

The Impact of Problem Based Learning (PBL) Method
on Grade 10 Physical Education Achievement at Pawi
Secondary School

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This is certify that the thesis prepared by Amanu Demelash, entitled; “**The Impact of Problem Based Learning (PBL) Method on Grade 10 Physical Education Achievement at Pawi Secondary School**” and submitted in partial fulfillment for the requirements for the degree of Master of Education (Teaching Physical Education) complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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Declarations

Student's declaration

I hereby declare that the work which is being presented in this thesis has not been presented for a degree of any other university and that all sources of material used for the thesis work have been duly acknowledged.

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Supervisor's declaration

I confirm that the work reported in this thesis was carried out by the candidate under my supervision as university supervisor.

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Addis Ababa University, 2008

ABSTRACT

The main issue considered is problem based learning in sports activities, physical education as an academic discipline, and finally the factor that affects student's physical education achievement. The paper focuses on the use of PBL as a tool in the student-centered physical education learning. This thesis was based on the research study of the impact of PBL at Pawi grade 10 students in Physical Education Teaching-Learning Process in Benishangul Gumuz Region. The main purpose of the study is to analyze Students knowledge and performance improvement in physical education and it's enhancement in the academic achievements and skills improvement of students in physical education classes. The subjects of the study are 50 students which are 30 male and 20 female students. To this effect, respondent sampling is carried out by using Simple random sampling and taking as experiment control groups. The real and queried information is gathered through questionnaires, interviews and classroom and field practice observation. The percentage is used to make analysis of the data obtained from the respondents under the study. The analysis result of the study shows PBL positively influence students' knowledge and performance in learning physical education. From this study it is possible to conclude that teachers should include PBL-style /system in the class room. Hence, it is recommended that depending on the results of findings, concerned bodies such as teachers, participants and woreda educational bureau responsible to give the concept of PBL learning strategies, such as working in groups, students teaching each other, and working together outside of class, were useful teaching practices, particularly at the high school level.

Keywords: , Cognitive Learning, Problem-Based LearningSurface Learning, Traditional teaching, Work Capacity,

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Acronyms

AAIT -	Addis Ababa University Institute of Technology
ELC-	Energetic Learning Campus
“FUZZY” -	(ill-structured)
K2V2 –	Ketene 2 Village 2
K2V7 –	Ketene 2 Village 7
K2V14 –	Ketene 2 Village 14
K2V23/45 –	Ketene 2 Village 45
K1V49 –	Ketene 1 Village 49
PBL –	Problem Based Learning
SDL -	Self-Directed Learning
SPSS -	(Statistical Package for Social Science)

Chapter one

1.1 Background of the Study

Most physical education courses involve kinesthetic and visual learning. Since these classes were different from other courses it was my intent to apply cognitive thinking to examine the domains (body composition, cardiorespiratory endurance, and muscular strength and endurance aspects) from real situations whether they be incomplete, wrong, or confusing. In correspondence with enhancing cognitive thinking should be the increase in motivation for learning about physical education. Lastly, I required many small group activities using PBL to see if the students gained confidence in working with others and confidence in their team/group members. With new equipment and publicity of workout programs it is essential that each student is able to make educated decisions based on their ability to think critically. If a student is accustomed to cognitive thinking when they assess new equipment and/or programs the feedback they conclude on will allow them to preview the benefits or hindrances prior to instilling them into their program avoiding an increased chance of risk for themselves or those individuals they teaches.

The student's attitudes and behaviors changed over the subject and showed an increase in the desire to learn and understand the course. The discussion increased across the board as all students made contributions or statements in the subject. The students often mentioned the fact that they enjoyed learning about practical situations and how they felt they were actually learning what they could apply to their life and training. The small group project was used to evaluate how each student was able to contribute to their team as well as give them another tool for learning.

I have seen that physical education can best be applied when we were able to breakdown a program from final results into understanding each element. As a facilitator the researcher no longer wish to allow students to set their goals on "surface learning", instead the researcher wish to allow each student to find their place within the physical education field and hold themselves accountable for what they learn and submit. After teaching the course the researcher felt that using traditional lectures was not meeting the standard and therefore there was a need to change up the way the information was presented.

1.2 Statement of the Problem

I have been in teaching for the past 12 years. During this time ,as a teacher in high school, I tried to observe when students faced problems during the teaching learning processes and they failed to solve the problem and come up with a solution .even they did not tried solve it. While the teaching learning process is underway, learner do not take a responsibility of their learning. The opportunities to make discussions about various discussions of the learning and to perform self-regulation are rare however, every human beings have experience in life nevertheless, students failed to bring their real world experience's in to the class room to solve the already faced challenges.

Problem based learning is expensive in time and effort. (Honebein, P., Duffy, T.M; & Fishman, B. 1993). Teachers want learners to develop a set of skills that enable them to find information, use information to solve problems, and be capable of communication and teamwork. It uses stimulus material to trigger discussion. Problem based learning presents the problem as a real-life situation, though teachers and learners fail to put into practice in the actual teaching and learning process. It was expected to guide students' critical thinking but it failed. Problem based learning requires that students work in a group. (Duch, 1995; Gallagher, 1997; Kaplan and Keitima, 2002; Lanmbias, 2002; sendcak, 2005) Here also it was not seen when students work in-group most of the time, and it encourages students to identify their own learning needs and it encourages evaluation of the learning process. However, these all will be effective if put into practice properly.

Students are familiar with traditional methods and may feel threatened if the system is changed, even there is no fixed curriculum, no textbook and there is no any hard worker, which facilitates the implementation of these approach. The teacher has the authority and ownership of knowledge and/or personal power. Prefers students to be passive and the facilitator does not necessarily know the answer or loss of control, and students will not achieve the standard of knowledge.

At last, should we use traditional methods of assessment for a non-traditional way of teaching? Students have to make decisions about how to solve the problem and what information is needed. Students have to find information, digest it and present to the group. But these all fail to practice in the classroom.

These are the reasons that the current researcher was triggered to conduct the research project on the title mentioned above.

1.3 Research Questions

There are four main questions that were the focus of this study and determined the literature search strategies for background information these are:

1. How the causes of PBL methods on grade 10 physical education classes affect student's achievement level?
2. What are the consequences of PBL methods on grade 10 students' achievement level?
3. How the PBL methods are effective on grade 10 students of physical education?
4. What is the perception of the students towards PBL methods?

1.4. Objectives of the study

1.4.1. General objective

The general objective of the research was to investigate the impact of PBL method on grade 10 physical education achievement. Subjective experience of students for physical education.

1.4.1. Specific objectives

To this end, the specific objectives of the study are to:

-  Examine the causes of problem based learning method.
-  Examine consequences of problem based learning method.
-  Investigate the effectiveness of PBL on grade 10 physical education.
-  Explore the perception of students towards PBL method.

Possible Research Outcomes are:

1. Conveners of the participating courses should be able to assess the effectiveness of using PBL approach in their courses.
2. Positive results from this research was encourage other courses to adopt a PBL approach when appropriate.

With the coordinated effort from the study was provide valuable information for future modification and improvement of our teaching methods. Diversified trial courses, the findings of the student learning outcomes include:

1. Students should develop independent and critical reasoning thinking abilities;
2. Students should acquire self-directed learning skills;
3. Students should experience different learning and teaching approaches;
4. Students should be more interested and capable in self-directed learning;
5. Students should be more interested in learning.

1.5. Significance of the study

The findings of this study should be significance in identifying the impact of problem based learning method on grade 10 physical education achievement at Pawi secondary school. As a result should make the current status of grade 10 students at Pawi secondary school improve the study and enable them to be so intelligent. As students take on the role, the problem becomes their own. This personal connection between the student and the problem at hand drives the learner to discover whatever it is they feel they need in order to arrive at a viable solution or conclusion to the problem. As students become more accustomed to the PBL learning environment they start to mature intellectually, Identifies self-confidence, desire to achieve, analytical skills and teamwork abilities, as intellectual skills students learn that might not be prevalent in a traditional classroom format. There was significant of the study because PBL is self-directed and is based on real-life situations, students gain self confidence in being able to resolve problems that they might face in everyday activities. Being able to successfully solve problems in the class room can correlate to self confidence in solving problems outside the classroom as well. This study correlate on PBL help to show students that there was a direct correlation between school and real-world problems, thus the desire to achieve is heightened by this knowledge that "I can use this in the real-world. "The study allows students develop deeper analytical skills. Analytical skills such as critical thinking, problem defining and problem solving was at the heart of PBL. Students use these skills by looking at possible solutions to a problem. Students start to develop skills such as research techniques, data analysis and working as a team member as they move through these analytical skills. All of these skills assist students in becoming lifelong learners. This study builds working in

team; students learn to be responsible to other learners. Learn to set both long and short term goals as they relate to the problem. Students learn to communicate effectively with other members of a team and learn the importance of effective communication. These skills are what the business world has been telling the educational community that students lack when entering the workplace.

The study have importance on PBL facilitates in giving students tools to become lifelong learners, tools that cannot be taught out of a text book, but only by being an integral part of the learning process. This Apply content knowledge to a practical real world problem; learn and practice both individual and group communication skills; evaluate the learning and discovery process they used to achieve their goals and solve the problem. The features of the learning environment in a PBL curricular stand out as typical in normative texts about PBL and were regarded as essential for enhancing student learning. The students thinking, belief, perception and self-knowledge have been challenged and they collaborate with other students and this was stimulate cognitive process development.

1.6. Delimitations of the Study /Scope of the study

This research was expected to study the problem of grade 10 students participation in problem based learning method in all high schools in Pawi Woreda, however, it is delimited to grade 10 students at Pawi secondary school in Pawi Woreda Metekle Zone Benishangul Gumuz regional state.

Table 1. Secondary schools in Pawi Woreda are:

No	Schools
1	Pawi secondary school
2	K2V7 secondary school
3	K2V2 secondary school
4	K2V14 secondary school
5	K2V23/45 secondary school
6	K1V49 secondary school

1.7.Limitations of the study

The major limitation of the thesis was that the results cannot be generalized to the wider population and the findings cannot be subjected to statistical analysis. That is because of the core of the used research method. The document analyses itself can only explore topics in more detail and depth but cannot offer high reliability or uncover patterns or correlations. Thus, although the research offers some quantitative data, such as number of teachers experiencing the same problems, these findings can be used more as a base for possible future quantitative research.

The next thing was that the gained data, which were closely examined and sorted out into main eight themes, were assessed mainly through the view that was taken by the particular teacher and thereby their origins may be the case of bias and personal subjectivity. Hence, some data could have been allocated to different subthemes since each teacher could have perceived and assessed the same troublesome situation solely from his or her point of view and thus the same situation could have been presented with diverse perspective, which means that the same evident problems may be attributed to different subcategories, depending on the experience or personality of the teachers. Next, there were two ways data could have been presented in the graphs. The first way was to present the number of occurrence of each case in connection with its subtheme. Or the other way could display each subtheme in relation to the

number of teachers experiencing the issues. The latter was not chosen because of the orientation the qualitative research entails and that is rather to provide insights rather than generalize results or test hypothesis during the research.

Finally, it was stated that it is documentation that belongs among basic PBL features. This thesis offers some PBL templates in the appendixes, yet, not all of them that are recommended on the theory part. The reason was that nowadays all necessary documents for PBL could be easily downloaded from the Internet and mainly project management itself provides abundance of documentation that can be then adjusted to a particular teaching situation.

1.8. Operational Definitions of Key Terms

Physical education: is defined as “a planned sequential standards-based program of curricula and instruction designed to develop motor skills, knowledge, and behaviors of healthy active living, physical fitness, sportsmanship, self-efficiency, and emotional intelligence.”

Problem-based learning (PBL): It is a teaching method in which student’s gains knowledge and skills by working for an extended period of time to investigate and respond to an engaging and complex question, problem, or challenge.

1.9. Organization of the Study

This thesis consists of five chapters. Chapter one shows the contextual background of the problem based learning method; this chapter also highlights the significance and scope of the study. Chapter two reviews the literature in the key areas of the study and provides a conceptual frame work for the study and refinement of PBL for high school physical education learning. In addition, this chapter examines the conceptual development and empirical studies of PBL in different sectors. Subsequently, the review of the related studies entails the need for the present study and clarifies its orientation.

Chapter three describes design of the study methodology, data collection methods and data analysis strategies for the study, in detail this chapter describes the sampling method, participants of the study and data collection instruments, as questioner, interview, observation and data sources. Chapter four presents the results by

discussing the data of the research participants and the research sites, as well as the data interpretation, this chapter also presents the ethical concerns related to the study and addresses a series of ways to increase trust worthiness.

Chapter five discusses and reflects on the findings and results that emerged by comparing theories and the related literature and concludes the study by presenting implications and contributions to the related areas and directions for further research.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1. Introduction

The search for literature on the various forms of problem-based learning with emphasis on PBL focused on books and articles that contained information on what the specific curriculum components should look like along with details of implementation. The search began with article databases focusing on education and professional development in the area of problem-based learning. This resulted in a broad range of papers that included educational programs in medicine, sport science, math, business, and psychology. These articles were sorted through the filter of high school, college and university level implementation of PBL. A further search of the literature-cited sections of these collected papers also produced books and papers not appearing in the original database search. These sources were also sorted with the same filter. After reading through all of these data sources a final filter was used to extract articles and books with information focused on specific definitions and classification of PBL implementation components and details of implementation with emphasis on physical education. The definitions extracted from the final collection of data sources were included in the definition section of the introduction of this paper.

2.2. Problem-Based Learning

Problem-based learning is another teaching and learning strategy that challenges students to seek solutions to real-world problems. The problems are designed to arouse student curiosity, attempt to engage students in authentic and interesting types of activities, and prepare them to think critically and analytically. An interesting historical note about problem-based learning is that it was first used in medical schools in the 1970s. Medical students were finding that their educational experiences had little connection to the real-life activities of practicing doctors; consequently, they began using problem-based learning environments to examine, diagnose and solve real-world patient problems. This use laid the groundwork for applying problem-based teaching and learning strategy in other educational arenas.

Problem-based learning is generally composed of two parts: a question or a problem, which is either student or teacher generated, and the students' arrival at a solution.

Students need to feel competent and have the skills to solve the problem, but it is essential that students do not possess sufficient prior knowledge to address the entire problem. As students work in cooperative learning groups they examine the problem, research, discuss, analyze, and produce tentative recommendations, explanations, or solutions.

A key element to problem-based learning is that it focuses on students solving problems perceived as meaningful or relevant to their lives. At the center of problem-based learning are “fuzzy” (ill structured) questions that lack an easy solution, but mirror real-life problems. The questions must not be limited in scope and must be conducive to many interpretations and solutions.

PBL formally originated at McMaster University School of Medicine in Ontario, Canada in the late 1960s (Magnussen, et.al, 2000). Problem-based instruction directly addresses many of the recommended and desirable outcomes of an undergraduate education: specifically, the ability to do the following (Duch, 2001, Savin-Baden, 2000, Evensen, 2000):

- Find, evaluate, and use appropriate learning resources ,
- Work cooperatively in teams and small groups.
- Demonstrate versatile and effective communication skills, both verbal and written,
- Use content knowledge and intellectual skills acquired at the college to become continual learners,
- Think critically and be able to analyze and solve complex, real-world problems.

Barrows proposed taxonomy of many ways of PBL has been put into action at college and professional/ high school levels. This taxonomy includes the following: (quoted from Barrows, 1986).

1. Lecture-based cases - where students are presented with information through lectures and then case material is used to demonstrate the information.
2. Case-based lectures - where students are presented with case histories or vignettes before a lecture that then covers relevant material.
3. Case method - where students are given a complete case study that must be researched and prepared for discussion in the next class.

4. Modified case-based - where students are presented with some information and are asked to decide on the forms of action and decisions they may make. Following their conclusions, they are provided with more information about the case.
5. Problem-based - where students meet with a client in some form of simulated format that allows for free inquiry to take place.
6. Closed-loop problem-based - which is an extension of the problem-based method, where students are asked to consider the resources they used in the process of problem-solving in order to evaluate how they may have reasoned through the problem more effectively.

Unfortunately classifications such as these don't encompass the actual complexities of problem-based learning. These complexities include how to incorporate discipline content, what level of PBL to use, when to use it, how to assess the results, and many other implementation issues. However, consensus was established that three broad areas of differentiation must be present for the distinction of "problem-based learning" to be valid (Arambula-Greenfield, 1996, Duch, 2001; Evensen, 2000; Savin-Baden, 2000; Wilkerson, 1996 ;)

These areas are:

- 1) Curricula organization around problems rather than disciplines, an integrated curriculum and an emphasis on cognitive skills.
- 2) Conditions such as small groups, tutorial instruction, and active learning.
- 3) Outcomes such as the development of skills and motivation, together with the development of the ability to be lifelong learners.

The problem based learning being increasingly used in several areas recently was firstly implemented in medical science in the 1950s, specifically in the medical school of case w. University in the USA. It was begun to be implemented in the medical school of the MSc master of university in Canada at the end of the 1960s. (Rhem, 1998;Herreld, 2003). Today, the problem based learning model is used in the classes with many departments of many universities such the Harvard university, New Mexico University and Addis Ababa University. This teaching model is put in to practice in medical faculties of the Hacetepe University in Turkey. In addition to medical faculties the problem based learning model is used in pre-clinic classes with

in medical faculties of many universities such as the Harvard University, Mexico University and MSc master university. In addition to medical faculties the problem based learning model is also implemented in other educational instructions accomplished of fields like natural sciences ,engineering and law in many universities of the world including Ethiopia.

When this literature is examined it is seen that the studies focused on the use of PBL achieved in 1980s. (Duch, 1995; Gallagher, 1997 Kaplan and Kortma, 2002; lambras, 2002 Senocak, 2005). The problem based learning is a learning model which centers on students develops active learning problem solving (Barrows and Tamblyn, 1980s; Maya et al, 2000). Malinowski and John son, 2001. In the classrooms when problem based learning model is used. Learners take much more responsibility for their own learning progressively. They have more independent from their teachers gradually, and have become independent learners who can continue to learn in their whole lifetime.

In 2008, Parramatta Marist High School, a secondary Catholic school in Australia, employed the methods of PBL in their teaching for grade 9 and 10 students. The learning system was a great success and since has been expanded to lower grades to challenge students to think outside of the box and relate content drive courses to problems in the real world.

North Lawndale College, Prep High school, on Chicago's west take I-projects, As they progress freshman through senior year, these vertically aligned projects involve increasingly rigorous common core state standards in research ,close reading, quantitative reasoning, argumentation writing and presentation skills. Each Junior and senior project derives itself from the students own deriving.

Sir John Deane's college, a sixth form college in England, in 2013 offered an extracurricular PBL Course in medicine positioned towards students studying A-Level Biology and Chemistry who are aspiring into medicine, dentistry, veterinary science degree or biological science at Oxford or Cambridge. The course (developed by Dr.Vimalan Jesudason) successfully served 85 students, before being offered independently in late 2014, PBL Cheshire.

In Canada, North Peace Secondary School Energetic Learning Campus (ELC) is based on this Philosophy. It takes grade 10 and 11 students and work through the core courses based on the Prescribed Learning Outcomes for the province of British Columbia. The center students are guided through English, Math's, sciences and Social studies, along with physical activity.

2.4. History of Problem Based Learning

PBL was pioneered in the medical school program at McMaster University in Hamilton, Ontario, Canada in the late 1960s by Howard Barrows and his colleagues. Traditional medical education disenchanted students, who perceived the vast amount of material presented in the first three years of medical school as having little relevance to the practice of medicine and clinically based medicine. The PBL curriculum was developed in order to stimulate the learners, assist the learners in seeing the relevance of learning to future roles, maintain a higher level of motivation towards learning, and to show the learners the importance of responsible, professional attitudes.

Problem-based learning has subsequently been adopted by other subject courses The use of PBL has expanded from its initial introduction into other education programs to include education in the areas of other sciences, math, law, economics, business, social studies, and engineering. The use of PBL, like other student-centered pedagogies, has been motivated by recognition of the failures of traditional instruction. And the emergence of deeper understandings of how people learn, unlike traditional instruction, PBL actively engages the student in constructing knowledge. PBL includes problems that can be solved in many different ways and have more than one solution.

2.5. How does Problem-Based Learning Encourage Students' Learning?

In problem-based learning, the traditional teacher and student roles change. When the students assume responsibility for their learning, they become motivated and feel a sense of accomplishment. Problem-based learning engages students in activities that are similar to those they will use in future situations (Albanese. M.A and Mitchell,s 1993). In assessing problem-based learning, students demonstrate their understanding and not mere fact acquisition.

Problem-based learning can give students the feeling of empowerment because they have an impact on the outcome of the investigation (Barrow,s H.S, & Myers, .A.C1993). The ill-structured problem scenario calls forth critical and creative thinking by suspending the guessing game of, "What's the right answer the teacher wants me to find?" The responsibility of the teacher is to provide the educational materials and technology resources in the learning environment and guide the students in their problem solving efforts.

2.6. More on Problem-Based Learning

Problem-based learning involves students in an active, collaborative, student-centered learning environment where the "fuzzy"(ill-structured) question is the organizing center. Howard.S 2006) It challenges students as they work with complex real- world problems.

Students familiar with the traditional "talk and chalk" classroom may be uncomfortable with problem-based learning for some time. Teachers need to be patient. It is up to the teacher to guide them through the process where there may not be one "right answer" to solve the problem. Those students who ask the question "What do I have to do to get an 'A'?" or "What does the teacher want?" are adept to "book learning" and may feel disjointed in problem-based learning roles. In many instances, the self-directed roles are unfamiliar: tracking down the best evidence related to the problem, critically examining the best evidence, coordinating with peers, and reporting back with the best solution to the problem. If students don't take ownership of the problem, they will spend their time trying to figure out and deliver exactly what the teacher wants, which defeats the intention of problem-based learning.

Problem-based learning is multifaceted. (Hmelo-Silver, C.E 2004) Using "real-world" problems is the stimulus for learning. It is based on the premise that students become more motivated because they "want to know" and solve the problem posed because it is presented in a context that simulates real-world situations. In addition, as students engage in solving the problem, they develop critical thinking and problem solving skills while learning content and skills essential to the curriculum.

2.7. The goals of PBL

Problem-based teaching provides students with guided experience in learning through solving complex, real-world problems. PBL was designed with several important goals (Barrows and Kelson, 1995). It is designed to help students;

- 1) Construct an extensive and flexible knowledge base;
- 2) Develop effective problem-solving skills;
- 3) develop self-directed, lifelong learning skills;
- 4) Become effective collaborators; and
- 5) Become intrinsically motivated to learn.

2.8. Characteristics of PBL

PBL has six defining characteristics;

1. The starting point is problem.
2. The problem is one that students are to face in the future work place.
3. Subject matter is organized around problems rather than the discipline.
4. Students assume a major responsibility for their own instruction and learning.
5. Most learning occurs within the context of small groups rather than lecture.
6. The solution to the focal problem has an implementation focus that goes beyond problem diagnosis and analysis.

2.8.1 The advantages of PBL

Students should develop the ability to learn and gain a sound understanding of knowledge. They should be able to make sense of the material by integrating new knowledge with prior knowledge and experiences. In order to successfully solve the problems student should develop a range of critical, cognitive and transferable skills within the context of their discipline.

2.8.2. The Disadvantages of PBL

Time and resource implications should not be underestimated. In addition, the content covered in this way is reduced compared to the amount that is covered in lecture-based courses. PBL may be a new experience for staff and students and they may require some support or training. Group work often suffers from non-participation or personality clashes and strategies have to be put in place to deal with groups that

don't work. Some students may not take the need for independent study seriously and some time may be required to make to make clear the outcomes and commitment required.

2.9. Other Outcomes

One of the aims of PBL is the development of self-directed learning (SDL) skills. SDL is defined as "a process in which individuals take the initiative in diagnosing their learning needs, formulating goals, identifying human and material resources, choosing and implementing appropriate learning strategies, and evaluating learning outcomes. (Albanese, M.A and Mitchell,S 1993) By being invited into the learning process, students are also invited to take responsibility for their learning, which leads to an increase in self-directed learning skills. SDL led to motivation for students to maintain study pace, led to social and academic integration, encouraged development of cognitive skills, and fostered more study progress than students in a conventional learning setting. PBL encourages learners to take a place in the academic world through inquiring and discovery that is central to problem-based learning.

PBL is also argued as a learning method that can promote the development of critical thinking skills. (Uden, Lorna, and Beaumont, Chris 2006) In PBL learning, students learn how to analyze a problem, identify relevant facts and generate hypotheses; identify necessary information/knowledge for solving the problem and make reasonable judgments about solving the problem. Students have appreciated the positive attributes of communication, teamwork; respect and collaboration that PBL experienced students have developed. These skills provide for better future skills preparation in the ever-changing information explosion.

2.10. PBL Approach

The main stress of this approach is to have an inter-disciplinary integrated development of deliverables, in order to improve the overall competency and skills of the students. PBL mentoring is a structured activity that involves situated learning and constructivist learning strategies to foster the culture of practice that would extend beyond the schools to real life. (Honebein, P., Duffy, T.M.,& Fishman, B. 1993) PBL is all about encouraging teaching and learning teamwork in the information age, by

facilitating team interaction with necessary guidance and support for the learning activity.

Key advantages of this method are that it familiarizes students with real world problems and improves their confidence in solving these. It also improves their networking skills, thereby establishing rapport with key persons of the subject. They also learn the value of teamwork. The method also creates in them an appreciation of interdisciplinary approach.

The PBL learning process normally involves the following steps:

- Students in groups of five to eight encounter and reason through the problem. They attempt to define and bound the problem and set learning goals by identifying what they know already, what hypotheses or conjectures they can think of, what they need to learn to better understand the dimensions of the problem, and what learning activities are required and who will perform them.
- During self-directed study, individual students complete their learning assignments. They collect and study resources and prepare reports to the group.
- Students share their learning with the group and revisit the problem, generating additional hypotheses and rejecting others based on their learning.
- At the end of the leaning period (usually one week), students summarize and integrate their learning.

2.11. Outcomes of a PBL approach

It is claimed that a PBL approach produces more motivated students, develops a deeper understanding of the subject, encourages independent and collaborative learning, develops higher order cognitive skills and develops a range of skills which include problem solving, group working, critical analysis and communication. (Ge, Xun, Planas, Lourdes G., and ER, Nelson 2010).

2.12. Demands of Implementing

Implementing PBL in high schools is a demanding process that requires resources, a lot of planning and organization. (Albanese. M.A and Mitchell,S 1993) The following simplified model describes the steps for implementing problem-based learning Steps two through four may be conducted concurrently as new information

becomes available and redefines the problem. Step five may occur more than once especially when teachers place emphasis on going beyond the first draft.

1. **Present the problem:** As the teacher, you introduce an "ill-structured" problem (or scenario) to the students. The problem serves as a focal point for knowledge acquisition and drives the instruction. Allow ample time for this process. You may need to provide background, clarify terminology, and answer basic questions relating to understanding the problem.
2. The students should have very limited background to solve the problem. This means that the students hold enough prior knowledge to understand the problem. After the problem (or scenario) is introduced, students ask some basic questions: What do I already know about this problem? What do I need to know to effectively address this problem? What resources can I access to determine a proposed solution?
3. **List what is known.** In answering the basic questions above, students begin by listing what they know about the problem. Some teachers like to facilitate this process by utilizing "What do we know" and "What do we need to know" boards. Using this technique, the problem becomes more defined as the students list what is known under the heading: "What do we know?" This is necessary before a problem statement or research question can be written.
4. **List what is needed.** Now that the problem is developed, students need to find information to fill in missing gaps. A second list is prepared under the heading: "What do we need to know?" The questions developed in this list are essential to direct their focus. With these questions guiding the way, the data collection (by individuals or cooperative learning teams) begins and group analysis of these data is now incorporated into the process. After several cycles of data collection and analysis, possible solutions to the problem are formulated. The potential solutions are examined in the light of all the evidence collected and the most practical solution is then selected. When utilizing the information, students must carefully appraise the worth of the data or resources. How current is it? How credible and accurate is it? Is there any reason to suspect bias in the source?
5. **List possible actions, recommendations, solutions, or hypotheses.** Under the heading: "What should we do?" students list actions to be taken (e.g. questioning an

expert), and formulate and test tentative hypotheses. The students must construct a solution to the problem.

6. To aid the students in organization, they can use a Problem Log where they keep a to-do list, time-line, observations, questions, list of resources, etc. The Problem Log reflects students' lines of inquiry, new questions that arise during the process and their thoughts on the problem. This tool also assists teachers in tracking student progress toward solving the problem. Students, with their teacher as a coach, continuously engage in a dialogue about what they discover and what they know/need to know.
7. **Present and support the solution.** As part of closure, teachers generally require students to communicate their findings and recommendations. The product should include the problem statement, questions, data gathered, analysis of data, and support for solutions or recommendations based on the data analysis. The experience becomes most valuable when it culminates with the public sharing of the solution and with evaluation.

2.13. Assessment in PBL method

As this is a very different type of learning activity it may not be appropriate to assess students in a traditional way. The assessment should be matched to the desired learning outcomes. Assessment may focus on the solution to the problem, or the problem solving process or the skills development aspect. Tutors must decide whether they wish to give each member of a group the same mark or whether they wish to build in an individual element. Students may be involved in assessing each other's contribution to the activity or may be involved in self-assessment and reflection. Useful assessment tools include logbooks and diaries, written reports, oral presentations and reflective evaluation.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Research Design

Quasi experiment is an empirical study used to estimate the causal impact of an intervention on its target population. Quasi-experimental research shares similarities with the traditional experimental design or randomized controlled trial, but they specifically lack the element of random assignment to treat or control. Instead, quasi-experimental designs typically allow the researcher to control the assignment to the treatment condition, but using some criterion other than random assignment. The research study used was quasi-experimental design.

Quasi-experimental research designs, like experimental designs tests causal hypotheses. To make it clear, quasi-experimental methods that involve the creation of a comparison group are most often used when it is not possible to randomize individuals or groups to treatment and control groups. This is always the case for ex-post impact evaluation designs. It may also be necessary to use quasi-experimental designs for ex-ante impact evaluations, for example, where ethical, political or logistical constraints, like the need for a phased geographical roll-out, rule out randomization.

3.2. Research Methodology

In conducting a research on the impact of PBL methods on grade 10 physical education achievements in Pawi secondary school, I formed two groups which were control and experimental groups, for 40 minutes per week for 4 months, focusing mostly on the experimental groups expecting changes on their attitude on physical education and their improvement on self-problem solving ability, beside this groups were compared with the control groups based on their results showed on the study. The researcher under take a situational analysis which shows current performance of students in the study and interview notes. The researcher has followed the general methodology, (a method which was applied before the research) to get an accurate image of the study and research results.

3.3 Subject/ Participants of the study

The study was conducted on two classrooms, one for control group and the other for experimental group. This group includes both female and male students. The particular groups include 20 females and 30 males of age ranges from 16 to 20.

3.4. Methods of Data Collection instruments

To obtain adequate information for the study, three types of data collection tools were used. These were; questionnaires, observation and interview.

3.4.1. Questionnaires

This consists of two types of structured questionnaire prepared from different sources based on the significance of the study. The first questionnaire was for teachers which request their background, qualification, the teaching method used for better teacher-students interaction, physical education learning facilities, and classroom management to implement effective teaching so as to enhance teacher-students interaction. The second questionnaire was for the target group of students, which were female and male students of grade 10 in Pawi secondary school. Requesting response on their background, the teaching method that improve teacher-students interaction, class room discipline and school facilities.

3.4.2. Observation

To gather more reliable information, actual class room teaching and learning process were used as data gathering instrument. Observation checklist developed by the researcher was employed to collect the data focusing mainly on method of teaching, classroom management, and student ability and classroom facilities. In order to get the clear picture about the impact of problem based learning method on grade 10 physical education achievements, the teaching and learning sessions should be observed. The observation should be made on all the focused groups of the study.

3.4.3. Interview

Based on the problems in teacher-students interaction, the researcher conducted structured interview with school principals. The main purpose of the interview was to understand their knowledge about Teacher-students interaction concerning on PBL classroom management availability of instructional materials or facilities and disciplinary problems by initiating the interviewer and to get additional information about the data which is impossible with questionnaires alone.

3.5. Source of Data:

The researcher study used both primary and secondary sources. Primary sources, such as respondents from questionnaires interviews and observation, secondary sources, like school documents, such as teachers attendance, students attendance, students assessment for (mark list), students roster etc. internets, education bureau such as directors bureau vies principals bureau etc.

3.6. Data Collection Techniques

The researcher used administrate standard questionnaire to the entire sample of students on the 15th of January 2016 at Pawi secondary school and conducted personal interviews with sub sample of students using a semi interview schedule are attached an appendix the researcher made an appointments with these respondents and conduct the interviews in Pawi at their school.

3.7. Sampling techniques

This study was use simple lottery method or simple random sampling to select control group and experimental group but sections were selected purposively. In each group sampling there should be both male and female students, which were selected for the study as experimental and control groups.

3.8. Methods of Data Analysis

Based on the nature of the data the researcher collected both quantitative and qualitative procedures were employed. Accordingly, percentage and frequency counts were used to analyze the items in the questionnaire. Information gathered from observation, interview and open-ended questions were presented and described

qualitatively. This method of document analysis was based on the collection of data through careful reading of the practical parts of the thesis with the simultaneous data analysis. First, data were collected which were found to be in concord with the intended research question described above. This data was to be gathered with the indication of the origin of the thesis. Thereafter, when all the relevant data was to be collected, the work of data sorting and classification begins so that data was to be labeled with a “code” by a short phrase that suggest connection to my research main objective. When the coding was complete the researcher categorized the codes into a system that would provide the overall scheme with its primer categories and subcategories which summarize the prevalence of codes, describe their main features and consequences.

The researcher also worked to ascertain whether the intended goals of PBL methods on physical education as a student centered learning method were achieved. This equation was again answered through comparison of the PBL course results with those from the core courses. For this thesis analysis, however, the researcher would look at the results on specific scale items that addressed teaching and learning characteristics consistent with the goals of PBL. These items included the following;

- Rate the ability of the instructor to make the course content practical.
- Rate the teacher’s ability to actively involve students in learning.
- Rate how well test and assignments assessed your understanding of topics.
- Rate the teacher’s effectiveness in encouraging students to learn from each other.

All of these items used the same responses set: (1) strongly disagree; (2) disagree; (3) neutral; (4) agree; (5) strongly agree. If the teachers in the PBL courses section were using PBL as intended, the researcher would expect better results on these items than in the more traditionally taught core courses sections. The results on the other related items were generally in the same direction as the results presented in the first analysis. Students do perceive the PBL modules as using more active learning methods and as oriented towards the development of more practical application of knowledge.

The instruments of data collection were confined to each other in the way that the questioner was the first phase to identify the student’s attitude both the control and experimental group prior to the application of PBL method to the control group. The questionnaire a pre-test comparison of the control group and the experimental group,

after the problem based learning method applies to the experimental group now the post test was entered to distinguish and compare the difference improvement at their knowledge, skill and other perspectives of the students. Depending on the pretest questioner there was a need to compare both groups.

Data collection instruments were all in supporters to the analysis adding different quality of data as observation, interview and questionnaire. The observation is done in and outside class room learning process to collection of data on the improvement of students skill and self-problem solving ability this technique proceeds from the interview and questioner using the first perception of the students response to add a practical test and field practices to improve students attitude towards physical education.

Furthermore the methods of data collection instruments were a guide to the collection of the student's response and analysis of the collected data. After this the interpretation of the data based on the data collection instruments.

CHAPTER FOUR

PRESENTATION, ANALYSIS AND INTERPRATION OF DATA

4.1 Introduction

This chapter provides with the analysis of the data collected through questionnaire and practical class observations. Results of the observations are analyzed and explained in word with the support of bar chart while the responses of the closed ended questions are analyzed in percentage. In this study students and classroom observation were used as source of data. There different tools were used to gather the data. The questionnaire including only fixed extent or close ended questions and practical classroom observation. From a total of questionnaires distributed to students, 50(100%) were properly filled and returned. In this study there were two groups such as control group and experiment group. The analysis of the data was based on the responses obtained from these groups of respondents and from classroom observation.

4.2 Personal Information of Respondents

Table 2. Categorizes of respondents based on sex and age

No	Items	Students(Respondents)		
1	Sex		No	%
		M	30	60
		F	20	40
2	Age	16-20	50	100
		>20	0	0

In this research female respondents are 20 and male respondents are 30. As indicated in the above table,4.1 a total of 50 students were involved in the study. Concerning the age of students all of the respondents are between the ages of 16-20 years. With the regard to educational level of student or respondents all of them (100 %) are grade 10 students in Benishangul Gumuz region at Metekel zone Pawi wereda.

4.3 Analysis and Interpretation of the Data

The respondents of the study were asked different questions relevant to the impact of problem based learning on students in physical education class. Their responses were organized in tables furthermore; the frequency counts, percentage, mean standard deviation and T-test values were computed for the purpose of analyzing and interpreting of the data as follow. Below is objective number 4 which answers the perceptions of students' towards PBL methods.

Table 3. Students' response about their attitude towards problem-based learning

No	Item	Controlled group		Experimented group	
		N	%	N	%
1	This learning style is new to me.				
	➤ Strongly disagree	0	0	0	0
	➤ Disagree	3	12	1	4
	➤ Neutral	4	16	6	24
	➤ Agree	9	36	7	28
	➤ Strongly agree	9	36	11	44
	Total	25	100	25	100
2	This learning style is preferable than traditional lecturing style				
	➤ Strongly disagree	0	0	0	0
	➤ Disagree	2	8	1	4
	➤ Neutral	4	16	6	24
	➤ Agree	7	28	7	28
	➤ Strongly agree	12	48	11	44
	Total	25	100	25	100
3	This learning style prompts me for higher motivation for self-learning				
	➤ Strongly disagree	0	0	0	0
	➤ Disagree	5	20	0	0
	➤ Neutral	4	16	3	12
	➤ Agree	7	28	7	28
	➤ Strongly agree	9	36	15	60
	Total	25	100	25	100

4	This learning style is time saving				
	➤ Strongly disagree	0	0	3	12
	➤ Disagree	5	20	3	12
	➤ Neutral	4	16	5	20
	➤ Agree	7	28	4	20
	➤ Strongly agree	9	36	10	40
	Total	25	100	25	100
5	This learning style makes me learn more about physical education than the traditional learning style				
	➤ Strongly disagree	0	0	0	0
	➤ Disagree	2	8	1	4
	➤ Neutral	4	16	0	0
	➤ Agree	7	28	12	48
	➤ Strongly agree	12	48	12	48
	Total	25	100	25	100
6	This learning style helps me to communicate better with in group.				
	➤ Strongly disagree	0	0	0	0
	➤ Disagree	0	0	1	4
	➤ Neutral	4	16	5	20
	➤ Agree	7	28	6	24
	➤ Strongly agree	14	48	13	52
	Total	25	100	100	100
7	The PBL learning style increased my knowledge of my physical fitness strength and weaknesses.				
	➤ Strongly disagree	0	0	0	0
	➤ Disagree	0	0	2	8
	➤ Neutral	7	28	0	0
	➤ Agree	9	36	12	48
	➤ Strongly agree	9	36	11	44
	Total	25	100	25	100

As can be generalized from the above table concerning students' attitude towards problem-based learning, the following analysis can be drawn.

The above table item 1 indicated that 36% (9 students) of respondents in the control group said strongly agree whereas in the experiment group 44%(11 students) of respondents strongly agreed on the issue 'this learning method is new to me' and 36% (9 students) of respondents in the control group, 7(28%) of students in the experiment group agreed on the issue of item one .However, 12%(4 students) of the respondent

in the control group were disagreed on this issue .And only 16%(4 students) of respondents in the control group ,24% (6 students) of respondents in experiment group were said neutral.

Under the same table for item number 2 a great number of respondents 12(48%) of respondents in control group, 11(44%) of respondents in the experiment group were strongly agreed and 7(28%)of respondents in each group were agreed on this issue. However, 2(8%)of respondents of control group,1(4%) of respondents of experiment group were disagreed in this issue. And only 4(16%) in control group, 6(24%) in experiment group were have no idea on this issue. the above table item 3 states that 9(36%) of respondents in control group, 15(60%) respondents in experiment group were strongly agreed on the issue ‘this learning style prompts me for higher motivation for self-learning’ and 7(28%) respondents in each groups were said agree on this idea. However,5(20%) of respondents of control group said disagree, and only 4(12%) of respondents in control group, 3(12%) of respondents in experiment group said neutral.

On the same table, item number 4 indicated that the majority respondents 9(36%) of control group, 10(40%) of experiment group said strongly agree and 7(28%) of respondents in control group, 4(16%) of respondents in experiment group said agree. However, 3(12%) of respondents in experiment group were said strongly disagreed and 5(20%) of respondents in control group, 3(12%) of respondents were said disagree. And only 4(16%) in the control group,5(20%) in the experiment part said no idea or neutral.

Regarding item number 5, almost half of the respondents 12(48%) of control group, 12(48%) of experiment group said strongly agree for this item issue and 7(28%) in control group, 12(48%) in control group said agree. However, 2(4%) in control group and 1(4%) in experiment said disagree. And only 4(16%) of respondents in control group said neutral about issue ‘this learning style makes me learn more about physical education than traditional learning style’.

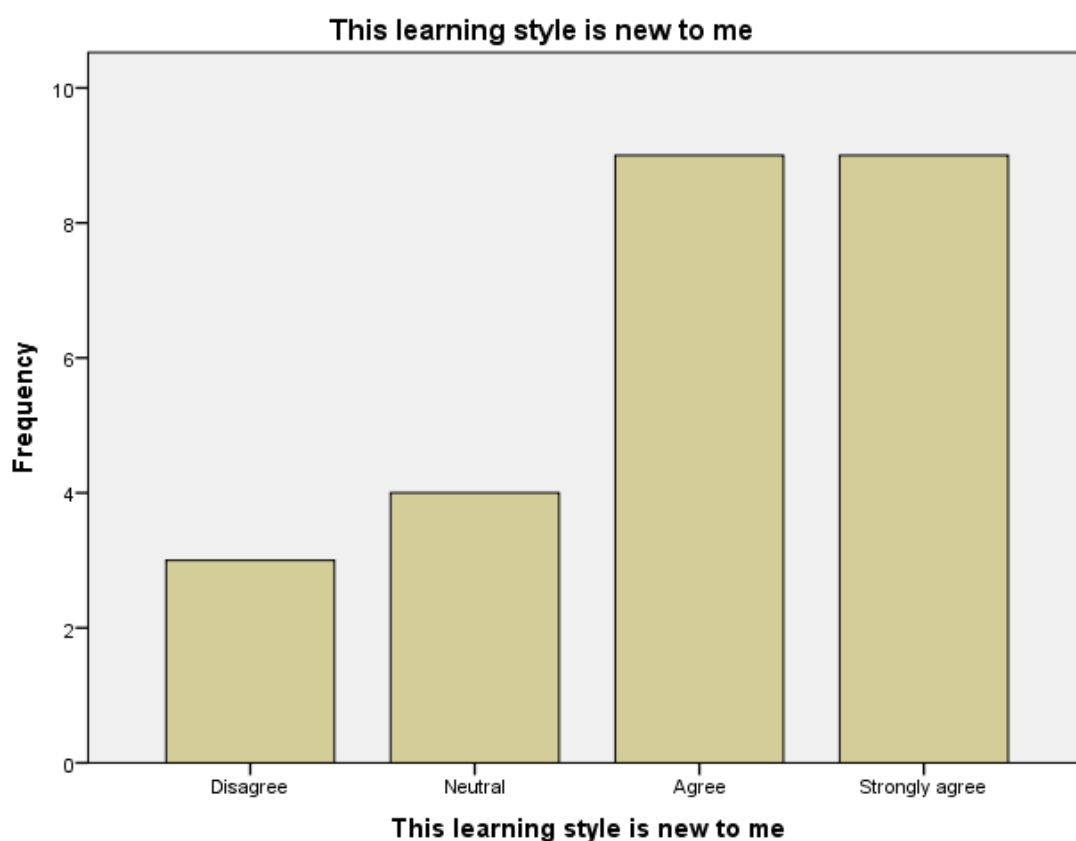
Item 6 of the above table stated that above half 14 (56%) of respondents in the control group, 13(52%) of respondents said strongly agree and 7 (28 %) of respondents in control group,6(24%) of respondent students in experiment group said agree. However, 1(4%) of respondent in experiment group were disagreed on this item issue.

And only 4(16%) of respondents in the control group and 5(20%) of respondents in the experiment group said neutral that means they were have no idea about the issue.

As can be conclude from item number 7 of the above table 9(36%) of the respondents in the control group, 11(44%) in experiment group were strongly agreed in the issue 'The PBL learning style increased my knowledge of my physical fitness strength and weakness' and 9(36%) of respondents in the control group, 12(48%) of respondents in the experiment group said agree. However, 2(8%) of respondents in the experiment group were disagreed. And only 7(28%) in the control group were said neutral.

Let us look these analyses of the above table items in some frequency chart for both control and experiment group.

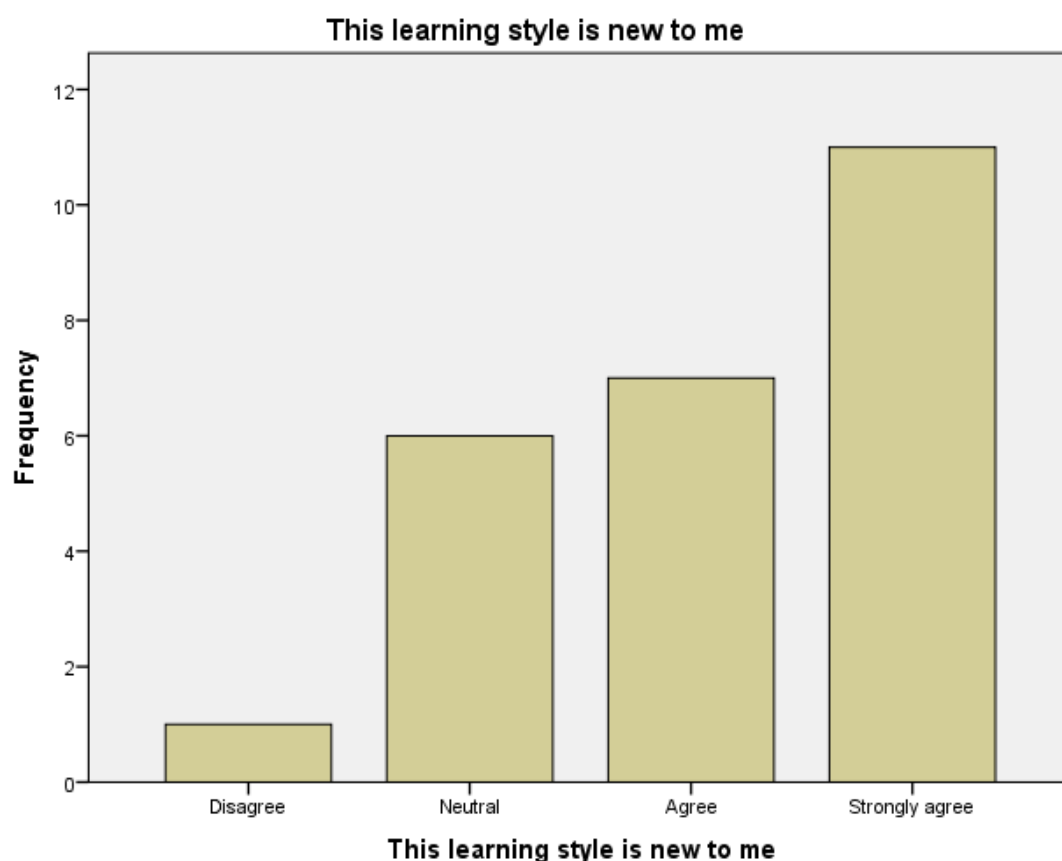
Figure 1. Control group response for item 1 issue.



The above chart showed almost the entire controlled group respondents were agreed about the issue “this learning style is new to me”.

The data from the above chart reveals that, 9(36%) of the controlled-respondents indicated their strong agreement on the issue “The PBL learning style is new to me” and also 9(36%) of them were agreed in this issue. The rest of the controlled - respondents said that 4(16%) neutral, 3(12%) of them disagreed.

Figure2 experiment group response for item 1 issue .



On the same table, item number 1 further indicated that, the great majority of experiment group-respondents, 11(44%), strongly emphasized that the PBL learning style is new to them and 7(28%) of them agreed. In contrast, 1(4%) of the students disagree on this issue. And only 6(24%) of them said neutral.

Similarly the above figure 2 indicated that almost all of the experimented group students were agreed on the issue of item 1 of table2. The researcher can conclude according to the study result both control group and experiment group were have same idea about item 1 issue

The independent sample t-test statistics can be shown below to next page.

Table 4. Group independent sample T-test statistics

No	Respondents	N	Mean	Std. Deviation	Sig(2-tailed)
1.This learning style is new to me	Control group	25	3.96	1.02	0.000
	Experiment group	25	4.12	0.927	
2.I prefer this learning style than the traditional lecturing learning style	Control group	25	4.16	.987	0.000
	Experiment group	25	4.52	.714	
3.This learning style prompts me for higher motivation for self- learning	Control group	25	4.32	.69	0.000
	Experiment group	25	4.48	.714	
4.This learning style is time saving	Control group	25	3.8	1.155	0.000
	Experiment group	25	3.6	1.443	
5.This learning style makes me learn more about than the traditional learning style	Control group	25	4.16	.987	0.000
	Experiment group	25	4.40	.707	
6.This learning style helps me to communicate better with the group	Control group	25	4.4	.764	0.000
	Experiment group	25	4.24	.926	
7.The PBL learning style increased my knowledge of my physical fitness strength and weakness	Control group	25	4.28	.843	0.000
	Experimented group	25	4.08	.812	

The above independent sample t-test statistics indicators showed that there is no significant difference between the control and experiment group since their mean and standard deviation were almost similar.

Table 5. Students' response about group learning values

No	Item	Controlled group		Experimented group	
		N	%	N	%
8	I learn best when working in small groups.				
	➤ Strongly disagree	0	0	0	0
	➤ Disagree	4	16	2	8
	➤ Neutral	4	16	3	12
	➤ Agree	9	36	12	48
	➤ Strongly agree	8	32	8	32
	Total	25	100	25	100
9	I communicate well in group settings.				
	➤ Strongly disagree	1	4	1	4
	➤ Disagree	6	24	1	4
	➤ Neutral	9	36	12	48
	➤ Agree	6	24	3	12
	➤ Strongly agree	3	12	8	32
	Total	25	100	25	100
10	I achieve higher grades when I participate in group discussions.				
	➤ Strongly disagree	0	0	0	0
	➤ Disagree	0	0	2	8
	➤ Neutral	1	4	1	4
	➤ Agree	14	56	12	48
	➤ Strongly agree	10	40	10	40
	Total	25	100	25	100
11	I learn problem-solving skills from group project				
	➤ Strongly disagree	0	0	0	0
	➤ Disagree	3	12	0	0
	➤ Neutral	0	0	5	20
	➤ Agree	12	48	11	44
	➤ Strongly agree	10	40	9	36
	Total	25	100	25	100
12	I am motivated by group learning.				
	➤ Strongly disagree	0	0	1	4
	➤ Disagree	1	4	5	20
	➤ Neutral	2	8	0	0
	➤ Agree	14	56	9	36
	➤ Strongly agree	8	32	10	40
	Total	25	100	25	100
13	From the group project process /presentation, I have obtained useful information.				
	➤ Strongly disagree	0	0	0	0
	➤ Disagree	2	8	2	8
	➤ Neutral	2	8	2	8
	➤ Agree	10	40	14	56
	➤ Strongly agree	11	44	7	28
	Total	25	100	25	100

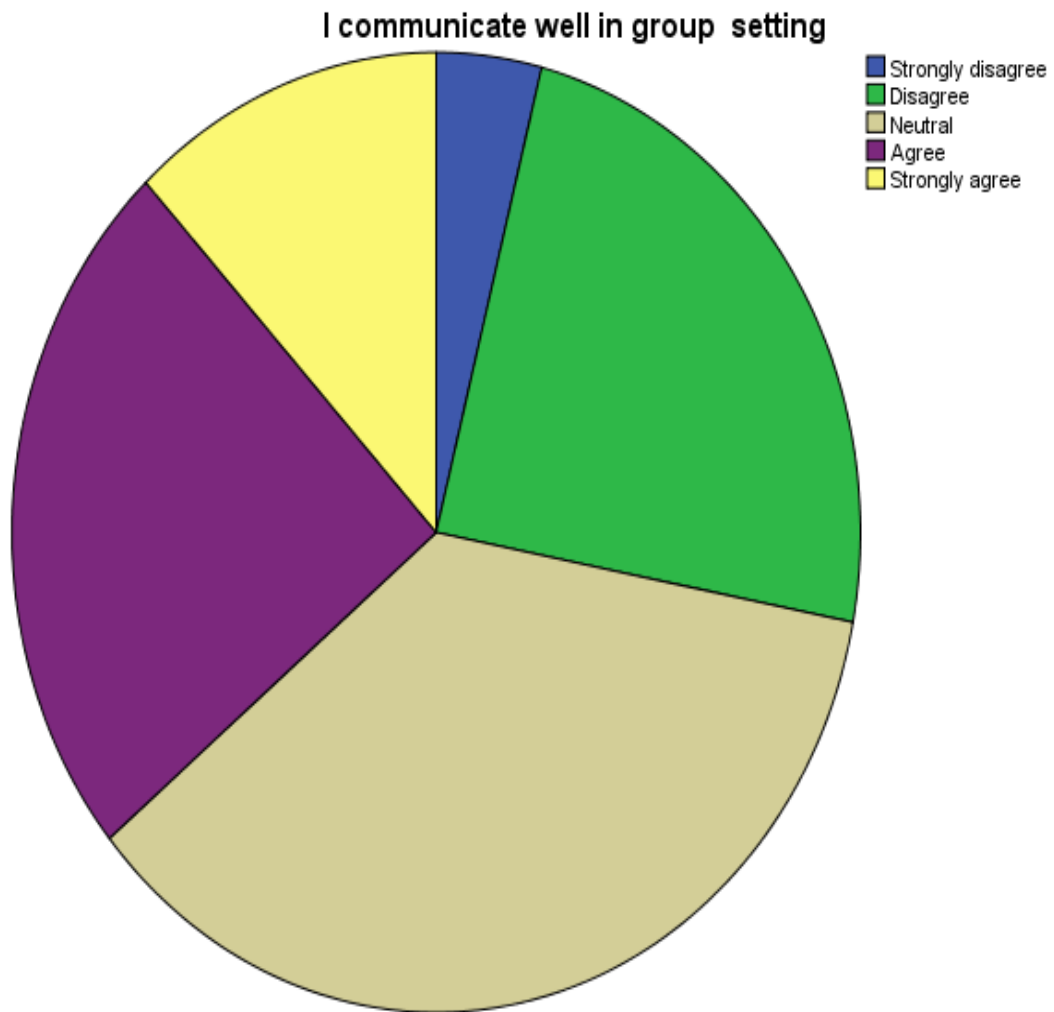
As can be concluded from the above table concerning the issue of group learning values, the following analysis can be drawn.

In item 8 of the above table 8(32%) of the respondents in both groups were strongly agreed, 9(36%) of respondents in control group, 12(48%) of respondents in experiment group were said agree. However, 4(16%) of the controlled group respondents, 2(8%) of the experiment group were said disagree. And only 4(16%) respondents of control group and 3(12%) of respondents in the experiment group were have no idea (said neutral) about the issue.

Accordingly as shown in the same table of item (9) I communicate well in group settings. Regarding to this, 3(12%) of control group respondents, 8(32%) of experiment group respondents were said strongly agree and 6(24%) of control group respondents, 3(12%) of respondents in experiment group said agree. However, 1(4%) of respondents in both group said strongly disagree and 6(24%) of the control group respondents, 1(4%) respondents of experiment group said disagree. And only 9(36%) of control group respondents, 12(48%) of experiment group respondents accounts to neutral.

Let the researcher show the analysis of item 9 in frequency pie chart for both control and experiment group.

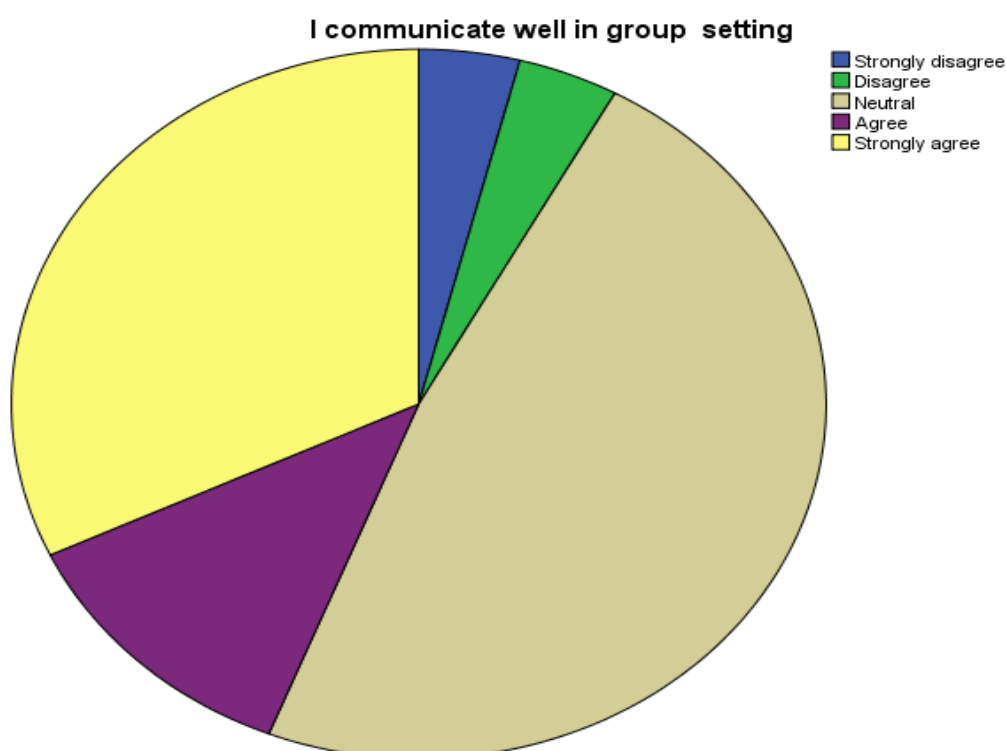
Figure 3 control group respondents about group setting



In the above pie chart majority of the respondents in this group accounted to neutral towards item 9 issues. 3(12%) and 6(24%) of control group respondents said strongly agree and agree respectively. However, 1(4%) of respondents in this group said strongly disagree and 6 (24%) of them said disagree. only 9 (36%) of respondents account to neutral.

For experiment group the analysis of item 9 will be shown below in the next chart

Figure 4. Experiment group respondents about group setting



The above chart proved that almost half of the respondents were have no idea (neutral) about the issue of item 9. In this group 8(32%) and 3(12%) of respondents said strongly agree and agree respectively.

Generally my study proved that both control and experiment group almost have same idea without significant difference towards the issue of item number 9.

Under part two (table 2) item numbers 10 of the questionnaire which is filled by pawia secondary school grade10 physical education students' deals with the participation of students in group discussion to achieve higher grades.

Based on the responses that were gained from the two group respondents various interpretation are made .Accordingly in this item (item 10), majority of the respondents 14 (56%) of the control group,12(48%) of respondents of experiment group agreed and 10(40%) of the two group respondents strongly agreed. However, 2(8%) of experiment group respondents disagreed. and only 1(4%) of respondents in each group said neutral.

As shown their above tables of item (11) students learn problem-solving skills from group project. Shows that 12(48%) of them in control group agreed, 11(44%) of respondents in the experiment group agreed and 10(40%) in the control group, 9(36%) of experiment group respondents were strongly agreed. However, 3(12%) of control group respondents disagreed.

And only 5(20%) of experiment group respondents were have no idea about the issue of this item.

Accordingly as shown in the same table of item (12) students are motivated by group learning. Regarding to this, majority of control group respondents 14(56%) were agreed, 9(36%) of experiment respondent were agreed and 8(32%) in the control group, 10(40%) in experiment group were strongly agreed, 5(20%) in the side of experiment group, 1(4%) in the control group disagreed and only 1(4%) of respondents in the experiment group were strongly disagreed.

In addition to this, item number (13) of above table reveals almost half 11(44%) of respondents in control group, 7(28%) of respondents in the experiment group were strongly agreed, 10(40%) in control group, 14(56%) of student respondents said agree. However, 2(4%) of respondents in each group said disagree. and only 2(4%) of respondents in each group said neutral.

- In this part of analysis there were two groups which were differentiated. Thus are control group which the study was applied in a less attention manner, and experimental group that more attention was given during the study. When we see the result of the comparison, most of the respondents of the control group were agreed on each issue of the study relatively to the experimental group.

Table 6. Group independent sample t-test statistics

Item	Respondents	N	Mean	Std .deviation	Sig(2-taild)
8.I learn best when working in small group	Control group	25	3.84	1.068	0.000
	Experiment group	25	4.04	.899	
9.I communicate well in group setting	Control group	25	3.16	1.068	0.000
	Experiment group	25	3.64	1.114	
10.I achieve higher grades when i participate in group discussions	Control group	25	4.36	.569	0.000
	Experiment group	25	4.20	.866	
11.I learn problem-solving skills from group project	Control group	25	4.16	.943	0.000
	Experiment group	25	4.16	.746	
12.I am motivated by group learning	Control group	25	4.16	.746	0.000
	Experiment group	25	3.88	1.269	
13.From the group project process/presentation, I have obtained useful information	Control group	25	4.20	.913	0.000
	Experiment group	25	4.04	.841	

The above table (5) independent sample t-test statistics showed that only one issue ‘I communicate well in group setting’ were significant difference between control and experiment group respondents since the indicator mean value showed that control group 3.16 and for teachers 3.64 but the others indicator showed no statistically difference response between two groups. Below answers objective number 3, which answers how PBL methods are effective?

Table 7. Students' response about teachers' role in PBL learning effectiveness

No	Item	Controlled group		Experimented group	
		N	%	N	%
14	The teacher encouraged students to be responsible for their own learning.				
	➤ Strongly disagree	2	8	0	0
	➤ Disagree	3	12	0	0
	➤ Neutral	3	12	3	12
	➤ Agree	9	36	11	44
	➤ Strongly agree	8	32	11	44
	Total	25	25	25	100
15	The teacher used effective techniques for learning, both in class and for out –of class assignments.				
	➤ Strongly disagree	4	16	0	0
	➤ Disagree	3	12	3	12
	➤ Neutral	2	8	1	4
	➤ Agree	8	32	11	44
	➤ Strongly agree	8	32	10	40
	Total	25	100	25	100
16	The teacher motivates students to dig out and solve problems in PBL learning process.				
	➤ Strongly disagree	3	12	0	0
	➤ Disagree	6	24	0	0
	➤ Neutral	4	16	5	20
	➤ Agree	8	32	10	40
	➤ Strongly agree	4	16	10	40
	Total	25	100	25	100
17	The teacher facilitates well the PBL learning process.				
	➤ Strongly disagree	2	8	1	4
	➤ Disagree	2	8	3	12
	➤ Neutral	4	16	2	8
	➤ Agree	9	36	11	44
	➤ Strongly agree	8	32	8	32
	Total	25	100	25	100
18	The teacher has given me enough background subject knowledge that helps me to deal with the subject problem.				
	➤ Strongly disagree	2	8	0	0
	➤ Disagree	5	20	1	4
	➤ Neutral	4	16	4	16
	➤ Agree	6	24	10	40
	➤ Strongly agree	8	32	10	40
	Total	25	100	25	100

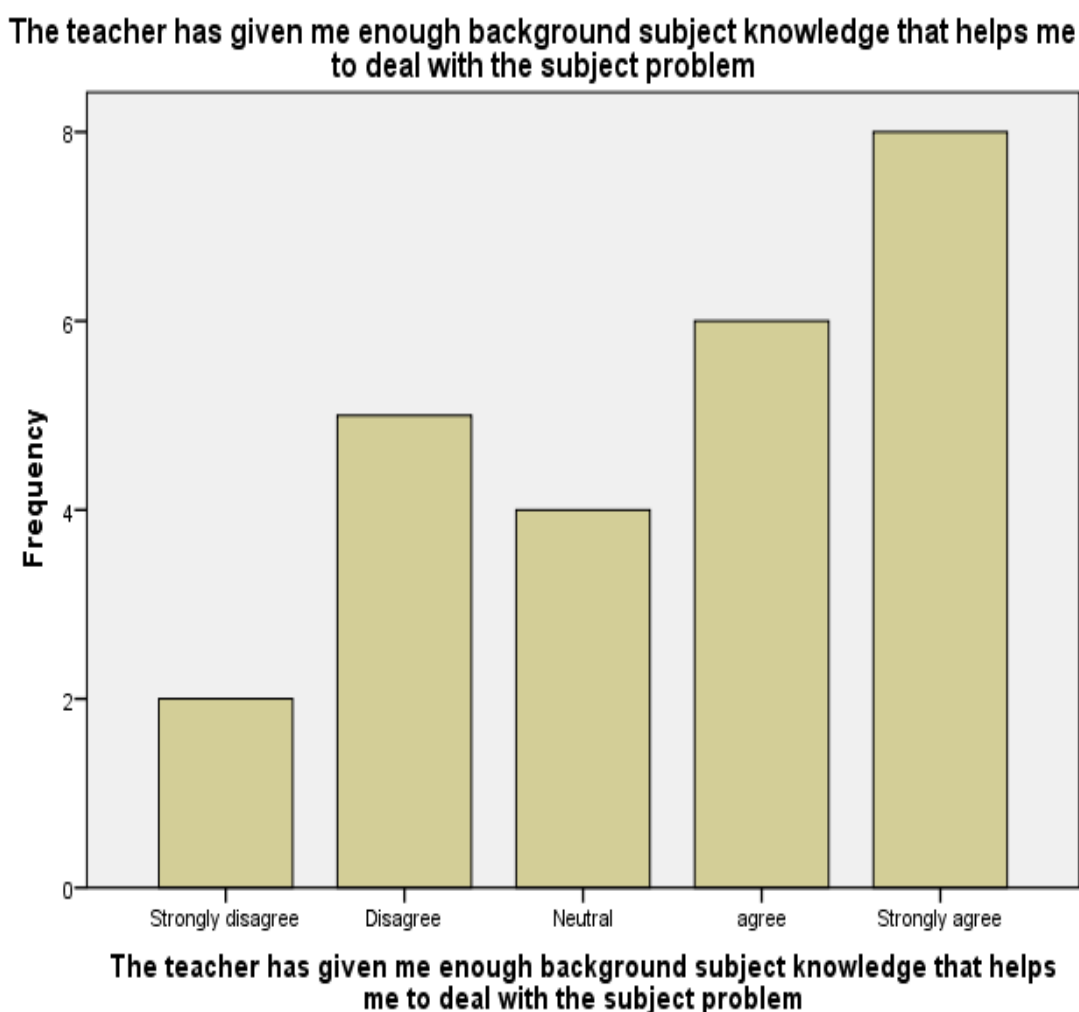
In the above table item (14) showed that 8(32%) of respondents in control group, 11(44%) of respondents in the experiment group were strongly agreed and 9(36%) of respondents in control group, 11(44%) of respondents in experiment group agreed. However, 2(8%) of respondents in control group and 3(12%) respondents in this same group said strongly disagree and disagree respectively.

Item (15) of the same table proved that 10(40%) of the control group respondents, 8(32%) of respondents in experiment group were strongly agreed in the issue and 8(32%) of respondents of control group, 11(44%) of respondents in experiment group said agree. However, 3(12%) of respondents in both group said disagree, 4(16%) of respondents in control group said strongly disagree and only 2(8%) of respondents in control group, 1(4%) of respondents in experiment group said neutral.

Item (16) of the above table proved that 4(12%) of control group respondents, 10(40%) respondents in experiment group said strongly agree and 8(32%) in control group, 10(40%) in experiment group agreed on the issue. However, 3(12%) and 6(24%) in control group said strongly disagree and disagree respectively. and only 4 (16 %) in control group, 5(20%) of respondents in experiment group said neutral.

Item (17) indicated that the teacher facilitates well the PBL learning process. Regarding to this, 8(32%) of respondents in both experiment group and control groups were strongly agreed, 9(36%) of respondents in control group, 11(44%) of respondents in experiment group agreed on the above issue, 2(8%) of control group respondents, (4%) of respondents in experiment group said strongly disagree and 2(8%) in control group, 3(6%) in experiment group said disagree and only 4(16%) in control group, 2(8%) in experiment group said neutral. Let us look analysis of item 18 in frequency chart shown in the next page.

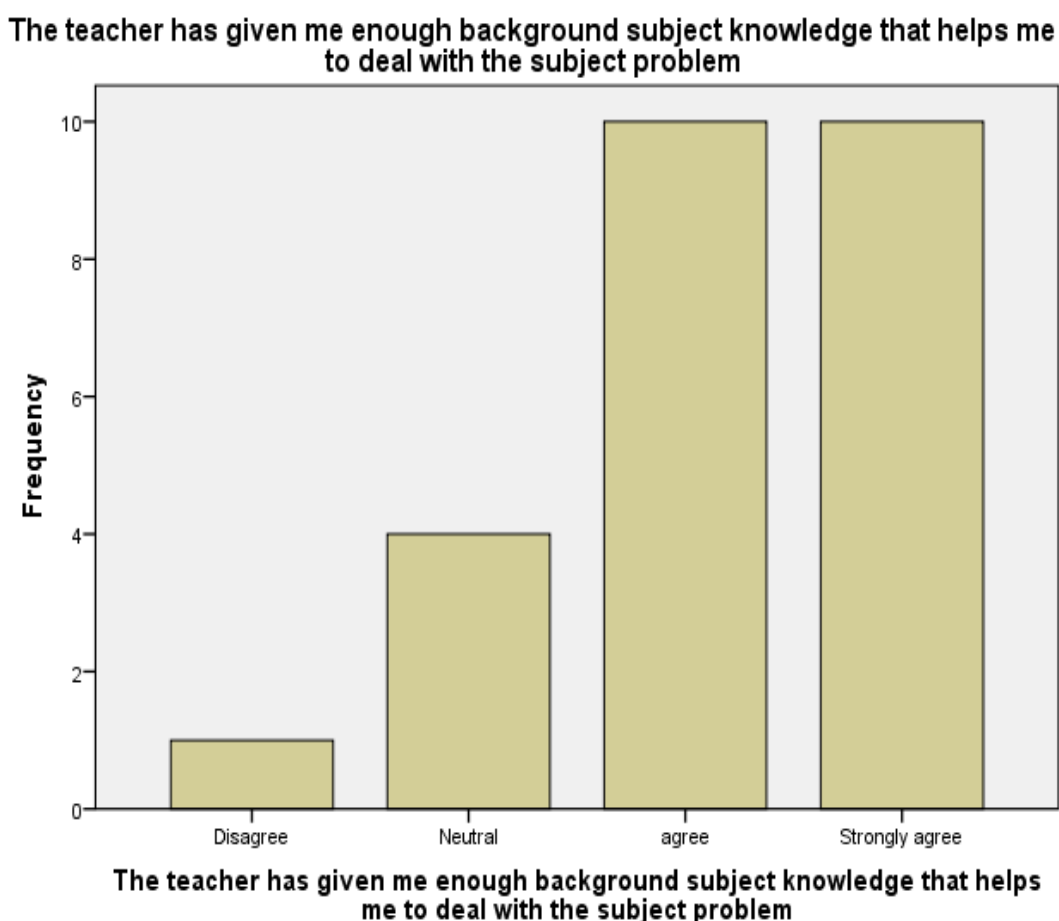
Figure 5 control group response about item 18 issues.



The above figure showed that almost all of the controlled group respondents were agreed on the issue that the teacher has given them enough background subject knowledge, which helps them to deal with the subject problem. 8 (32%) of this group respondents strongly agreed, 6 (24%) of them agreed, 4 (16%) students said neutral, 5 (20%) students disagreed and 2 students strongly disagreed in control for the above issue. Respondents were asked to rate about their subject teacher's whether he/she gave them enough background subject knowledge that helps learners to deal with the subject problem. As a result, of this the majority of those respondents strongly agree that their teacher did provide them such kinds of given situations. The rest of the majority of the respondents when we prioritize their response rate confirmed that as they agree with the questions asked. This showed that teachers most frequently provided to their students' backgrounds know how concerning the subject matter that helps learners to grasp the needed content subject matter. To the contrary as the above

chart indicates, some of the other respondents rated that their teachers did not provide to them background subject knowledge that helps learners to deal with the subject problem. This indicates that teachers are not doing their own respected tasks that are expected of them to achieve the subject matter.

Figure 6 experiment group responses for item 18 issue.



As shown in the above figure the experiment group respondents' response is not significantly different from control group respondents' response.

The figure above proved that 10(40%) of the experiment group said strongly agree and similarly 10(40%) of them said agree .However, 1(4%) of this group disagreed on the issue of this item. And only 4(16%) of them said neutral.

The above analysis can be done by independent sample t-test statistics as shown below in the next page. Thus, let's look the analysis by independent sample t-test statistics below

Table 8: Group independent sample t-test statistics

No.	Item	Respondents	N	Mean	Std .deviation	Sig(2-tailed)
14	The teacher encouraged students to be responsible for their own learning	Control	25	3.72	1.275	0.000
		Experiment	25	4.32	.69	
15	The teacher used effective techniques for learning, both in class and for out of class assignments.	Control	25	3.52	1.475	0.000
		Experiment	25	4.12	.971	
16	The teacher motivates students to dig out and solve problems in PBL learning process.	Control	25	3.16	1.313	0.000
		Experiment	25	4.2	.764	
17	The teacher facilitates well the PBL learning process.	Control	25	3.76	1.234	0.000
		Experiment	25	3.88	1.13	
	18.The teacher has given me enough background subject knowledge that helps me to deal with the subject problem	Control	25	3.52	1.358	0.000
		Experiment	25	4.16	.85	

Objective number 2, the consequences of PBL methods on grade 10 student's achievement level are discussed below.

Table 9. students' response concerning effect of PBL learning on students

No	Item	Controlled group		Experimented group	
		N	%	N	%
19	My physical and mental courage to accomplish challenging tasks and ability preserve in adverse conditions was enhanced because of my experiences in PBL learning.				
	➤ Strongly disagree	2	8	0	0
	➤ Disagree	3	12	3	12
	➤ Neutral	4	16	4	16
	➤ Agree	8	32	10	40
	➤ Strongly agree	8	32	8	32
	Total	25	100	25	100
20	My knowledge, skills and abilities to promote and maintain my personal fitness was enhanced by PBL learning.				
	➤ Strongly disagree	2	8	0	0
	➤ Disagree	1	4	4	16
	➤ Neutral	3	12	4	16
	➤ Agree	10	40	9	36
	➤ Strongly agree	9	36	8	32
	Total	25	100	25	100
21	PBL learning method enhanced by moral-ethical attributes essential for effective leadership.				
	➤ Strongly disagree	0	0	2	8
	➤ Disagree	0	0	3	12
	➤ Neutral	5	20	1	4
	➤ Agree	11	44	12	48
	➤ Strongly agree	9	36	7	28
	Total	25	100	25	100
22	The knowledge gained in PBL learning enables me to develop a scientifically sound exercise program.				
	➤ Strongly disagree	0	0	0	0
	➤ Disagree	5	20	2	8
	➤ Neutral	4	16	3	12
	➤ Agree	9	36	8	32
	➤ Strongly agree	7	28	12	48
	Total	25	100	25	100

In the above table item (19) the study of the researcher showed that 8(32%) of respondents in both groups strongly agreed on the issue, 8(32%) of control group respondents, 10(40%) of experiment group respondents said agree. However,3(12%) of respondents in both group said disagree,2(8%) of respondents in control group strongly disagreed and only 4(16%) respondents in both groups said neutral.

Item 20 of the table proved that 9(36%) of control group student,8(32%) of experiment group said strongly agree and 1 (40%) in control group, 9(36%) in experiment group agreed,1(4%)in control group and 4(16%) of experiment group disagreed and 2(8%) of the control group respondents response were strongly disagree. And only 3 (12%) in control group 4(16%) in experiment group said neutral.

In item (21) the study proved that 9(36%) in control group,7(28%) in experiment group strongly agreed,11(44%) of control group respondents and 12 (48%) of experiment group respondents agreed, but3 (12%) and 2(8%) respondents in the experiment group said disagree and strongly disagree respectively. And only 5(20%) in control group, 1(4%) in experiment group said neutral.

Item 22 issue was analyzed as follow, 7(28%) respondents in the control group, 12(48%) respondents in experiment group said strongly agree and 9(36%) of control group, 8(32%) of experiment group were agreed on the issue which is raised on item 22. However, 5(20%) of control group and 2(8%) of experiment group disagreed on this issue (item22). And only 4(16%)in control group and 3(12%) in experiment group were said neutral.

Table 10. Group independent sample t-test statistics

Item	Respondents	N	Mean	Std. deviation	Sig(2-tailed)
19. My physical and mental courage to accomplish challenging tasks and ability persevere in adverse conditions was enhanced because of my experience's in my PBL learning	control	25	3.68	1.282	0.000
	Experiment	25	3.92	0.977	
20. My knowledge ,skills, and abilities to promote and maintain my personal fitness was enhanced by PBL learning	control	25	3.92	1.187	0.000
	Experiment	25	3.84	1.068	
21. PBL learning method enhanced my moral-ethical attributes essential for effective leadership	control	25	4.16	.746	0.000
	Experiment	25	3.76	1.234	
22. The knowledge gained in PBL learning enables me to develop a scientifically sound exercise program	control	25	3.72	1.100	0.000
	Experiment	25	4.2	0.957	

Specific objective, 1 which answers the causes or the pushing factors that lead students to participate or not are discussed as follows.

Table 11. Student's response concerning their motivation to participate in PBL.

No	Item	Controlled group		Experimented group	
		N	%	N	%
23	I am more committed to participate in sports and physical activity thought my experiences in PBL learning method.				
	➤ Strongly disagree	0	0	0	0
	➤ Disagree	4	16	4	16
	➤ Neutral	3	12	3	12
	➤ Agree	11	44	9	36
	➤ Strongly agree	7	28	9	36
	Total	25	100	25	100
24	My motivation to learn and to continue learning physical education in the future has increased because of PBL learning method .				
	➤ Strongly disagree	0	0	2	8
	➤ Disagree	7	28	3	12
	➤ Neutral	5	20	5	20
	➤ Agree	5	20	7	28
	➤ Strongly agree	8	32	8	32
	Total	25	100	25	100
25	In the future I am willing to participate in PBL learning practice because it is challenging and more preferable than the traditional method.				
	➤ Strongly disagree	0	0	1	4
	➤ Disagree	5	20	1	4
	➤ Neutral	0	0	6	24
	➤ Agree	10	40	10	40
	➤ Strongly agree	10	40	7	28
	Total	25	100	25	100

Under the above table item (23) stated that students are more committed to participate in sports and physical activity thought their experiences in PBL learning method. Regarding to this 7(28%) of control group,9(36%) of experiment group respondents were strongly agreed and 11(44%) of control group respondents 9(36%) experiment group respondents said agree.However,4(16%) of the two group respondents were disagreed. And only 3(12%) of each group respondents said neutral.

In the same table item (24) 8(32%) of control group and experiment group strongly agreed, 5(20%) of control group respondents, 7(28%) of experiment group respondents agreed. However, 7(28%) of control group and 3(12%) of experiment group respondents were strongly disagreed. And only 5(20%) of each group respondents said neutral.

From the above table item (25) 10(40%) of control group, 7(28%) experiment group were strongly agreed and 10(40%) of the two groups agreed. but 5(20%) of control group, 1(4%) of experiment group said disagree and strongly disagree.

Table 12. Group independent t-test statistics

Item	Respondents	N	Mean	Std .deviation	Sig(2-tailed)
23.I am more committed to participate in sports and physical activity throughout my experiences in PBL learning method	Control	25	3.84	1.028	0.000
	Experiment	25	3.92	1.007	
24.My motivation to learn and to continue learning physical education in the future has increased because of PBL learning method	Control	25	3.56	1.227	0.000
	Experiment	25	3.64	1.287	
25 .In the future i am willing to participate in PBL learning practice because it is challenging and more preferable than traditional method	Control	25	4.00	1.118	0.000
	Experiment	25	3.84	1.028	

4.4 Analysis and interpretations of practical class observations

In this part of analysis there were experiment and control group which were differentiated. Control group, which is more part of the theory, and the other group is experiment group which were observed in practice. My study in this part took 8 students. Then I have collected data as pre-test and post -test form both control & experiment group. The result of comparison between each test for both groups is

shown in the following independent sample t-test statistics. Remember; for this test I have selected sprinting running among my four measurement tools (flexibility, sprinting, high jump and basketball)

Table 13. Group sample independent t-test statistics value

Group independent sample T-test					One sample t-test		
Pair of items	N	Mean	St .deviation	Std. Error mean	t	Df	Sig.(2 - tailde)
Control group pre -test average	8	2.2143	0.20415	0.069411	39.1803	7	0.000
Experimental group pre-test average	8	2.1013	0.0108502	0.16036	140.958	7	
Control group post- test average	8	2.1025	0.608609	0.024257	86.677		0.000
Experimental group post-test average	8	2.0438	0.029731	0.10511	194.43	7	
General average of control group	8	2.2103	0.09711	0.34192	62.578	7	0.000
General average of experiment group	8	2.0015	0.027483	0.13254	157.593	7	

The above independent sample t-test statistics showed that there is a significant difference between pre-test of control group and experiment group similarly the above statistics result showed that there is a significant difference between post -test average of experimental and controlled group, there was deviation between general average of control and experiment group. As my study proved that the controlled group scores

less than the experiment group in both tests for sprinting running and rest of four measurement tools.

As the table showed the value of pre -test mean and standard deviation of control group are (2.2143, 0.20415) respectively whereas for experiment group are (2.1013, 0.0108502).then finally from my study I concluded that the controlled group highly deviates from the truth since its standard deviation and its mean are large but the experiment group slightly deviates from the truth.

That means the controlled group scored less time in sprinting running also in the rest of other observation instruments than experimented group.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATION

5.1. Summary

The main objective of my study is to observe and to collect data on the impact of problem based learning (PBL) method on grade 10 physical education achievement at pawi secondary school. This research indicates that motivation and performance of students was enhanced through the PBL method and also it improved certain aspects of the learning environment and contextual factors such as competitive learning, cooperative learning, teaching strategies, task presentations, and structuring of learning experiences. The general objective of the study is to analyze the impact and effect of PBL method on students improvement on their fitness, strength course mater knowledge gain, motivation to learn physical education, the main objective of my study generalized as follows:-

- ❖ To analyze the impact of PBL method on student's improvement performance, knowledge and motivation towards physical education.
- ❖ To assess the challenge of implementing PBL method.
- ❖ To analyze the effect of this learning method on students attitude to the course matter.

The purpose of my study was to know the structures of the motivational and performance characteristics of students enrolled in a physical education course. Understanding the improvement and performance profile of our students was lead to a clear coordination and efficient organization of the physical education at the school. To understand the improvement and performance enhancement of our students we used the experimental method based on the questionnaires. The way in which educational objectives were set by the teacher was another teaching strategy for attracting students in practicing at physical activities.

Positive and essential techniques of this method was a change in the motivational structure of students which opens a wider perspective of important values. Health is the first thing that students have in mind when they decide to participate in the physical activity the reasons that students come to this courses was also the

improvement of their self-image which is on a high position in the classification. The enhancement and improvement performance of practicing physical activities through school years is also closely associated with the desire to improve and enhance self-problem solving ability.

Furthermore, the information was obtained from the sample respondents through a set of questionnaires and practical *class* observations of grade 10 of Pawi secondary school students. Moreover, different literatures and internet access were reviewed and assessed in order to get clear idea about the effect and impact of problem based learning on enhancing students' enhancement and improvement of performance in learning physical education subject.

As stated earlier, the focus of this study was to answer these questions:

- How the causes of PBL methods on grade 10 physical education classes affect student's achievement level?

For this research question, since the majority of the respondents are committed to participate in sports and physical activity, the causes of PBL method are not that much related to this issue. Besides, the motivation to learn and continue learning predication in the future increased because of PBL method affects students learning by the majority of the discussants. Finally because of the challenging and more preferable nature of PBL when we compare from the traditional method learners are highly willing to participate in it.

- What are the consequences of PBL methods on grade 10 student's achievement level?

Due to the experiences that students have had in PBL, the consequences of PBL method enhanced the physical and mental courage of learners to do tasks and activities in various conditions. In addition to this, learners knowledge skills, and abilities to promote and maintain learners personal fitness was more of increased by PBL enables more discussants to develop a scientifically sound exercise programmes.

- How the PBL methods are effective on grade 10 students of physical education?

For the effectiveness of PBL on grade 10 level teachers encouraged learners to be responsible for their own learning, and the teachers used effective techniques for learning as indicated by the majority of the respondents. More-over, the teachers motivates students to practice and solve problems. This is done by facilitating in in a good way in PBL process and as well the background subject knowledge assists learners to deal with the with the subject problem. This is confirmed by the majority of respondents.

- What is the perception of the students towards PBL methods?

The perceptions of students about PBL style was rated by the majority of repliers as it is new to them. Likewise, PBL style is preferable than traditional lecturing style, and this style promotes them for their higher motivation for their own self learning. Lastly, PBL style is reported as it is time saving and it helps learners to communicate better within the group.

In order to analysis the collected data, percentages, standard deviation and frequencies were used. Based on the result of analyzed data, the following major findings were obtained:

- ❖ It is reality that, in order to enhance student's knowledge and performance in physical education practice class problem based learning was advantageous as shown in the study of the researcher.
- ❖ Almost all of the respondent defined problem based learning has as a positive effect on their performance.

The final results confirmed that in this research there were several significant factors that supported problem-based learning well others showed similar results to past classes using traditional lectures. The supportive findings came from many areas, such as the field practice observation reports, surveys, questionnaires of student's response to the questioner and quick assessment techniques. The most significant findings occurred in the field class data and the questionnaire although there were minuscule findings from the field study, pre and post observation and quick assessments to support PBL.

After reviewing the analyzed data PBL had gains over traditional lectures such as quiz scores improved, performance of students improved and the assessment techniques supported PBL being effective. Other results had PBL equally effective as traditional lectures, but at no time did PBL ever show to be a hindrance to the learning environment or below traditional lecture lessons.

This research presented significant findings to indicate that PBL can improve cognitive thinking, motivation, and improve small group learning in a physical education course. Additional benefits of PBL included increasing the student's confidence by increasing their knowledge of physical fitness. In regards to physical education courses PBL was beneficial and enhanced the student's ability to learn when compared to traditional learning. PBL should be considered as a high priority teaching technique when instructing courses that involve practical skills. If PBL can benefit this course I am sure it can benefit other courses.

5.2 Conclusions

Based on the data gathered and the analyzed result the following conclusions were made in relation to the basic research questions and that were formulated in the introduction section. Therefore, from the finding it can be concluded of the physical education students of Pawi secondary school almost all of them strongly agreed on the idea of problem based learning. From the finding most of the respondents strongly agreed on the issue which was concerned on their self-efficiency. As the study indicted in the active learning strategies of learning most of the respondents agreed on the issue of the researcher idea. From the result of the study almost all of the respondents were willing to participate in the course if the environment stimulation attracts (comforts) them. If the students have not given the appropriate teaching method the performance and improvement couldn't come, and also no physiological change. In these ways the method of teaching was by combination of the whole class then the teacher used explanation and show performance to his students. From the finding all of the students response to the researcher questionnaire was strongly agree this shows that the researcher's observation was vital to solve problems of students in physical education practice course. As the study indicated the active learning strategies of students were 100% good.

The study results reinforce the concept that problem based teaching method, such as working in groups, students teaching each other, and working together outside of class, were good teaching practices, particularly at high school level. Employing such techniques leads to long term cognitive enjoyment, which leads to a wide range of benefits for students and society. Research on problem based learning typically focused on grade 10 Pawi secondary school students, with a more narrowly defined performance measure. This study provided further evidence of effectiveness within the practical class of physical education.

5.3. Recommendations

- The only other assessment that needs to be carried out was long term recall. If the same students were to take 3 months, 6 months, or 1 year after taking the course how well would they do when compared to students who had the traditional lecture technique? Would they be able to recall general and detailed information from each of the four domains? As of this point PBL was beneficial and can improve the students ability to apply cognitive thinking, increase motivation, and enhance small group learning when used in physical education courses.
- Analysis result for this study was participation in problem based learning activities positively influence students' knowledge and performance in learning physical education.
- The study's findings support my hypothesis that PBL method positively influences the development of need for cognition among first-year college students.
- Controlling for pre-college characteristics, institutional type, classroom experiences, and other college experiences, the researcher found that students engaged in cooperative learning were more likely to develop need for cognition than students not engaged in PBL method.
- The study results reinforce the concept that PBL learning strategies, such as working in groups, students teaching each other, and working together outside of class, were useful teaching practices, particularly at the high school level.
- For analysis and tests of my study the researcher used SPSS software application. Class room teachers may find the results of this study useful as

they consider teaching methodologies across a variety of instructional activities.

- Problem based learning strategies might be an effective teaching tool for those who wish to develop long-term students' interest in improvement of their self-problem solving ability.
- School members should be cautioned that PBL method must be administered appropriately, focusing on interdependence among group members.
- For PBL method to be effective, students should rely on their own, with the understanding that each individual is required to contribute toward overall group success.
- Poor execution undermines the positive benefits of PBL method.
- Some schools may lack the skills or confidence to implement such a decentralized approach to teaching if then the researcher recommended these schools to use this teaching strategy for their success.
- Finally the researcher recommended that students must be given opportunities to gain the knowledge and skill needed to adopt in problem based learning.

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Appendix A

ADDIS ABABA UNIVERSITY

College of Education and Behavioral Studies Department of science and mathematics education in (teaching physical education)

This questionnaire contains statement about the impact of problem based learning on students in physical education class .you will be ask to express your agreement on each statement .There are no “right “ or “wrong” answers. Your opinion is what is wanted. Think about how well each statement describes your attitude about problem based learning.

Draw a circle around:

1. If the statement you strongly disagree
2. If the statement you disagree
3. If the statement you have no idea
4. If the statement you agree
5. If the statement strongly agree

A. Students attitude about problem-based learning (PBL)

1. This learning style is new to me.
1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree
2. I prefer this learning style than the traditional lecturing learning style.
1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree
3. This learning style prompts me for higher motivation for self-learning.
1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree
4. This learning style is time-saving.
1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree
5. This learning style makes me learn more about than the traditional learning style.
1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree
6. This learning style helps me to communicate better within the group.
1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree

7. The PBL learning style increased my knowledge of my physical fitness strengths and weaknesses.

1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree

B. Group learning values

8. I learn best when working in small groups.

1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree

9. I communicate well in group settings.

1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree

10. I achieve higher grades when I participate in group discussions.

1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree

11. I learn problem-solving skills from group project.

1. Strongly disagree 2. Disagree 3. Neutral 4. Agree

5. Strongly agree

12. I am motivated by group learning.

1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree

13. From the group project process/presentation, I have obtained useful information.

1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree

C. teacher's role in PBL learning effectiveness

14. The teacher encouraged students to be responsible for their own learning.

1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree

15. The teacher used effective techniques for learning, both in class and for out-of-class assignments.

1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree

16. The teacher motivates students to dig out and solve problems in PBL learning process.

1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree

17. The teacher facilitates well the PBL learning process.

1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree

18. The teacher has given me enough background subject knowledge that helps me to deal with the subject problem.

1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree

D. Effect of PBL learning on students

19. My physical and mental courage to accomplish challenging tasks and ability persevere in adverse conditions was enhanced because of my experiences in PBL learning.

1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree

20. My knowledge, skills and abilities to promote and maintain my personal fitness was enhanced by PBL learning.

1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree

21. PBL learning method enhanced my moral-ethical attributes essential for effective leadership.

1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree

22. The knowledge gained in PBL learning enables me to develop a scientifically sound exercise program.

1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree

E. Motivation of students to participate on PBL method

23. I am more committed to participate in sports and physical activity throughout my experiences in PBL learning method.

1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree

24. My motivation to learn and to continue learning physical education in the future has increased because of PBL learning method.

1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree

25. In the future I am willing to participate in PBL learning practice because it is challenging and more preferable than the traditional method.

1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree

Instruments to measure some practical class activities performance

1. Sprinting running

The units to measure this activity are

Meter→ with accelerating time that is hour, minute , second and microsecond

- Kilometer→ also with accelerating times which are mentioned above.

2. Jumping

- By observing students capacity and accuracy
- By cm

3. Measuring instrument of flexibility

Flexibility testing should be done for trunk and lower body and for upper body

For lower and trunk body the tests which are used listed as follow

- Straight leg raise
- Goring flexibility
- Trunk rotation flexibility
- V-sit test and so on

For upper body

- Shoulder flexion
- Shoulder rotation

4. Basket ball

The capacity of students to playing a basketball is measured by

- Catching the ball
- Dribbling the ball
- Passing
- Receiving
- shooting

Sprinting running test for 8 sample students of the whole classes per four trial

No	Sex	Control Group										Experiment Group									
		Pre-test				A	Post-test				A	Pre-test				A	Post-test				A
		1	2	3	4	avg	1	2	3	4	avg	1	2	3	4	avg	1	2	3	4	avg
S1	M	2.112	2.11	2.12	2.12	2.1175	2.11	2.11	2.1	2.08	2.11	2.12	2.11	2.13	2.12	2.12	2.108	2.04	2.02	2.01	2.07
S2	F	2.14	2.13	2.13	2.12	2.13	2.11	2.1	2.1	2.04	2.08	2.14	2.12	2.11	2.13	2.12	2.07	2.05	2.02	2.01	2.04
S3	M	2.13	2.11	2.08	2.08	2.1	2.1	2.08	2.1	2.07	2.08	2.1	2.6	2.05	2.05	2.07	2.02	2.01	2.0	2.0	2.01
S4	F	2.14	2.12	2.1	2.08	2.11	2.08	2.07	2.1	2.05	2.07	2.14	2.11	2.11	2.1	2.11	2.05	2.23	2.02	2.0	2.03
S5	M	2.1	2.08	2.06	2.05	2.07	2.07	2.06	2.1	2.05	2.06	2.1	2.08	2.05	2.05	2.07	2.06	2.04	2.0	2.0	2.03
S6	F	2.19	2.18	2.16	2.16	2.173	2.14	2.12	2.1	2.11	2.11	2.18	2.2	2.15	2.15	2.17	2.1	2.1	2.08	2.08	2.09
S7	M	2.02	2.03	2.04	2.03	2.03	2.03	2.02	2.1	2.03	2.03	2.02	2.03	2.03	2.01	2.01	2.2	2.8	2.02	2.01	2.01
S8	F	2.15	2.13	2.11	2.11	2.13	2.1	2.1	2.1	2.11	2.1	2.15	2.13	2.11	2.11	2.12	2.08	2.06	2.07	2.0	2.07