

No	Teaching approach	respondents	Always (5)		Mostly (4)		Sometimes (3)		Rarely (2)		Never used (1)		Mean value
			f	%	f	%	f	%	f	%	f	%	
1	Question and answer	teacher	-	-	4	57.1	2	28.6	1	14.3	-	-	3.43
		student	42	32.3	58	44.6	13	10.0	11	4.6	6	4.6	3.92
2	Lecture method	teacher	4	57.1	2	28.6	1	14.3	-	-	-	-	4.43
		student	71	54.6	34	26.2	17	13.1	5	3.8	3	2.3	4.27
3	Demonstration method	teacher	-	-	1	14.3	1	14.3	3	42.9	2	28.6	2.14
		student	8	6.2	24	18.5	76	58.5	14	10.8	8	6.2	3.08
4	Group discussion	teacher	1	14.3	4	57.1	2	28.6	-	-	-	-	3.29
		student	23	17.7	56	43.0	41	31.5	10	7.7	-	-	3.70
5	Discovery method	teacher	-	-	-	-	2	28.6	4	57.1	1	14.3	2.14
		student	2	1.5	4	3.1	54	42.5	39	30.0	31	23.8	2.28
6	Problem solving method	teacher	-	-	1	14.3	2	28.6	3	42.9	1	14.3	2.43
		student	13	10	18	13.8	30	23.0	57	43.8	12	9.2	2.72
7	Project method	teacher	-	-	-	-	2	28.6	4	57.1	1	14.3	2.14
		student	10	7.7	28	21.5	43	33.1	38	29.2	11	8.5	2.91
8	Experiment in the laboratory	teacher	-	-	-	-	-	-	3	42.9	4	57.1	1.57
		student	-	-	3	2.3	10	7.7	24	18.5	93	71.5	1.41
9	Worksheet method	teacher	-	-	1	14.3	4	57.1	2	28.6	-	-	2.86
		student	14	10.8	33	25.4	46	35.4	27	20.8	10	7.7	3.11

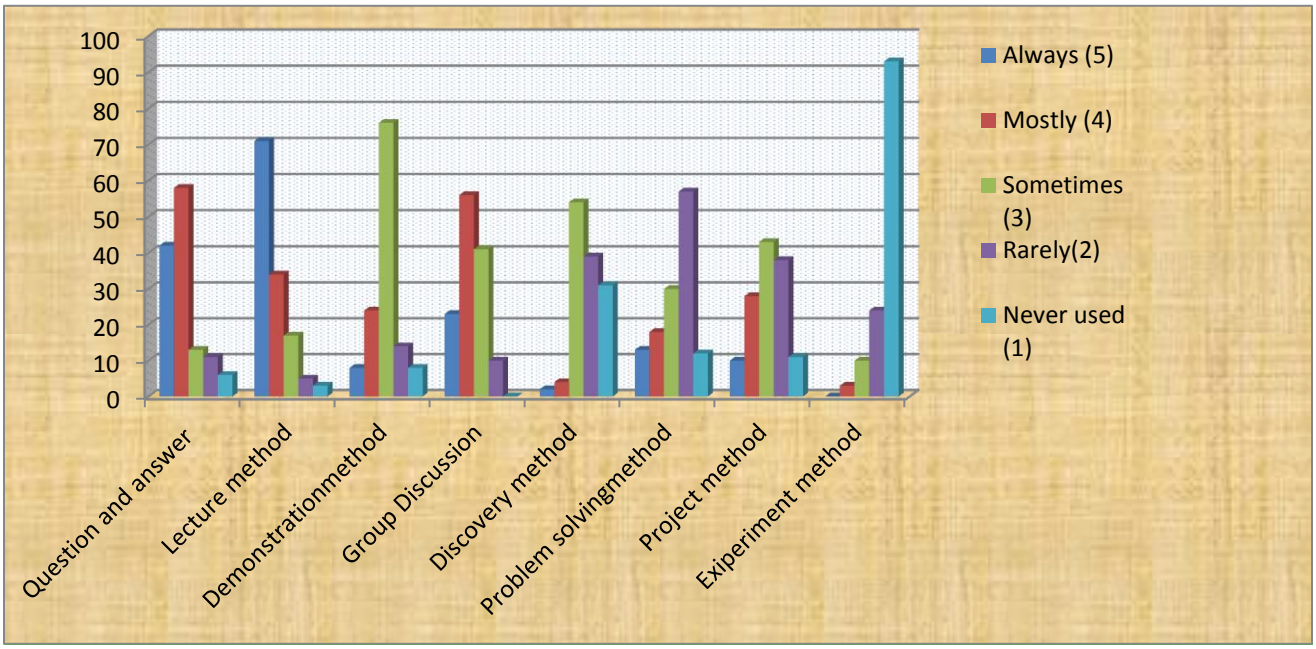
10	Cooperative method	teacher	-	-	-	-	2	28.6	4	57.1	1	14.3	2.14
		student	17	13.1	20	15.4	24	18.5	55	42.3	14	10.8	2.78
11	Scientific research method	teacher	-	-	-	-	1	14.3	2	28.6	4	57.1	1.57
		student	2	1.5	6	4.6	20	15.4	29	22.3	73	56.2	1.73
12	Game based learning	teacher	-	-	-	-	2	28.6	3	42.9	2	28.6	2.00
		student	2	1.5	10	7.7	38	29.2	63	48.5	17	13.1	2.36
13	Student presentation	teacher	-	-	-	-	3	42.9	3	42.9	1	14.3	2.29
		student	6	4.6	9	6.9	34	26.2	51	39.2	30	23.1	2.31
14	Student debating	teacher	-	-	-	-	1	14.3	1	14.3	5	71.4	1.43
		student	-	-	3	2.3	27	20.8	67	51.5	33	25.4	2.00
15	Modeling method	teacher	-	-	-	-	-	-	3	42.9	4	57.1	1.43
		student	8	6.2	18	13.8	25	19.2	52	40.0	27	20.8	2.45
16	Solving sample problems	teacher	2	28.6	4	57.1	1	14.3	-	-	-	-	3.57
		student	35	26.9	73	56.2	13	10.0	7	5.4	2	1.5	4.02

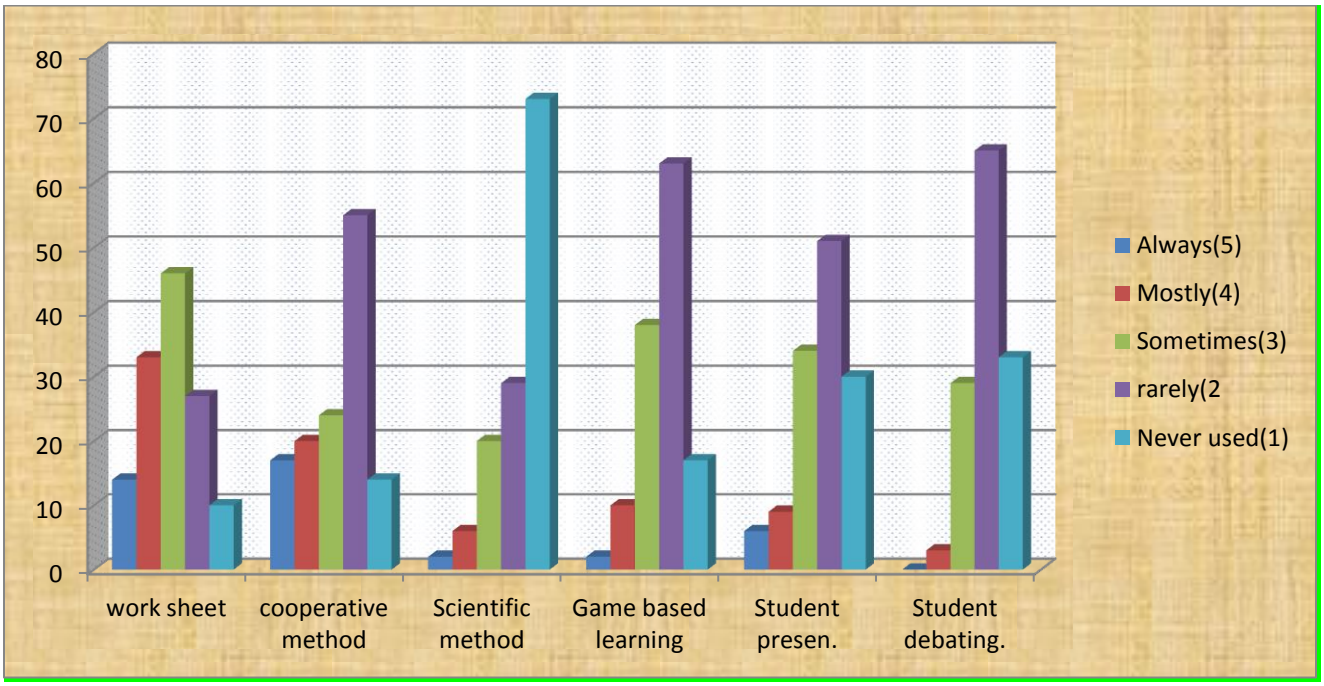
Table 4: Teachers and students response on methodology of teaching in physics classes.

The first teaching method presented in the table 4, item 1, is question and answer method. 4 (57.1%) and 58 (44.6%) of the student responded mostly. The average mean value of the the respondents was 3.7 which shows mostly. Therefore question and answer method was practiced in the class mostly. The second teaching approach is focused on lecture method. 4 (57.1%) teachers and 71 (54.6%) students responded always. The average mean value was 4.35 which shows always. This shows that lecture method is the most dominant teaching method than others. This method was employed widely, because it was familiar with both teachers and students. The domination of old instructional approach focusing on lecture chalk board and text book still prevails.The majority of teachers do not utilize different active learning strategiesin the classroom. Mostly teacher's delivers lectures, give notes and solve sample problems without any active participation of the students.

In Solving sample problems 4 (57.1%) teachers and 73 (56.2%) of students were responded mostly, and the average mean value 3.80 show that which is mostly done. As observed from class room observations, most teachers commonly make the use of traditional methods such as lecturing, question and answer method, solving sample problems and demonstration of figures and charts from the text books. Because of this physics teachers do not use different teaching techniques which require student's active participation. On the other hand, among common learning strategies presented in table 4, is Group discussion. Group discussion is one of most popular active learning strategies responded by 4 (57.1%) of teacher respondents and 56 (43%) of the student respondents mostly. The average mean value is 3.50 which is in the range of mostly. This indicates that Group discussion was practiced mostly in the class room. The other method in this table 4, is the work sheet method, on this method 4 (57.1%) of teacher respondents and 46 (35.4%) of student respondents response show that sometimes and the average mean value also show that 2.99 shows sometimes. This indicates that work sheet in the learning teaching process used sometimes. The other method in this table 4, Demonstration method, on this method 3 (42.9%) of teacher respondents response shows rarely. 76 (58.6%) student respondents response shows sometimes. But the average mean value of the respondents response was 2.61 which shows sometimes applied. This indicates demonstration method of teaching physics was applied sometimes. Regarding to problem solving method, project method, modeling method, cooperative learning, Game based learning, discovery method and student presention most of teacher and student respondents response shows that rarely employed with average mean value 2.58, 2.53, 1.94, 2.46, 2.18, 2.21 and 2.30 respectively. By supporting this idea, from class room observation, Teachers do not use different teaching learning techniques. Most teachers used lecture method to teach physics in classroom.Moreover, almost all of the teachers do not follow up students participation and activities.

Finally, the remaining method of teaching was experiment in the laboratory. About experiment in the laboratory 4 (57.1%) of teacher 93 (71.5%) of students response with average mean value was 1.49 shows never used. Because in most of preparatory schools there was no laboratory. In schools were laboratory present not functional. Student debating method and scientific research method of teaching physics was also never used as student and teacher respondents response shows with average mean value 1.72 and 1.65 indicates respectively. Generally in methodology of teaching most teachers do not follow up students participation.





Graph 3: methodology of teaching used in preparatory schools during physics class.

4.2.2 Instructional Materials used in the implementation of SCL in physics teaching.

No	Items	respondents	Strongly agree		agree		Neutral		disagree		Strongly dis agree		Mean value
			f	%	f	%	f	%	f	%	f	%	
1	Sufficient instructional materials	teacher	-	-	1	14.3	1	14.3	4	57.1	1	14.3	2.28
		student	8	6.2	18	13.8	17	13.0	71	54.6	16	12.3	2.48
2	Preparation of teaching aids	teacher	-	-	4	57.1	1	14.3	2	28.6	-	-	3.29
		student	-	-	66	50.7	2	1.5	52	40.0	10	7.7	2.95
3	Sufficient physics text books	teacher	6	85.7	1	14.3	-	-	-	-	-	-	4.86
		student	91	70.0	23	17.7	16	12.3	-	-	-	-	4.58
4	Sufficient physics referencebook	teacher	1	14.3	1	14.3	1	14.3	4	57.1	-	-	2.86
		student	26	20.0	14	10.8	39	30.0	51	39.2	-	-	3.12
5	well-equipped physics laboratoryroom	teacher	-	-	2	28.6	1	14.3	3	42.8	1	14.3	2.57
		student	-	-	12	9.2	8	6.1	67	51.5	43	33.0	1.92
6	well trained laboratory technician.	teacher	-	-	-	-	-	-	4	57.1	3	42.8	1.57
		student	-	-	-	-	10	7.7	39	30.0	81	62.3	1.45
7	physics laboratory manual.	teacher	-	-	-	-	1	14.3	4	57.1	2	28.6	1.85
		student	-	-	-	-	16	12.3	24	19.4	90	69.2	1.43
8	Sufficient laboratory equipment's	teacher	-	-	-	-	-	-	4	57.1	3	42.8	1.57
		student	-	-	11	6.15	19	11.5	73	56.1	27	20.7	2.10
9	Computer Service	teacher	-	-	-	-	-	-	-	-	7	100	1.00
		student	-	-	-	-	-	-	28	21.5	102	78.5	1.15
10	Internet access or serves	teacher	-	-	-	-	-	-	-	-	7	100	1.00
		student	-	-	-	-	-	-	12	9.2	118	90.8	1.10

Table 3: Instructional materials used in the implementation of student centered in physics teaching.

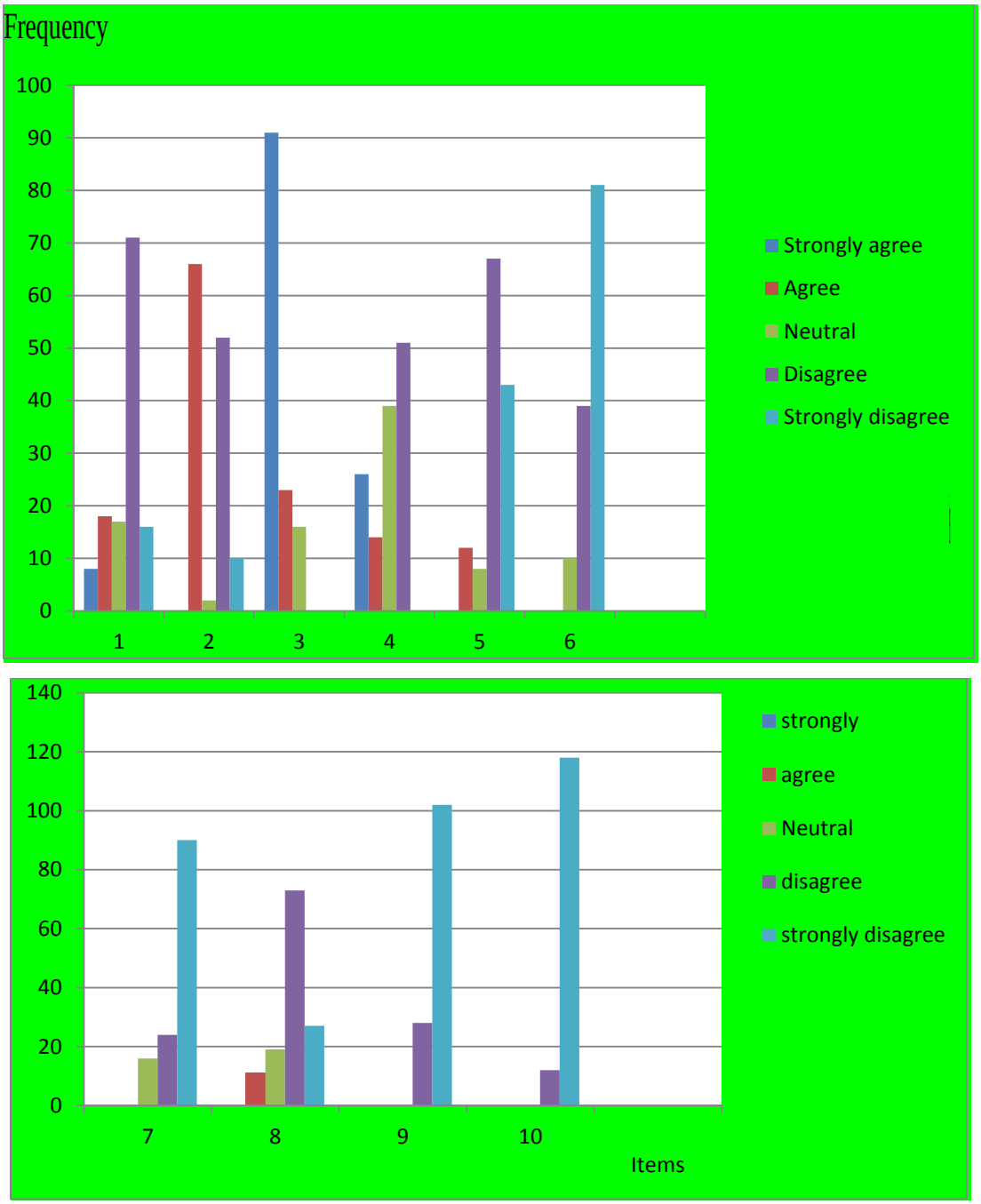
Instructional materials are one of the most important means of giving long life knowledge for the students. Learning with teaching materials is an interesting because teaching materials can motive

the learners, can save time and can attract the attention of the learner. But, in table 5, item1, there are sufficient teaching materials to implement SCL in teaching physics was show that 5 (71.4%) teacher's response and 71 (54.6%) of student's response disagree and the average mean value is 2.31 which falls under disagree. This indicates that almost all respondents agreed that there are insufficient instructional materials in these preparatory schools that can help to implement student centered approaches in learning physics. But instructional materials are elements to be considered in the implementation of student centered approach. Because, the availability or unavailability of instructional materials can facilitate or impede the implementation of student centered approach. Learning physics theoretically without teaching materials is very difficult, slow the participation of the students and decrease the quality of the teaching process of the subject physics. Some of barriers of communication can be overcome by using teaching materials in the class room instructions. Teaching materials helps students in understanding some complicated and difficult concepts and provide an opportunity for a better support between the learner and the teacher. But in the study areas as the study indicates that due to lack of instructional materials in these schools, teachers taught their students with words alone is very tedious wasteful and ineffective. Students can be taught scientific facts and theories but with out experiments they can not experience the reality of physics.

Instructional materials can serve as a primary influence on how to teach physics practically. But in this study , table 5 item 2, Teachers and Students prepare teaching aids to facilitate learning 4 (57.1%) of teachers and 60 (50.7%) student's response show agree, and the average mean value is 3.52 which falls under agree .This indicates that almost students and teachers try to prepare teaching aids from their local materials and as well as teachers were used figures (diagrams) as alternatives. But this is not enough to provide practical innovations in teaching physics. In table 5, item 3, for case of text book 6 (85.7%) of teachers and 91 (70%) student's response shows that strongly agree, and the average mean value is 4.72 which falls under strongly agree. This indicates that there are sufficient physics text book in these preparatory schools. This helps the students to practice their lesson effectively.

Regarding table 5, item 4, 4 (57.1%) of teacher respondents shows disagree and 39 (30%) students response show that neutral. But the average mean value is 2.99 which shows neutral. This indicates that there are insufficient physics reference books in the library.

Regarding table 5, item 5, there is well equipped physics laboratory room was responded as 3 (42.8%) of teacher's response and 67 (51.5%) of student's response show that disagree. The average mean value is 2.25 which shows disagree. This shows that in the schools were laboratory room is present the laboratory was not equipped well. In this case laboratories was insufficient and rarely operational. But in some schools there were no functional laboratory rooms. Because of this student do not experiment topics what they learn theoretically in the laboratory rooms. Many students ultimately fail to make connection between theory and practical application. Learning physics without practical work decreases the quality of learning physics. For item 6, for well trained laboratory technician, 4(51.1%) teacher respondents and 81(62.3%) student respondents response show that disagree, and the average mean value is 1.51 which indicates strongly disagree. This indicates that there were no laboratory technician in those preparatory schools. For item7, for well prepared laboratory manual, 4(57.1%) teacher respondents response show that disagree and 90(69.2%) student respondents response show that strongly disagree. But the average mean value is 1.64 which indicates strongly disagree. Therefore there was not well prepared laboratory manual in those preparatory schools. For item 8,for sufficient laboratory equipment's, 4(57.1%) teacher respondents and 73(56.1%) student respondents response shows that disagree, and the average mean value is 1.84 which indicates disagree. There for there were insufficient laboratory equipment's in those preparatory schools. For item 9, for computer serves in teaching physics, 7(100%) teacher respondents and 102(78.5%) student respondents response shows strongly disagree, and the average mean value is 1.08 which shows strongly disagree. This indicates there was no computer serves in teaching physics. For item10, for Internet serves 7(100%) teacher respondents and 118(90.8%) of student respondents response shows strongly disagree. The average mean value is 1.05 which shows the range of strongly disagree. Therefore, it indicates there was no internet serves in those preparatory schools. Therefore, this study indicates that there was a lack of teaching materials to develop activities that engage the students in scientific investigation and with the process of educational innovation. Teaching physics without teaching materials is difficult and slow the participation of the students and decrease the quality of the teaching process of the subject physics. Therefore, many students fail to make connections between theory of Physics and the natural world.



Graph 4 The availability of materials. instructional

1. Sufficient instructional materials
2. Preparation of teaching aids.
3. Sufficient physics text book for each students.
4. Sufficient physics reference book in the library.
5. Well equipped physics laboratory room.
6. Well trained physics laboratory room.
7. Well prepared physics laboratory manual
8. Sufficient physics laboratories equipments
9. Computer serves
10. Internent access

4.2.3 Student's Participation in the implementation of SCL in teaching physics.

No	activities	respondents	Very high		high		medium		low		Very low		Mean value
			f	%	f	%	f	%	f	%	f	%	
1	Students interest towards learning physics	teacher	-	-	-	-	2	28.6	5	71.4	-	-	2.29
		student	35	26.9	26	20	61	46.9	8	6.15	-	-	3.69
2	Students usage of mathematical skills in SCA of learning physics	teacher	-	-	-	-	2	28.6	5	71.4	-	-	2.29
		student	9	6.9	26	20	43	33.0	52	40.0	-	-	2.94
3	Students usage of language skills in the expressing their ideas in SCA in teaching physics	teacher	-	-	-	-	1	14.3	6	85.7	-	-	2.14
		student	8	6.15	26	20	35	26.9	61	46.9	-	-	2.85
4	Students interest to cooperate in physics learning	teacher	-	-	-	-	6	85.7	1	14.3	-	-	2.86
		student	24	18.5	28	21.5	78	60	-	-	-	-	3.58
5	Students effort in doing homework and assignments	teacher	-	-	1	14.3	2	28.6	4	57.1	-	-	2.57
		student	27	20.7	33	25.4	66	50.8	4	3.07	-	-	3.64
6	Student's participation in learning Physics in student centered method of teaching.	teacher	-	-	1	14.3	5	71.4	1	14.3	-	-	3.00
		student	16	12.3	18	13.8	42	32.3	54	41.5	-	-	2.97
7	Students engagement to reflect what they are learning	teacher	-	-	2	28.6	3	42.8	2	28.6	-	-	3.00
		student	14	10.8	23	18.7	49	37.7	27	20.8	17	13	2.92
8	Students interest in learning by doing	teacher	1	14.3	2	28.6	3	42.8	1	14.3	-	-	3.26
		student	16	12.3	64	49.2	23	17.7	16	12.3	11	8.5	3.45
9	Students trying to experiment what they learned	teacher	-	-	-	-	2	28.6	4	57.1	1	14.	2.14
		Student	12	9.2	22	16.9	27	20.8	50	38.5	19	14.	2.68

Table 4: Students participation in the implementation of student centered approach in physics teaching.

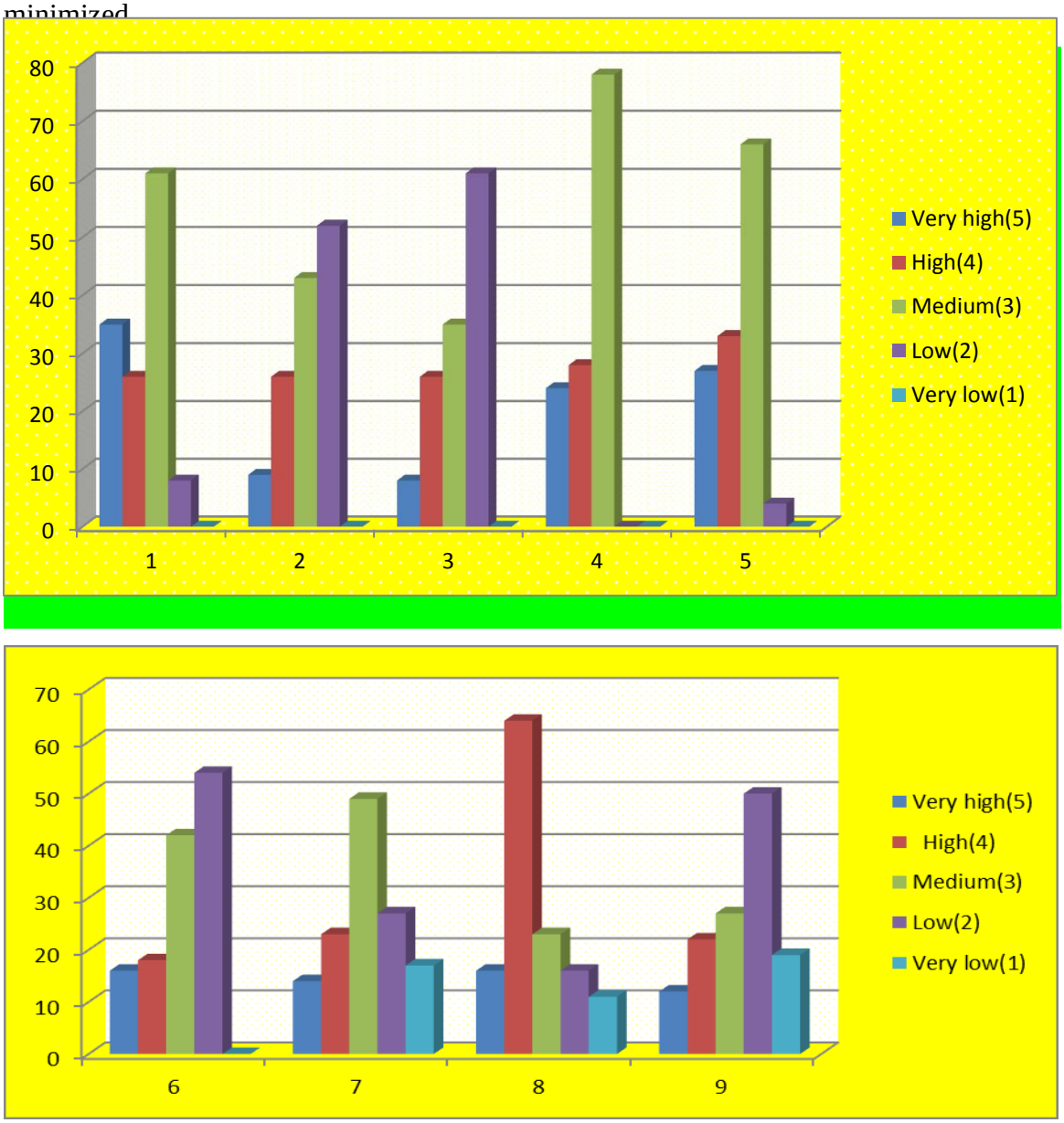
Based on table 6, item 1, about students interest toward learning physics 5 (71.4%) of teacher respondents response shows low, and 61 (46.9%) of student respondents response shows medium, But the average mean value is 2.99 which indicates medium. This indicates that students interest

toward learning physics were medium. Regarding table 6, item 2, about Students mathematical skills in SCL in physics, 5(71.4%) teacher respondents and 52 (40%) show low and the average mean value is 2.43 which indicates low. Therefore students mathematical skills in practicing physics in SCL approach were low. The main reasons were inadequate knowledge and and experiences in mathematics in the lower grades. For table 6, item 3, Student's language skills in the expressing their idea in SCL, 6 (85.7) teacher respondents and 61 (46.9%) student respondents response shows low, and the average mean value is 2.49 which indicates low. This indicates that students language skills in the expressing their idea in SCL were poor.

For table 6, item 4, students interest to cooperate in physics learning, 6 (85.7%) of teacher respondents response and 78 (60%) student respondents response show that medium, and also the average mean value is 3.22 which indicates medium. This indicates that there were almost a little cooperation among student in physics teaching. Regarding table 6, item 5 about students effort in doing homework and assignment,4 (57.1%) teacher respondents show that low, 66 (50.8) student respondents response shows that medium and the average mean value is 3.11 which indicate medium. This indicates that almost some student were do their homework and assignments some of students dependent on the others.

For table 6, item 6, about student participation in learning physics in SCL approach, 5 (71.4%) teacher respondents show medium and 54 (41.5%) student respondents shows low. But the average mean value is 2.67 which is medium. This indicates that almost the participation of students in learning in school with SCL approach is low. Regrding table 6 item 7, about students engagement to reflect what they are learning, 3 (42.8%) teacher respondents and 49 (37.7%) student respondents show medium, and the average mean value is 2.96 which indicates medium. This indicates that some students try to reflect what they are learning theoretically. Regarding table 6, item 8, about students interest in learning by doing, 3 (42.8%) teacher respondents response show that medium, and 64 (49.2%) student respondents show that high. But the average mean value is 3.36 which indicates medium. Regarding table 6,item 9, about students trying to experiment what they learned, 4 (57.1%) teacher respondents response show low, and 50 (38.5%) of student respondents shows low. the average mean value 2.41 which indicates low.

This indicates that even if physics was a practical science there were no practical experiment in the school. So learning physics without practical work and experimentation decreases the quality of learning physics. in addition to this student learning through student centered approach is minimized.



Graph 5: Student participation in student centered method.

4.3 Presentation and Analysis of Data Obtained Through Observation

The analysis and the presentation obtained through observation are presented below. To fulfill the observation seven teachers were observed when teach physics in the class. Four teachers teach grade 12 physics and three of them teach grade 11 physics. The data based on the requirement of the classroom observation checklist were collected. They are analyzed in separate tables. The observation was conducted by the researcher and the result of observation is presented in the following table.

No	List of observation	Yes(positive)		No(Negative)	
		f	%	f	%
1	Desks and chairs are movable	2	28.6%	5	71.4%
2	Enough seating space to facilitate different arrangements	5	71.4%	2	28.6%
3	The class composed greater than 40 students	7	100%	-	-
4	Table for different activities in the laboratory	2	28.6%	5	71.9%

Table 5 Observation checklist about class room facilities

The condition of the class room is also one of the factors that affect the implementation of student centered learning approach. Therefore, the data obtained from classroom observation analyzed as the following. Regarding item 1, 5 (71.4%) of class room observation about Desks and chairs are movable shows no. This indicates desks and chairs in the classroom is not movable for the arrangements of Group Discussions. Regarding item 2, 5 (71.4%) of class room observation about enough seating space to facilitate different arrangements show no. This indicates the class room not arranged to facilitate student centered learning and there was no sufficient space between desks and students for instructional activities because three students were sitting on one desk.

Regarding item 3, 7(100%) of classroom observation about the class composed greater than 40 students were show Yes. This indicates that the classroom composed more than 40 students in one class up to 56 students. Regarding item 4, 5(71.9%) of classroom observation about table for different activities in the laboratory were show no. This indicates that in the laboratory lacks tables to perform different activities. Most of schools are not fully equipped with necessary facilities such as laboratories, in few schools laboratories are rarely operational, and libraries are insufficient, laboratory facilities are none in some schools and very limited in the rest (not functional laboratories).

No	List of observations	Applied very well		Applied to some extent		Not Applied	
		f	%	f	%	f	%
1	Students working together cooperatively in groups.	1	14.3%	2	28.6%	4	57.1%
2	Teaching directed at class divided into groups	2	28.6%	2	28.6%	3	42.8%
3	Teaching directed at whole class.	4	57.1%	2	28.6%	1	14.3%
4	Teacher varies grouping, whole, small and individual	-	-	3	42.8%	4	57.1%
5	Students working individually, at their own pace, on work given by the teacher	4	57.1%	2	28.6%	1	14.3%
6	Teacher encourages students to communicate effectively	3	42.8%	2	28.6%	2	28.6%
7	Teacher clarifies the learning objectives	4	57.1%	2	28.6%	1	14.3%
8	Teacher helps the students by rounding group	1	14.3%	2	28.6%	4	57.1%

Table 6: Observation checklist about organization of the class room instruction

From classroom observation the data presented on table 8 was analyzed as the following;

Regarding item 1, 4 (57.1%) of class room observation shows that students working together cooperatively in small groups not applied very well. This indicates that students are working individually at their own pace. Regarding item 2, 3 (42.8%) of the classroom observations show that teaching directed at divided into small groups were not applied well. This indicates that teachers do not divided students into small groups in the class. Teaching was directed at whole class. Regarding item 3, 4 (57.1%) of the class room observation show that teaching directed at whole class were applied well. This indicates that teachers teach their lesson at whole class without dividing to small groups. Regarding item 4, 4 (57.1%) of the class observation show that teacher varies grouping whole small and individual not applied. This indicates that the classroom not arranged to facilitate student centered approach and there was not sufficient space between desks and students for instructional activities by varying grouping. Regarding item 5, 4 (57.1%) of the classroom observation show that students working individually at their own pace were applied well. This indicates that students were working individually than group work.

Regarding item 6, 3 (42.8%) of the class room observation show that teachers encourages students to communicate effectively were applied well. This indicates that teachers motivate their students by using different appreciation words like good, verygood, excellent to encourage students become active participants. Regarging item 7, 4(57.1%) of the class room observation show that teachers clarifies the learning objectives were applied very well. This indicates that teachers select and use different teaching methods and materials to attaining a given objectives. Regarding for item 8, 4 (57.1%) of the classroom observation show that teacher helps the students by rounding groups not applied very well. This indicates that teachers used lecture method of teaching to cover the course in time.

No	Classroom observation lists	Yes(positive)		No(Negative)	
		f	%	f	%
1	Students are participating in problem solving activities	2	29%	5	72%
2	Students are playing roles while learning.	2	29%	5	72%
3	Students are taking part in peer teaching.	3	43%	4	57%
4	Students are practicing demonstration.	1	14%	6	86%
5	Every students involved in each activities and practices.	1	14%	6	86%
6	Active participation of students in the class.	2	29%	5	72%
7	Student-student and student-teacher interaction.	3	43%	4	57%

Table 7: Observation checklist about students activities in a class.

From class room observation the data presented on table 9 was analyzed as the following:

For item1, 5 (72%) of classroom observation about students are participating in problem solving activities shows no. This indicates that most of students are not participate in problem solving activities such as Discovery method, experimenting and Scientific research method. For item2, 5 (72%) of class room observation about students are playing roles while learning show no. This indicates that students are passive listener of information while teachers are playing great role in teaching. For item 3, 4 (57%) of the classroom observation about students practicing demonstration show no. This indicates only teachers demonstrates charts and figures from text books.

For item 5, 6 (85.7%) of the classroom observation about every students involved in each activities and practices show no, only few students are involved effectively in each activities and practices given in the classroom. From item 6, 5 (72%) of the classroom observation about active participation of student in the class shows no., only few students are actively participate in the class. From item 7, 4 (57%) of the classroom observation about student-student and student-teacher interaction show no. Student-Student and Student- Teacher interaction is seen for only 3 (43%) in the class observation. From this class room observation the researcher obsereved that, the most frequent problems in teaching physics in using student centered approach were students are often too passive, poor motivation of students, low participation in the lesson, negative perception of physics and lack of interests. In this study the researcher observed that the teachers have an ideas about active learning of students theoretically but have a little practices in the classes.

4.4 Document analysis

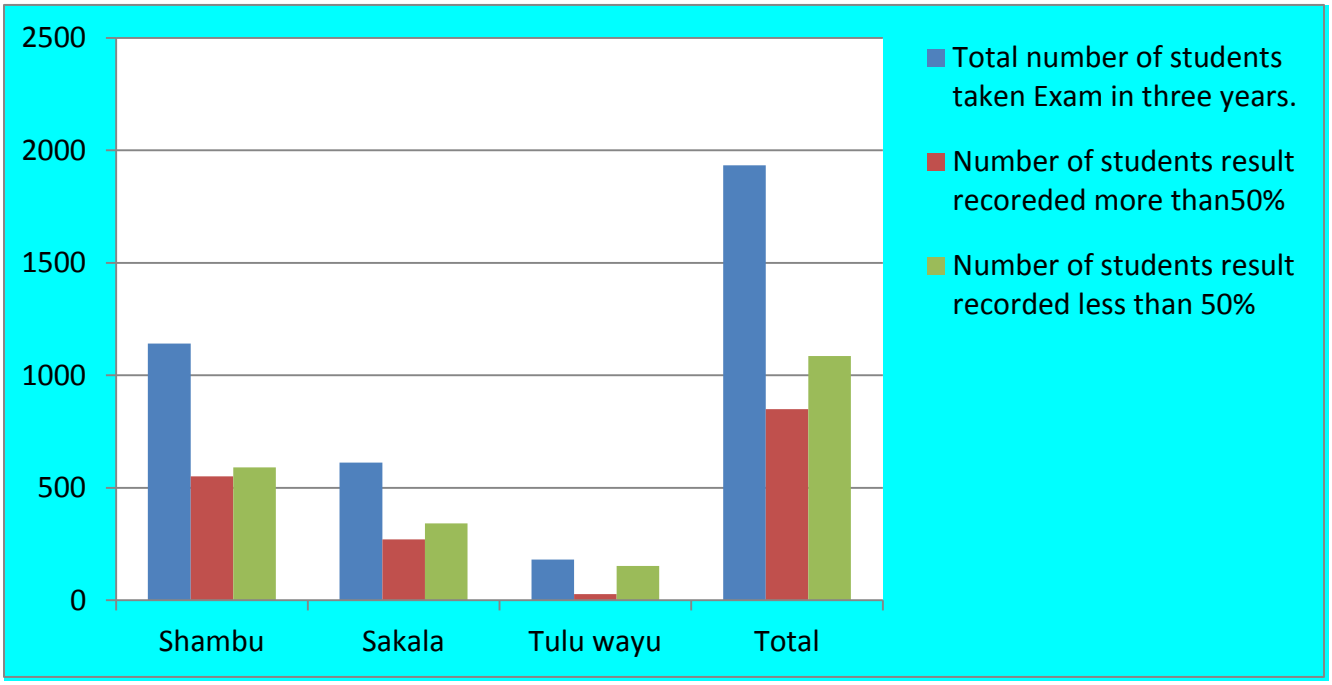
4.4.1 Document Analysis of Students EUEE Physics Result

To evaluate the current achievement of students in physics,Ethiopian University Enterance Examination Physics result document (2007- 2009 E.c) is analyzed as the following table.

No	School name	Exam. Years	Total number of student taken examination			Highest mark recorded (100%)	Lowest mark recorded (100%)	Total number of students result recorded above 50%
			Male	Female	Total			
1	Shambu	2007	198	154	352	70	14	169 Students
		2008	217	163	380	63	18	183 Students
		2009	229	180	409	74	20	199 students
2	Sakala	2007	77	54	131	70	22	42 Students
		2008	131	95	226	60	21	39 Students
		2009	142	113	255	78	21	189 students
3	Tulu wayu	2007	26	16	42	58	22	3 students
		2008	35	19	54	58	26	14 students
		2009	50	35	85	54	18	11 students
	Total	2007-2009	1105	829	1934	65.0	20.22	849 students
From 2007 - 2009E.C from total of 1934 students taken Exam. Only 849 (44%) got more than 50% in physics in EUEE. 1085 (56%) got less than 50% in physics in EUEE.								

Table 10: EUEE physics result 2007- 2009 E.C.

As indicated in the table 10 above, In three years in these schools, from the total students 56% of students recorded below fifty and only 44% of students recorded above the average value. This indicates that the performance of students in physics was very low. little or lack of active involvement of students in their learning could lead them a poor score in the academic achievement of physics result. Because Examination scores are used to measure internal efficiency. The document analysis of students result 2007- 2009 E.c.in this three years show that highest mark recorded is 78 and the lowest mark recorded 14 out of 100% . From this we concluded that poor academic performance by the majority of the students mostly linked to an effective implementation of student centered mode of delivery of teaching physics. This show that most teachers do not seriously design varies teaching methods which may improve student's achievement.



Graph 6: Grade 12 EUEE 2007- 2009 E.C physics result recorded in the study areas.

4.4.2 Teachers Lesson Plans

Lesson plan is the actual plan of an action and is the key to effective teaching. A physics teacher must know in advance the subject matter and the mode of its delivery in the classroom. Such advance knowledge gives the physics teacher an idea of how to introduce the topic, how to develop various key concepts and correlation between concepts and daily life in the lesson.

By teaching physics we aim at bringing about desirable behavioral changes among students. In order to make students learn effectively, the teacher has to adopt the right method of teaching. For choosing right method for a given situation the teacher must be familiar with different methods of teaching. Therefore careful lesson planning is the key to successful teaching. The planned teaching at any level serves to describe how curriculum guide goals are implemented daily. Notify topics covered, material needed, methods or activities to be used and identifies evaluation techniques.

Teachers lecture (effort) is not enough to prepare students performance in physics teaching. The way teacher's plan their lesson was also one of the factors that affect the implementation of student centered learning. Teachers should create conductive atmosphere to learning in order to enhance the development of students learning experiences. Effective teaching and learning require the use of different methodologies and strategies to meet the demands of the learners.

Teachers who seriously design in their lesson plans with various teaching methods may improve student's achievement. But in the document analysis of teachers lesson plan the researcher observed the following limitations. Thus teachers do not paid sufficient attentions in the proper planning of their lessons in both annual and daily plans. In proper planning may fall into several problems of teaching and learning process.

- Teachers lesson plan on the cognitive domain in the acquisition of knowledge was mostly done. On the Affective domain sometimes and on psychomotor skills rarely as seen by class room observations.
- Under the column of the activities in most teachers lesson plans activities were written what the teachers can do in the class. All topics were delivered according to the priority determined by the teacher. For students the opportunities do not given to direct their own learning. This show that mode of delivery of lesson was teacher centered methods.
- Teachers donot plan their lesson by choosing different active learning methods according to the contents of the lesson.
- Teaching aids and materials are not briefly stated in the lesson plans except textbook charts and figures.
- Teachers lesson planning does not ensure effective utilization of resources and time.
- Mostly daily lesson plans donot written in observable or measurable verbs.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Based on the major findings, the following conclusions were drawn.

5.1.1 From the Respondent's Personal Characteristics

1. From the data collected teacher respondents all are males, this show that in these preparatory Schools there were no female physics teachers.
2. Regarding to the age of teacher respondents 1 (14.3%) was between 21- 30 years. 4 (57.1%) between 31- 40 years. 2 (28.6%) were above 40 years. This indicates the majority of teachers was at middle age. Therefore, this helps the teachers to work actively and facilitate the teaching learning process.
3. Regarding to work experience 3 (42.8%) between range of 11- 15 years, 2 (28.6%) between 21-25 years, 1 (14.3%) has experience between 26-30 years, the remaining 1 (14.3%) has above 31 years of experience. The majority of teachers have medium experience which indicates that they have enough experience to teach physics.
4. Teachers are primary determinants of class room environment. Concerning to qualification of teacher respondents almost all teachers except one teacher do not hold the minimum qualification to teach at the preparatory school level, that is MSC as determine by MOE. So this show that teachers challenged in teaching above their capability in preparatory schools which can greatly affect the quality of teaching and learning.

5.1.2 Conditions of the class room

1. The maximum number of students in preparatory schools (11-12) were 40 in one class according to the standard given in MOE. But the number of the students in this study area were more than 40 students in one class up to 56 students as observed from class observations. Thus, the number of students in a class was more than the standard determined by MOE.

2. The condition of the class room was also one of the factors that affect the implementation of student centered learning approach.The data obtained from classroom observation indicated that desks and chairs are not movable. The classroom seating arrangement (straight row) do not allow teachers to employ student centered approaches in teaching physics. The desks were not comfortable for group works.

5.1.3 The Utilization of Active Learning Strategies.

1. Among 16 items of methodology of teaching presented in this study, only 4 items (25%) applied mostly or frequently in teaching physics in the classrooms. 2 items (12.5%) were applied sometimes. 7 items (43.75%) were applied rarely. 3 items (18.75%) was never used in teaching physics in the class room in this study area.
2. Among teaching methodologies presented in this study, lecture method of teaching was employed always more than other methods as respondents response shows. This indicates that lecture method of teaching was the most dominant teaching method in teaching physics in these preparatory schools. Mostly teachers delivers lecture, give notes and solve sample problems without any active participation of students. But teaching by telling is an ineffective mode of instruction for most students. This resulted challenges for students in the inability to foster critical thinking and fails to develop confidence in their learning. Because of this poor academic performance and low result in the examination by the majority of students was largely linked to the application of this traditional teaching method.
3. The analysis of the data shows that, in most physics classes Question and Answering method, Group discussion method and Solving sample problems was employed mostly in order to help students to internalize what they learned. But these methods were not acquired a long lasting knowledge and skills and these methods were not provide permanent learning for students for their future life in order to solve abstract concepts of physics lesson. Because this method helps the students only to develop positive attitude of sharing information about the content.
4. Work sheet activities provide opportunities for students to practice their lesson independently. But as indicated in the data analysis, work sheet method was applied sometimes and Demonstration method was sometimes employed which combines real things with oral explanation in the classroom.
5. Problem solving method, Project method, Modeling method, Cooperative learning, Game based learning, Discovery method, Students presentation method were utilized rarely in these preparatory schools. This indicates that teachers do not use various teaching strategies to facilitate the students with different learning styles. Therefore, students were not engaged effectively in their lesson and did not develop critical thinking skills and their interest towards learning physics was greatly dropped and this affects successes and demands of the learners.

6. Without water a fish cannot survive! Similarly without doing laboratory work physics cannot be learned fully. But the analyses of the data of this study show that, experiment in the laboratory never used in these preparatory schools due to absence of laboratory rooms and equipment's in these preparatory schools which is contradicts to [54]. Because of this learning by doing cannot achieved and students cannot experience the reality of physics by stating empirical laws by testing with experiments. Students fail to make connection between theory of physics and the natural environment. Scientific research method and student debating method were also never used in teaching physics in the class room as respondents response indicated.
7. As this research indicated, the effective way of teaching physics was when there were an active involvement of students in their lesson. This method was student centered method. But the level of utilization of active learning strategies implemented was low. Because schools were failed to satisfy students need effectively and efficiently. Therefore, the failure of the implementation of student centered approach in teaching physics leads to poor academic performance and low result in examinations.
8. Most teachers did not provide opportunities for Group Discussions between learners that would have promoted higher order thinking in learners. This was probably due to wider text book contents and 40 minutes class, which is too short to cater for both content coverage and individualized attention. physics teachers was occupied full time by theoretical lecture.

5.1.4 Instructional materials

1. As collected data from questionnaire and observation shows that almost all respondents agreed that there are insufficient instructional materials in the schools that can help to implement student centered approaches in learning physics. Because there were insufficient physics reference books in the library, no laboratory manual, insufficient laboratory equipment's, no computer serves and internet access. Students have no chance to have access to utilize internet based and computer based learning materials. This can impeded the student centered implementation in teaching physics.
2. As indicated in the data analysis, student's interest in learning by doing is very high. But there were insufficient teaching materials and lack of laboratories and laboratory equipment's in these preparatory schools. This unavailability of teaching materials has a negative influence on the effective implementation of student centered approach in physics teaching. Therefore students learning through this approach is minimized and the quality of learning physics was decreased.

5.1.5 Students Mathematical skills and language skills in the implementationof student centered Method of teaching in physics learning.

Student's mathematical skills and language barrier in the expressing their ideas in learning physics class can affects the implementation of student centered approach of teaching physics. Concerning Mathematical and language skills of students in expressing their idea in SCL approach the average mean value of respondents response shows low. This indicated that most students do not reflect what they discussed in their group in student centered approach of learning physics. Therefore, most students have the gap of mathematical skills and language barrier to reflect on how to learn physics concepts and solving some sample problems. Language difficulty and inability of solving mathematical problems made students afraid of studying physics. This made most students passive listeners in the physics class to learn**.**

5.1.6 Conclusion from Document analysis

1. The Document analysis of student National examination of Grade 12 in the years 2007- 2009 E.C. the recorded physics result show that only 44% of the students in these three preparatory schools got more than 50% in physics exam. 56% of the students got less that 50% in physics exam. Therefore, in the Ethiopian university entrance examination physics result is the least as compared to other subject.

2. In the analysis of documents of teacher's lesson planning, Most teachers donot plan different varieties of active learning approach. This is due to lack of teachers knowledge to implement student centered approach and also teachers finding simpler method in their teaching and including other factors affects the implementation of student centered approach in physics teaching. This ineffective and insufficient way of planning resulted in the failure to achieve the objectives of the lesson, frustration and lack of confidence for both teachers and students and brings waste of time, effort and money and finally poor achievement in physics in preparatory schools.

5.2 Recommendations

In the light of findings and conclusions, the following recommendations are forwarded.

1. Physics teachers in Horo Guduru wollega zone of preparatory schools have to take the responsibility to bring a better change from teacher method approach to the student centered approach for effective teaching physics. Regular poor performance by majority of students was linked to the application of ineffective teaching methods. Therefore, physics teachers have to take responsibilities to bring a better change in physics teaching by adopting an effective way of teaching for permanent learning.
2. This study indicates that using student centered applications is necessary for permanent learning as physics contains abstract concepts. It is believed that students should benefit from the student centered approaches. For this reason to use this approach the curriculum should be revised and improved which makes the student active for the future.
3. The possession of required qualification helps teachers to have the readiness to promote teaching and learning process. Since most of the participants of the study do not have the qualification required working at the preparatory school level. Ministry of Education and Regional Education Bureau has to expand additional summer in service program instruction for preparatory teachers to solve this problem.
4. The quality of Education and Teaching-learning processes is highly affected by the availability and usage of instructional materials. Thus, Educational Bureau and Schools have to allocate funds for laboratory equipment's, reference books, built sufficient laboratories, computer serves, and internet access and pedagogy centers. Teachers and students also develop their interest to prepare instructional materials from local materials.
5. The most common way of practical supporting physics learning is using physics laboratories. Different studies showed that laboratory method has much more great effects than traditional methods. But there is absence of laboratories in some schools and in some schools laboratories are not functional, no laboratory technician and manual. Therefore the school administration has to plan to build laboratory and to fulfill the necessary laboratory equipment's.
6. Physics is an important base of science and technology because it is concerned with natural phenomena and helps people understand the increasing changing technological society. Therefore it needs teachers to adopt different teaching methodologies that help students to

acquire knowledge, skills and experiences. So it needs strong attention to change the strategy of old instruction and considerable efforts should be made in order to make our students to be problem solver, innovator, investigator and scientists.

7. Internal efficiency in education is influenced by qualification of teachers and teaching styles. Therefore,conferences, workshops, and seminars should be organized for the practicing and serving physics teachers to update their knowledge and skills on how to use student centered teaching strategies to teach students in physics.
8. The performance of students in physics had persistently remained poor in most Horo Guduru Wollega Zone preparatory schools. Different study conducted show that the schools were unsuccessful in their efforts to improve student's physics achievement. As a result majority of the students in these schools had no interest to learn physics and this resulted low achievement in national examinations. The ineffective teaching method and teacher's lack of knowledge in implementing student centered method including other factors resulted students poor physics achievement. So it needs applying a right method of teaching in our physics class to stimulate the students to learn. An effective teaching method can ensure effective learning by allowing students to reflect their own ideas. Hence students must talk about what they are learning, write about it, relate it to past experience and apply it into their daily lives. So the implementation of student centered approach in physics teaching improves students learning styles, their achievement and their scores.
9. Students should be encouraged to be actively involved in their learning environments to find physics an interesting subject and pass physics examinations with acceptable conceptual understanding of physics.
10. Physics teachers should also increase their professional development through participation of various programs such as Continous professional development (CPD),Teachers development program (TDP) and School improvement program (SIP) inorder to keep students engaged and motivate through out the learning process in the practice of student centered activities.

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Appendices

Appendix 1

I. Questionnaires to be filled by teachers.

Dear teacher: This questionnaire is prepared for MSC thesis in science of physics. The purpose of this questionnaire is to get valuable information data on "Evaluation of the student centered teaching & its implementation in physics teaching in the case of Horo Guduru Wollega preparatory schools''. The study can be successfully accomplished only when you complete items honestly and frankly. Thus it requires your full attention and cooperation. So, please cooperate me by filling this questionnaire. And you are kindly requested to return the complete questionnaire as soon as possible.

Thank you in advance.

General Instruction:

- No need to write your name.
- Write "X" for alternative questions in the space provided.
- Write your opinion briefly & clearly for open ended questions in space provided.

Part I. Back ground information of teachers.

1. School name……
2. Sex Male……. Female……
3. Age less than 25 years……26-30 years……
   31-35 years…….36- 40 years…… Above 41 years……
4. Qualification Diploma……First degree……second degree……..PhD
5. Experience less than 10 years…….. 11-20 year
   21-30years…….Above 31 years

Part I. Questionnaires for methodology of teaching used in physics classes

Items related to your practices of different methods of teaching are listed below. Select the correct answer that represents how these methods have been employed please mark "x" in the table.

Key: 5=always 4= mostly 3= sometimes 2= rarely 1=never used

Table.12. table of questionnaire for methodology of teaching for teachers.

No	Type of teaching method used or learning method used	How often do you use these methods of teaching in your teaching?				
		5	4	3	2	1
1	Question and answer					
2	Lecture method(teacher talking method)					
3	Demonstration					
4	Group discussion					
5	Discovery method					
6	Problem solving method					
7	Project method					
8	Experiment in the laboratory					
9	Work sheet					
10	Cooperative learning method					
11	Scientific research method					
12	Game based learning(brain storming)					
13	Student presentation					
14	Student debating					
15	Modeling method					
16	Solving sample problems					

Part II: Instructional materials

Instruction: Issues related with instructional materials are indicated below please, use tick mark "X" in the table based on experiences you have on the instructional materials.

Key: 5 = strongly agree 4=Agree 3 = Neutral 2=Disagree 1 = Strongly Disagree

No	Items	5	4	3	2	1
1	There are sufficient instructional materials in your school that can help to implement student centered approaches					
2	Teachers and students prepared instructional materials to facilitate learning to implement student centered learning.					
3	There are sufficient physics text books for each students					
4	There are sufficient physics reference books in the library.					
5	There is well-equipped physics laboratory room.					
6	There is well trained physics laboratory technician.					
7	There are sufficient physics laboratory equipment's					
8	There is well prepared physics laboratory manual.					
9	There is electricity installation or power in the laboratory					
10	There is computer serves in teaching physics in the class.					
11	There is internet access or serves in your school					

Part- III. Student participation

Instruction: Indicate student's participation in the implementation of student centered approach in physics teaching. Key: 5=Very high 4= high 3=medium 2=low 1= Very low

No	Activities	5	4	3	2	1
1	Students interest towards learning physics.					
2	Student's usage of mathematical skills in student centered approach of learning physics.					
3	Student's usage of language skills in expressing their ideas in student centered teaching in physics.					
4	Students interest to cooperate in physics learning.					
5	Student's effort in doing homework& assignments.					
6	Students participation in learning physics in student centered method of teaching.					
7	Students engagement to reflect what they are learning.					
8	Students interest in learning by doing.					

Part. IV. Teachers attitudes toward the implementation of student centered approach in physics teaching. Key: 5=strongly Agree 4=Agree 3= Neutral 2=Dis agree 1=strongly disagree

No	Questionnaires	5	4	3	2	1
1	Teachers lecture alone is enough to prepare students performance in physics.					
2	Student centered approach of teaching poses work load on teachers& students.					
3	Student centered method of teaching engages students in the hard work of learning.					
4	Students learn more when there is more interaction b/n student-student &student-teachers cooperation.					
5	Student centered approach gives opportunities for learners to participate actively in their lessons					
6	Student centered approach makes students responsible for their own learning					
7	You are qualified or trained for the implementation of student centered approach in physics teaching.					

Appendix 2

II. Questionnaires to be filled by Students.

This questionnaire is designed to gather data on "Evaluation of the student centered teaching and it's Implementation in Horo Guduru wollega preparatory schools. (in the case of Shambu, Sakala and Tulu wayu preparatory schools). The data to be collected through the questionnaire is highly valuable to meet the objectives of this study. Therefore, you are kindly requested to fill in and return the questionnaire. The information you supply would be used for academic purpose only. Thank you in advance!

General instruction:

- Please, do not write your name on the questionnaire.
- Please, follow the directions given in each part.

Part I. Personal information

1. School name……..

2. Sex …… ….

2. Age…….

3. Grade and section……

Part I. Questionnaires on methodology of teaching used in physics classes.

Instruction: Items related to your practices of different active learning methods are listed below. Select the correct answer that represents how often these methods have been employed. Please, use tick mark "x" in the table based on your experiences.

Key: 5=Always 4= mostly 3= sometimes 2= rarely 1=never used

No	Method of teaching used or method of learning used	5	4	3	2	1
1	Question and Answer					
2	Lecture method(teacher talking method)					
3	Demonstration					
4	Group discussion					
5	Problem solving method					
6	Project method					
7	Experiment in the laboratory					
8	Work sheet					
9	Cooperative learning method					
10	Game based learning (brain storming)					
11	Student presentation					
12	Student debating					
13	Discovery method					
14	Scientific research method					
15	Modeling method					
16	Solving sample problems					

Part II: Instructional materials

Instruction: Issues related with instructional materials are indicated below please, use tick mark "X" in the table based on experiences you have on the instructional materials.

Key: 5 = strongly agree 4=Agree 3 = Nuetral 2=Disagree 1 = Strongly Disagree

No	Items	5	4	3	2	1
1	There are sufficient instructional materials in your school that can help to implement student centered approaches in learning physics.					
2	Teachers& students prepared instructional teaching aids to facilitate learning to implement student centered approach in teaching physics.					
3	There are sufficient physics text book in the library.					
4	There are sufficient physics reference book in the library					
5	There is well-equipped physics laboratory.					
6	There is well trained physics laboratory technician.					
7	There is well prepared physics laboratory manual.					
8	There are sufficient physics laboratory equipment's					
10	There is computer serves in teaching physics in the class.					
11	There is internet access or serves in your school.					

Part- III. Student participation

Instruction: Indicate student's participation in the implementation of student centered approach in physics teaching. key 5=very high 4= high 3=medium 2=low 1= Very low

No	Activities	5	4	3	2	1
1	Your interest towards learning physics.					
2	Your capacity to use mathematical skills to participate in learning physics in student centered approach.					
3	Your capacity to use language skills in expressing their ideas in student centered approach of learning.					
4	Your interest in learning physics in cooperation.					
5	Your effort in doing homework ,assignments					
6	Your participation in learning physics in student centered method of teaching.					
7	Your engagement to reflect what you are learning					
8	Students interest in learning by doing					
9	Students trying to experiment what they learned.					

Part. IV. Students attitudes toward the implementation of student centered approach in physics teaching. Key 5= strongly agree 4= agree 3=undecided 2= Disagree 1= strongly disagree

No	Questionnaires	5	4	3	2	1
1	Teachers lecture alone is enough to prepare students performance in physics teaching.					
2	Student centered approach of teaching poses workload on teachers and students					
3	Students centered method of teaching engages students in the hard work of learning					
4	Student learns more when there more interaction b/n student-student and student-teachers cooperation					
5	Student centered approach gives opportunities for learners to participate actively in their lessons					
6	Student centered approaches makes students responsible for their own learning.					

Appendix 3

III. Class room observation checklist

1. Class room facilities

No	Items or lists of observations	yes	No
1	Desks and chairs are movable		
2	Enough seating space to facilitate different arrangement.		
3	Enough space for movement b/n desks and chairs.		
4	Standardized chalk board, whiteboard, note board in the class room.		
5	The class size composed greater than 40 students.		
6	Table for different activities in the laboratory		
7	Electricity power and water supply in the laboratory.		

2. **Organization of the class room instruction**.

Key: 3=applied very well 2= applied to some extent 1= not applied at all

No	Items	5	4	3	2	1
1	Students working together cooperatively in groups					
2	Teaching directed at class divided into groups					
3	Teaching directed at whole class					
4	Teacher varies grouping whole, small and individual					
5	Students working individually at their own pace.					
6	Teachers encourage students to communicate effectively.					
7	Teacher clarifies the learning objectives.					
8	Teacher helps the students by rounding the group.					

2. Observation checklist about students activities in a class

No	Students activities	yes	No
1	Students are participating in problem solving activities		
2	Students are playing roles while learning.		
3	Students are taking part in peer teaching		
4	Students are practicing demonstration.		
5	Every student's involvement in each activities and practices.		
6	Active participation students in the class.		
7	Student-Student and Student- Teacher interaction.		