

CHAPTER ONE
INTRODUCTION

**Effects of Jigsaw Teamwork as Active
Learning Approach on Grade 9 Students’
Interest and Performance in Physical Education
class at Edget Chora Secondary School Yeka
Sub-City Addis Ababa**

by

G/medhin Hailu Berhe

A Thesis Summited to

Department of Science and Mathematics Education

**Presented in partial fulfillment of the requirements for the
Degree of Master of Education (Teaching Physical Education)**

Addis Ababa University

Addis Ababa, Ethiopia

September 2016

Addis Ababa University

School of Graduate Studies

This is to certify that the thesis prepared by G/medhin Hailu Berhe entitled “Effects of Jigsaw Teamwork as Active Learning Approach on Grade 9 Students’ Interest and Performance in Physical Education” and summated in partial fulfillment of the requirements for the degree master of education in physical education and summer in service program of the university and meets the accepted standards with respect to originality and quality.

Signed by the examining committee

Examiner _____ Signature _____ Date _____

Examiner _____ Signature _____ Date _____

Advisor _____ Signature _____ Date _____

Co/Advisor _____ Signature _____ Date _____

Chair of department or graduate program coordinator

ABSTRACT

Effects of Jigsaw Teamwork as Active Learning Approach on Grade 9 Students' Interest and Performance in Physical Education at Edget Chora secondary school Yeka Sub-City Addis Ababa.

G/medhin Hailu Berhe

Addis Ababa University 2016

The purpose of this study was to investigate the Effects of Jigsaw Teamwork as Active Learning Approach on Grade 9 Students' Interest and Performance in Physical Education Class. A mixed method approach specifically quasi-experimental design test, focus group discussion and observation were used to collect data. The study was conducted in one secondary school by comparing the performance of learners in physical education class taught through jigsaw teamwork as active learning approach with that of learners taught through traditional (teacher-centered) teaching method. Two grade 9 classes consisted of 102 students were divided into experimental and control groups holding 52 and 50 students respectively selected using purposive sampling method. The effects of jigsaw teamwork as active learning approach on students' learning performance of both groups measured through tests. While the effect of the active learning approach on the experimental groups' interest was also measured by interest Likert scale questionnaires containing 10 items. i). Learners taught using the active learning approach (experimental group) improved their learning performance slightly better in post-test than those to whom the traditional direct instruction was applied (control group). ii) regarding to interest learners subjected to the active learning approaches (experimental group) improved better than control group students. The findings suggest that the active learning approach had positive effect on the learning performance and interest of Grade 9 learners and thus, can be adapted to enhance learning in the classroom.

ACKNOWLEDGEMENTS

In conducting this research I have received valuable advice, opinion and support from my advisor Dr Mulugeta Atnafu and co-advisor Dr Bezabih Welde. I thank both them for their criticisms of the research proposal and drafts for their wisdom, suggestions and above all patience. The successful completion of this research was in large part due to their encouragement during the crucial moments of the research. My deepest gratitude specially goes to my advisor Mulugeta Atnafu (Ph.D). I also would like to thank the physical education teachers and learners of Edget chora secondary school who participated in this study for their precious time to permit classroom observation, complete questionnaires and answer interview questions for the study. Without their cooperation, this study would not have been possible. I would like to appreciate and thank them for many things to my wife w/ro Asmeret Asefaw who was always with me supporting and encouraging throughout the course years and enabled me to complete from the very beginning to the completion of the study.

TABLE OF CONTENTS

TITLE	PAGE
DECLARATION.....	ii
ABSTRACT.....	iii
ACKNOWLEDGEMENT	iv
TABLE OF CONTENTS	v
LIST OF TABLES	vi
LIST OF TABLES	vii
CHAPTER ONE	
BACKGROUND OF THE STUDY	
1.1Introduction.....	1
1.2 statement of the Problem.....	5
1.3 Objectives of the research	
1.3.1. The General objective.....	6
1.3.2 .The specific objectives of the study.....	6
1.4 Research questions.....	7
1.5 Significance of the study.....	7
1.6. Delimitation of the stud.....	9
1.7 Limitations.....	9
1.8 Key word define.....	10
CHAPTER 2	
REVIEW OF RELATED LITERATURE	
2.1 Introduction	
2.2 High school student attitudes about physical education	
2.3 What are active learning instructional strategies?	11
2.4 Effects of active learning on the student learning performance and interest.....	13
2.5 Why are active learning strategies instructionally important in high schools?.....	14
2.6. Examples of active learning techniques.....	16
2.7 Academic performance and interest.....	23
2.8 Research findings in support of jigsaw teamwork as active learning strategy.....	24

2.9 Research findings not supportive of jigsaw teamwork as active learning technique	28
2.10 Active learning in academic institutions.....	29
2.11 Active learning and conceptual understanding.....	30
2.12 Traditional direct instruction.....	30
2.12.1 Advantages of traditional direct instruction.....	31
2.12.2 Challenges of traditional direct instruction.....	32
Theoretica framework.....	33
2.13 Conceptual framework	35
CHAPTER 3	
RESEARCH DESIGN AND METHODOLOGY	
3.1 Introduction.....	36
3.2 Research design.....	36
3.3 Research methods.....	38
3.4 Population & Sampling techniques.....	38
3.4.1 Sampling technique.....	39
3.5 Data collection instruments.....	40
3.5.1 Pre-test/post-test.....	40
3.5.2 The interest Likert scale.....	41
3.5.3. Focus group discussion.....	41
3.5.4. Observation checklist.....	42
3.6 Validity and reliability of the instruments.....	42
3.7 Procedures of data collection.....	44
3.7.1 Pre and post-test.....	45
3.7.1.1 Treatment / experimental group.....	45
3.7.1.2 Control group.....	46
3.7.2 Interest Likert scale test.....	46
3.7.3 The Interview.....	47
3.7.4 Observation.....	47
3.8 Data analysis methods.....	48
3.9 Ethical issues.....	49

3.10 summary.....	49
-------------------	----

CHAPTER FOUR

RESULTS AND FINDINGS

4.1 Introduction.....	50
-----------------------	----

4.2 Statistical analysis.....	51
-------------------------------	----

4.2.1 The extent to which teachers implement jigsaw teamwork as active learning approach in grade 9 Physical Education theory class analyses.....	53
---	----

4.2.2 Effects of jigsaw teamwork as active learning approach on grade 9 students' performance in physical education theory class.....	58
---	----

4.2.3 Effects of jigsaw teamwork as active learning approach in grade 9 students' interest towards physical education theory class.....	65
---	----

4.2.4 What are the major challenges/obstacles in implementing the active learning approach in the high school?	71
--	----

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS SUMMARY

5.1 Summary.....	78
------------------	----

5.2 Finding.....	79
------------------	----

5.3 Conclusion.....	80
---------------------	----

5.4 Recommendations.....	81
--------------------------	----

BIBLIOGRAPHY.....	82
-------------------	----

APPENDICES

LIST OF TABLES

Pages

Table 2.1 The representation of the relationship among variables within the conceptual framework is shown in Figure 1.	36
Table 3.1: Participants in experimental and control groups.....	39
Table 4.1: Analysis of the questionnaires for teachers.....	55
Table 4.2: Comparison between pre-test scores	60
Table 4.3: Comparison between of post-test scores.....	61
Table 4.4: Comparison between deviation of tests.....	62
Table 4.5: A comparison of interest between pre and post implementation.....	67
Table 4.6: Analysis of experimental group pre and post-test deviation.....	68
Table 4.7: analysis of questionnaires for teacher.....	73

LIST OF APPENDICES

APPENDIX 1; Pre-test questions

APPENDIX 2; Post-test a questions

APPENDIX 3; interest Likert scale Questionnaire to experimental group students

APPENDIX 4; Interest Likert scale (Questionnaire) in Amharic

APPENDIX 5; Questionnaires for physical education teachers

APPENDIX 6; Questionnaires for physical education teachers

APPENDIX:7 Interview guide questions

APPENDIX: 8 Field notes on observations

1.1 Background of the study

In Ethiopian context the previous curriculum design and instructional processes suffered from the old, traditional approach MoE, (2002:56-58). Hence continual curriculum revisions have been made and different programs were designed by the new education and training policy of the country to offer quality training and to make the active learning approaches practical at different levels of the country. For instance, the Teacher Education System Overhaul (TESO) program was introduced in 2001 and emphasizes the implementation of participatory, active learning in the pre-service and in- service programs of teacher education among other major programs (MoE, 2002:23). Thus the Ministry of Education (2002:28) underlined the importance of implementing active learning/student-centered approaches in teaching at various levels to promote the development of problem-solving capacities and competencies of the students.

The students should have the opportunity of getting awareness about benefits of active learning approaches such as cooperative learning, discussion, debating, Think Pair Share, Role Playing, peer teaching and jigsaw as teamwork methods of teaching the teaching practice will be based on the humanistic and communicative approach to teaching and learning which promotes active learning, student-centered learning Bonwell and Eison, (2006). Interest and learning performance of physical education as a tool for use in everyday life is important for the healthy existence of any individual and society. It prepares students with unique and powerful set of tools to understand the world and become productive members of the society.

Secondary school students in Ethiopia have continued to perform physical education theory class without interest and poor performance. This rises as an issue for all concerned stakeholders in education and training due to the importance of the subject.

Some of the factors that are attributed to the students' poor performance and lack of interest in the subject include; inadequate facilities in the schools like qualified teachers, poor attitude towards the subject by the students and teachers and the ineffective instructional methods used by teachers. This study sought to find out the effect of Jigsaw

teamwork active learning strategy during instruction.

The content of a lesson should be taught and learned from the point of view of the learner. The management of the group involves regularly shifting the modes of interaction: asking learners to work individually, in pairs and in groups. The researcher investigated the effects of active learning techniques in physical education class. There are a multitude of reasons for employing active learning techniques learning as an inclusion strategy.

In most high schools, teachers dominantly use passive or traditional (teacher-centered) teaching methods. The traditional teaching method begins with the instruction of the teacher, then practice of students. In this approach to teaching, students passively receive information from the teacher and internalize it through some forms of memorization. This process is characterized as traditional learning. Although traditional learning has been the dominant teaching method, teachers' behavior occupies a dominant position in the whole learning process, which cannot provide students with a chance to active learning and less opportunity to communicate with other students. As always mentioned education coverage is on its good position and increasing, but quality of education is not as it was expected. And one of the problems that harm quality of education is ineffective method of teaching. In this case as the researcher mentioned it below, now days the benefits of active learning method on students' interest and performance is approved through researches globally it is the most popular method.

A major challenge for teachers in heterogeneous classrooms is to engage all of their students in high quality learning activities. By replacing individual assignments, in which students have to work on their own, with assignments for small, heterogeneous groups organized according to teamwork steps in physical education, they would provide a more accommodating learning environment for students who are experiencing difficulties (Jenkins and O'Connor, 2003).

The term 'active learning' is used to describe a range of pedagogic approaches from the

simple asking of questions in a class through highly structured problem based learning exercises and simulations to practical learning in the community outside the educational institution. It might be helpful to briefly discuss some of these approaches before looking in more depth at the theoretical justification for the effect of active learning strategies such as jigsaw teamwork on grade 9 students' interest and performance based on the main obstacles of using the active learning techniques.

The active learning approach focuses on learning rather than teaching; it focuses on what learners will do rather than what the teachers will do. The teacher's role is to develop an environment for learners to take part in active learning. The approach engages learners in authentic communication through the use of social interaction activities such as, jigsaw teamwork. Learning topics are chosen so learners can draw their knowledge from past experiences, and apply what they learn to their daily lives. So that most of teaching learning process of the session is covered by students' participation and before involving into practice they need awareness about active learning techniques such as jigsaw teamwork.

There are many types of active learning methods in teaching learning process but the researcher was focused on the above one method of active learning. Active learning is simply engaging the students in some activities that stimulate them to think about and react on the information presented. Students are required to develop skills in handling concepts and to analyze, synthesize, and evaluate the provided information in discussion with other students, through asking questions, or through writing.

Active learning techniques focus on the direct involvement of the student with the learning material and can include short writes, brainstorming, quick surveys, jigsaw teamwork, peer teaching, think-pair-share, formative quizzes, debate, role playing, cooperative learning, and student presentations to name a few". This form of instruction emphasizes interactions with peers and teachers and involves a cycle of activity and feedback where students are given consistent opportunities to apply their learning in the classroom. By placing students at the center of instruction, this approach shifts the focus

from teaching to learning and promotes a learning environment more agreeable to the meta-cognitive development necessary for students to become independent and critical thinkers. (Liele Soltanzadeh¹, Seyed Reza Nazari Hashemi² and Sakineh Shahi (2013)).

A substantial number of studies have shown that active-learning instructional approaches can lead to improved students' interest and increased learning outcomes relative to a standard lecture format. Despite the effectiveness of active learning, teachers are resistant to such instructional shifts and rely on more traditional means of instruction. In the literature, numerous barriers to this adaptation are cited. For teachers, to experiment a new pedagogy creates feelings of discomfort, lack of confidence and commitment (Liele Soltanzadeh¹, Seyed Reza Nazari Hashemi² and Sakineh Shahi (2013)). Therefore, the reform of instructional practice at high school needs attention training to create awareness and motivation, it is important to promote student learning, which involve students actively engage them in problem solving activities. Active learning approach has been successfully when used in integration with the traditional technique across the disciplines. by the insertion of brief demonstrations, class discussions, ungraded written exercises etc. As a consistent practice traditional lecture methods, in which teachers talk and students listen, dominate our classrooms.

Although traditional learning has been the dominant teaching method, many teachers argue that students require more than a mere transfer of knowledge. The search for the best approach to quality education has led educators to explore many different teaching techniques, ranging from the traditional lecture class to various experimental approaches such as active learning. Teacher's behavior occupies a dominant position in the whole learning process, which cannot provide students with a chance to active learning and less opportunity to communicate with other students (Liele Soltanzadeh¹, Seyed Reza Nazari Hashemi² and Sakineh Shahi (2013)).

When teachers are actively involved and empowered in the reform of their own classrooms and schools, even those teachers with minimal levels of education and training are capable of changing the classroom environment and improving the

achievement of their students. Bonwell and Eison, (1991) defined the active learning as an instructional method that engages students in meaningful activities during the process of learning can improve quality of education. Ebert et al. (1997) viewed active learning as a way of improving student learning in the classroom by involving the student directly in the learning process. Thus it is timely to conduct a research on the effect of jigsaw as teamwork active learning method on grade nine students' interest and learning performance in physical education class.

1.2 Statement of the Problem

According to Prince and Felder (2007), several active learning instructional strategies have been designed and are available to be used but educators rarely use any. Prince and Felder (2007) explain that active learning instructional methods usually need great effort and time of the educator to plan. This study assumed that learner-centred teaching is not implemented by even highly knowledgeable educators because they do not have the time and the effort it takes to plan. The researcher also observed teachers in his circuit and none of them used any active learning instructional method. This study is aimed at examining the effect of a jigsaw as teamwork active learning instruction strategy on grade 9 learners' interest and learning performance in physical education class. Among many factors contributing to learners' low performance the main problem was the ineffective teaching methods used in physical education theory class.

In secondary schools of Addis Ababa physical education period allotment was two periods a week. So regarding the learning performance and interest towards physical education class, most of high school students were not interested to attend the class instead they always were eager to go outside and play games, this reflects the decline of their interest and learning performance in the theoretical and practical class.

To solve this problem every year the city administration of Addis Ababa educational bureau organizes capacity building programs in woredas sub-cities and educational bureau to create awareness and motivation on teachers implement of active learning approaches positive attitude about their teaching learning profession. But in practical

world especially in the context of our region most teachers are not committed to use active learning methods and the researcher set the following questions.

The Ministry of Education (2002:28) stressed the importance of implementing active learning/student-centered approaches in teaching at various levels to promote the development of problem-solving capacities, participation and competencies of the students.

However, little or no researches have been done in physical education specially, on the effect of jigsaw as teamwork active learning instructional method in theory class. Thus this study investigate the effect of active learning technique jigsaw teamwork on secondary school learners` of Yeka sub-city Edget Chora secondary school Addis Ababa, In an attempt to seek a teaching strategy to involve learners` in physical education class and improve their learning performance and increase interest.

1.3 Objectives of the research

The Ethiopian education and training policy of 1994 emphasizes the implementation of active learning approaches in teaching MoE, (2002:31). As indicated, this is an approach that increases interest and learning performance to produce problem-solving citizens. It is also a way of improving the quality of education MoE, (2001:40).

1.3.1. The General objective

The general objective of this study was to investigated the effect of jigsaw teamwork active learning approach on students' performance and interest in physical education class.

1.3.2 .The specific objectives of the research are to:

1. Examine to what extent jigsaw teamwork active learning approach is implemented by physical education teachers in Edget Chora and karalo secondary schools.

2. Investigate the effects of implementing jigsaw teamwork active learning method on students' interest towards physical education, in Edget Chora secondary school.
3. Investigate the effects of implementing jigsaw teamwork active learning method on students' learning performance of high schools physical education class in Edget Chora secondary school.
4. Identify the main challenges (obstacles) in implementing jigsaw teamwork active learning approach in physical education class in Edget Chora secondary school.

1.4 Research Questions

The research questions of this study are;

- 1.To what extent are physical education teachers implementing jigsaw teamwork active learning approach in theory class?
- 2.What are the effects of using jigsaw teamwork active learning Approach on grade 9 students' interest in physical education class?
- 3.What are the effects of using jigsaw teamwork active learning Approach on grade nine students' performance towards physical education class?
- 4.What are the main challenges (obstacles) in implementing jigsaw teamwork active learning approaches in physical education class.?

1.5 Significance of the study

The Ethiopian Education and Training Policy have widely been advocating active learning/student-centered approaches Melese, 1999:15; MoE, (2002:40). The results of this study would provide information on the problems that are currently experienced in the teaching of physical education in high schools of yeka sub-city in Addis Ababa. The results may be essential for implementing jigsaw teamwork active learning strategy to increase students' interest and learning performance by improving the instructional processes. The results may also provide recommendations for solutions on effects, obstacles or barriers experienced during implementing jigsaw teamwork active learning technique. Since the authorities at the various levels of educational administration

are responsible for creating conducive working environments in educational institutions and for guiding practitioners, they will benefit from the findings of the present study.

In view of the above, this study will help high school physical education teachers' sub-city supervisors, Woreda Education Office and instructional experts, students, academic department heads, the Regional Education Bureau, and other concerned bodies to design measures for addressing the possible problems related to the implementation of jigsaw teamwork as active learning/student-centered approach in high schools of yeka sub-city in Addis Ababa. Furthermore the researcher believes that this study has the following significance: It can indicate to educational authorities, supervisors, instructional experts of sub-city the factors that have to be considered in designing plans for the implementation jigsaw teamwork as active learning/student-centered approach in physical education class.

- It can help school administration and academic department heads to provide the necessary follow-up and support in the implementation of jigsaw teamwork as active learning/student-centered approach;
- The study may help physical education teachers to improve their methods of teaching;
- It can help students to increase their awareness and understand issues related to jigsaw teamwork as active learning approach, which impact on their interest and learning performance on physical education class.
- The study can contribute to modify and strengthen theories that focus on the importance, perceptions and beliefs regarding peer teaching and jigsaw teamwork active learning approaches in physical education class.
- Teachers and students can understand the difference between jigsaw teamwork as active learning and traditional teaching methods in physical education class so that they improve their attitude.
- The study serves as a stepping-stone for further and more extensive research in the area of active learning/student-centered approaches such as jigsaw teamwork by identifying areas that need further research.

1.6 Delimitation of the study

The study is delimited on one high school called Edget Chora found in Yeka sub-city Addis Ababa on 102 grade nine students from two different sections, (14-20 years of aged) three Physical education teachers and one department head, in addition the study was delimited to selected variables such interest towards physical education, learning performance, active learning implementation and challenges (obstacles) to implement active learning approaches. In this study the data was collected by questionnaires , tests(pre-test and post-test), observation and interview.

1.7 Limitations

The representative sample school employed in the study was new. However, the potential limitations of this study include the large class size of the experimental and control groups, lack of access to reference materials in the school, poor spoken English skill of students in focus group discussion process, turn-over and exchange of HPE teachers. Lack of awareness of teachers and students on jigsaw teamwork approach, and teachers were not interested to back the questionnaire immediately. As a result, it was so discouraging to get teachers at the same school.

1.8 Key word definition

Physical education refers to a planned, sequential program of curricula and instruction that helps students develop the knowledge, attitudes, motor skills, self-management skills, and confidence needed to adopt and maintain physically active lifestyles. Bonwell and Eison, (1991) defined the active learning as an instructional method that engages students in meaningful activities during the process of learning [3]. Ebert et al. (1997) viewed active learning as a way of improving student learning in the classroom by involving the student directly in the learning process.

The Jigsaw teamwork Technique; Jigsaw, one of the cooperative learning techniques,

is based on group dynamics and social interactions. According to Aronson (2000), Jigsaw is a cooperative learning strategy that enables each student assigned to a group or 'home' group to specialize in one aspect of a learning unit.

Traditional direct instruction (TDI); is instructional approach in which students sit passively in a classroom and absorb the knowledge transmitted by an expert.

Interest: a sense of concern with and curiosity about someone or something, the power of attracting or holding ones' interest.

Performance: The act of doing something successfully; using knowledge as distinguished from merely possessing it. Holistic or integrated demonstrations of mental, affective and manual activities, Performances also express particular values.

CHAPTER TWO

2 REVIEW OF RELATED LITERATURE

2.1 Introduction

Our society today needs young people who are flexible, creative, and proactive – young people, who can solve problems, make decisions, think critically, communicate ideas effectively and work efficiently within teams and groups. The ‘knowing of knowledge’ is no longer enough to succeed in the increasingly complex, fluid, and rapidly evolving world in which we live. (Bonwell & Eison (1991)).

In order to enhance life-long learning and potential success it is now widely accepted that young people need to have opportunities to develop personal capabilities and effective thinking skills as part of their all-rounded education. Increased flexibility in the curriculum in terms of content and time will offer teachers the opportunity to develop their pupils’ skills and capabilities concurrently with knowledge and understanding by using the active learning approaches. (Bonwell & Eison (1991)). It is hoped that this approach will actively engage students in their learning physical education, making the learning a more relevant, enjoyable and motivational experience. Additionally, teachers will have opportunities to further develop their own skills as creative curriculum developers.

The following collection is not intended to be a definitive resource, but one which provides practical advice to teachers on a varied range of methods which they may wish to integrate into their daily learning and teaching activities. It is hoped that teachers will find it a helpful tool in planning and creating a stimulating, enriching, challenging and focused environment for both their pupils and themselves.

In many regions of the world, Physical Education is considered as a non-productive activity, less important to a successful future than academic subjects. In other words, there is a prevailing perception that one cannot build a career on it in spite of the overwhelming evidence that sport is a money-making industry in the western world and in some African countries such as Nigeria, Kenya, Ghana and Ethiopia.

The success stories of these African countries in terms of performance in sports are

pointers to the fact that society's views about Physical Education are gradually changing (Musangeya et al, (2000)). Physical Education in some areas has been seen to make significant contributions to programmes designed to develop a total person, including both physical and intellectual development (Amusa et al, (1999)). (Journal of Emerging Trends in Educational Research and Policy Studies Today's society is growing technologically and sports and physical education can be utilized as tools to affect functional effectiveness in this technological era. (G. Linda Rikard* and Dominique Banville)

In this regard it becomes imperative for experts in physical education and sports to research and identify issues and problems peculiar to their locality as well as to a wider global context so as to ascertain how these could lead to the development of physical education and sports. There is no doubt that utilization of such information technology to drive a technologically sophisticated society will enhance better humanity.

The physical educator should consider psycho physical needs and problems of boys and girls and fit the program to suit the children instead of trying to adapt every boy and girl to the program. rigid syllabus has no place in physical education except as guidelines or outlines which can be altered or even completely dropped according to various factors like climate, time, environment type of group, purpose of activity, and so on. Therefore, the relationship between physical education and education is natural. It is a fact that we cannot conceive of physical education without education value as it cannot exist in an educational vacuum.

2.2 High school student attitudes about physical education

Attitudes are born from beliefs that we have about people and things. They shape our behaviors in countless ways and determine our involvement in activities, the goals that we set and those we decide to abandon. (Ajzen & Fishbein's 1980; Fishbein & Ajzen, (1975)) theory of reasoned action further explains that attitudes flow from beliefs and yield intentions and actions. Intentions are a function of two basic determinants: one's

personal attitude toward a behavior, and the attitude of others, including peers and parents, toward that behavior. The first determinant is the individual's positive or negative evaluations for performing the behavior. Generally, people with positive beliefs will have a favorable attitude toward the object of the beliefs and conversely will have an unfavorable attitude if their beliefs are negative (Silverman & Subramaniam, 1999). The second determinant is the person's perception of social pressure to perform or not perform the behavior based on the evaluation of others.

Other studies of elementary student perceptions have contributed to furthering our understanding of their views of physical education. For example, one study showed that students perceived physical education as fun and it made them feel good and special (Solmon & Carter, 1995).

Another study showed that elementary students were able to evaluate parts of the physical education curriculum and that their evaluations could be useful for curriculum revision. Findings also indicated a preference for skill-related over health-related activities (McKenzie et al, 1994)). Studies of student attitude toward physical education at the secondary level are informative. Luke and Sinclair (1991) found that curriculum content was the most influential factor in the development of positive and negative attitudes toward physical education, regardless of gender or whether students elected or avoided physical education.

According to Tannehill and Zakrajsek (1993), among the curriculum choices, running was most disliked by students and they indicated a negative attitude about fitness. These findings support those of Luke and Sinclair (1991) that running activities and fitness testing were very unfavorably viewed by all students. (Strand and Scantling 1994) examined activity preferences among high school students and found their choices to include a few team sports compared with a wide variety of individual and dual sports.

In a study focused on perceptions of high school students involved in a badminton unit, Tjeerdsma et al. (1996) found that students preferred game play and competition over

skill and drill practice. Finally, Chung and Phillips (2002) found a significant positive relationship between high school student attitudes toward physical education and participation in leisure-time activities. Student beliefs and attitudes impact their behaviors. Insights into these attitudes have implications for curriculum and instructional modification.

The need to examine and respond to student attitudes is especially important in high schools where curriculum and instructional delivery have historically been deficient (Locke, 1992; Siedentop, 1992). L. Rikard and. Banville Teaching in Physical Education monographs (Graham, 1995). Outcomes indicated that teachers could learn from students about what and how they teach (Graham, 1995). G. Linda Rikard* (2010) and Dominique Banville, High school students' attitude about physical education.

2.2 What are active learning instructional strategies?

Active learning instructional strategies include a wide range of activities that share the common element of involving students in doing things and thinking about the things they are doing (Bonwell & Eison 1991).

Active learning instructional strategies can be created and used to engage students in (a) thinking critically or creatively, (b) speaking with a partner, in a small group, or with the entire class, (c) expressing ideas through writing, (d) exploring personal attitudes and values, (e) giving and receiving feedback, and (f) reflecting upon the learning process

It should also be noted that active learning instructional strategies can (a) be completed by students either in-class or out-of-class, (b) be done by students working either as individuals or in group, and (c) be done either with or without the use of technology tools. When a teacher employs active learning strategies, he or she will typically will (a) spend greater proportion of time helping students develop their understanding and skills (promoting deep learning) and a lesser proportion of time transmitting information (i.e., supporting surface learning). In addition, the teacher will provide opportunities for students to (a) apply and demonstrate what they are learning and to (b) receive immediate

feedback from peers and/or the teacher.

2.3 Effects of active learning on the student learning performance and interest

The goal of an active teaching and learning process in physical education at high school level should be to establish a learning culture that promotes intelligent learning and deep understanding of physical education concepts. The knowledge of the learned physical education concepts could in such a case called conceptual knowledge (Setati & Adler, 2000:263-265). In short, the above mentioned researchers (Setati & Adler, 2000:263-265) found that conceptual knowledge and relational understanding is generated and intelligent learning occurs when the student was given a chance to actively create rich structures of cognitive connections within and between physical education concepts and practice. Hence, the teaching procedures and interpersonal relations in the physical education theory classroom should provide a framework that enhances such a creative and active learning culture. The research calls this type of framework an active learning approach.

Active learning is an approach that is extremely effective in maintaining students' information processing, developing skills, attitude and interest. The responsibility for learning is focused on the students. Most importantly, to be actively involved, students must engage in such higher order physical education theory class thinking tasks as analysis, synthesis and evaluation. Students are involved in acquiring information and interpreting or transforming it. To do all this, time must be provided within the curriculum. Norman and Schmidt (2000:727–728) argue that optimal student participation in the teaching and learning process is imperative to ensure that the students are able to effectively practice self-regulated learning methods.

2.4 Why are active learning strategies instructionally important in high schools?

Extensive workshop experience with faculty members indicates that before considering why using active learning instructional strategies is important in college classes, it is first

helpful to address —the elephant in the room by examining the question. What’s wrong with a 50-minute lecture? Though a well-crafted and captivating lecture presentation would seem to be an especially time efficient way for an instructor to —cover course content, converging evidence from a wide variety of different types of sources indicates that listening to a classroom lecture is not an especially effective way to promote deep and lasting student learning as many have long maintained.

Traditional teaching involves the transfer of information from the notes of the teachers to the notes of the student without passing through the minds of either (Multiple sources). For example, watching students today during teacher presentations, in both regular size classrooms, will reveal significant proportions of students (a) daydreaming, (b) attending casually to the lecture, (c) listening to iPods, (d) instant messaging on a cell phone, or (e) playing on a laptop computer. The proportion of students visibly engaged in taking notes in most classes has become all-too-often rather small. Further, the ubiquitous use PowerPoint slides during presentations has led students to anticipate routinely that they will have ready access to these slides. Further, the lecture method is a relatively poor instructional approach for maintaining student attention e.g., (Bligh, 2000).

Research findings suggest that student concentration during lectures begins to decline after 10-15 minutes e.g., (Stuart & Rutherford, 1978). A summary of the different types of evidence offered to support this assertion is provided by Bligh (2000, 44-56). Recently, Wilson & Korn (2007) have both reviewed this literature and questioned this claim, (i.e., largely by raising legitimate methodological and interpretive questions about the early yet often cited studies done in this area).

Their critique, however, does not challenge the consistent findings of recent research demonstrating that when compared to traditional 50-minute classroom lectures; - interactive lectures produce superior educational outcomes. For example, over twenty years ago, empirical research comparing lecture methods versus discussion techniques was summarized in the report *Teaching and Learning in the Classroom: A Review of the Research Literature* prepared by the National Center for Research to Improve

Postsecondary Teaching and Learning (McKeachie, et al., 1987). The review concluded that, In those experiments involving measures of retention of information after the end of a course, measures of problem solving, thinking, attitude change, or motivation for further learning, the results tend to show differences favoring discussion methods over lecture.

The use of active learning method in classroom is vital to have a positive impact on the quality of the students learning process and outcomes. In the active learning setting, behaviors such as working hard, attending class, participating regularly, acknowledging others' efforts and receiving help from colleagues are encouraged. A primary goal in active learning is that each student becomes a heterogeneous groups to master the content. The students are not only responsible for learning the material, but also for helping their group-mates learns.

There is a growing body of research in education that reports the benefits of active learning. Substantial evidence exists to support the idea that students working in active learning groups can master material presented by the teacher better than students working on their own Attitudes are psychological constructs composed of emotional, cognitive and behavioral components, attitudes have social, value, utilitarian, and defensive functions for the students who hold them (Newbill, 2005:41).

Effective implementation of active learning approaches enables students to acquire deep understanding of physical education theoretical and practical knowledge motor skills and problem-solving abilities which are essential to identify and tackle real problems employing appropriate learning methods. This approach has positive effects on students' academic performance. Besides from promoting academic achievement, students should be inculcated with interests and values that are appropriate to their lives as students and for career development. If active learning is properly implemented in mathematics education, students become successful in their learning. On the other hand, ineffective use of this approach brings academic failure. This in turn affects students' attitudes towards active learning methods and the subject. Thus, student's attitude

towards mathematics education could be enhanced by using effective active learning and teaching methods (Olowojaiye, 2000:129).

2.5 Examples of Active Learning Techniques

1. Think Pair Share: students ponder the answer to a question and then share their thoughts with a neighbor.
2. Role Playing: students look at the topic from the perspective of a character, which will affect and be affected by a chosen topic.
3. Jigsaw teamwork: this is a group discussion method employing many aspects of cooperative learning. In the example cited here, students use the "Jigsaw" technique to learn more about plate tectonics. For a more general discussion of cooperative learning see the module on Cooperative Learning.
4. The "jigsaw" mixes the students. They work in two or more different groups during the exercise.
5. Peer Review: students review and comment on materials written by their classmates.
6. Discussion: talk between students: a talk between two or more people about a subject, usually to exchange ideas or reach a conclusion, or talk of this kind deep in a discussion about what to do next. Promoting a successful discussion depends on correctly framing questions. Discover tips for framing discussion questions to promote higher order thinking.
- 7 . Problem Solving Using Real Data: students use a variety of data to explore scientific questions.
- 8 . Just in Time Teaching: students read assigned material outside of class, respond to short questions online, and then participate in collaborative exercises the following class period.
9. Game Based Learning: use competitive exercises, either pitting the students against each other or through computer imitations.
- 10 Interactive Lectures: draw students into the lecture by engaging them in short individual, pair, or small-group activities that deal with the lecture material.

The Jigsaw teamwork Technique

The jigsaw technique, which was introduced by Aranson et al (1978) to improve peer cooperation and create team solidarity among students through division of tasks Sharan, (1980), involves each student in a group to assume learning responsibility. Accordingly, students work in two different groups: main groups and jigsaw groups. First, students come together in their main groups (Doymuş, 2008). The main groups are divided into pieces like a jigsaw puzzle, and students join the jigsaw groups thus formed.

These jigsaw groups consist of the group members from different main groups that come together to study the same subject. After learning the subject in a jigsaw group, students return to their main groups and share the information they learned with the members of their own main group (Clarke, 1999).

A Jigsaw is an active learning exercise in which (1) a general topic is divided into smaller, interrelated pieces (e.g., the puzzle is divided into pieces); (2) each member of a team is assigned to read and become an expert on a different piece of the puzzle (e.g., one person is given a Team Building Issues puzzle piece/article, another the Team Composition & Roles piece/article, and soon); (3) then, after each person has become an expert on their piece of the puzzle, they teach the other team members about that puzzle piece; and, finally, (4) after each person has finished teaching, the puzzle has been reassembled and everyone in the team knows something important about every piece of the puzzle. Functioning as a successful team requires the integration of many different activities. If any piece of the puzzle is missing, the team is generally a group and not a team. This model was developed by Elliot (2000) and was based on the idea that cooperation will develop each individual, and each individual can reach a goal only if all other individuals in the group reach their goals. In Jigsaw, students are assigned to six member teams to work on academic material that has been broken down into sections. For example, the concept of acid might be divided into meaning and types, physical properties, chemical properties and uses.

Each team member reads his or her section. Next members of different teams who have

studied the same sections meet in expert groups to discuss their sections. Then the students return to their teams and take turns teaching their teammates about their sections. Since the only way students can learn sections other than their own is to listen carefully to their teammates, they are motivated to support and show interest in one another's work.

Elliot used cooperative learning specifically to bring children of different races and ability together. Student assigned to a group or 'home' group to specialize in one aspect of a learning unit. Students meet with members from other groups who are assigned the same aspect of a topic and after mastering the material, return to the 'home' group as experts and teach this material to the group members.

Jigsaw can be used whenever material can be segmented into separate components. Each group member becomes an expert on a different concept or procedure and teaches it to the group (Panitz, 1996). Like a Jigsaw puzzle, each piece (student part) is essential for the completion and full understanding of the final product. Therefore, each student is essential for the understanding of the whole concept being taught.

According to Aronson, (2000) the advantage of Jigsaw learning strategy is that students perform the challenging and engaging tasks in their expert groups with enthusiasm since they know they are the only ones with that piece of information when they move to their respective groups. Students who tutor each other develop a clear idea of the concept they are presenting and orally communicate it to their partner (Neer, 1987).

Elliot according to base the theory and practice of JIGSAW approach on social psychological research, mutual interest, coordinated efforts, trust and helpfulness amongst group members. Also academic performance was found to improve amongst ethnic-minority pupils. Socially, there was substantial development in inter-ethnic acceptance, concern and trust. Group members also showed an increased ability in taking on other perspective in role taking and promoting social sensitivity. Proposed the following steps to be followed while adopting this model:

The topics that were taught by use of Jigsaw cooperative learning strategy were Surds

and Logarithms to form three 17 year old students in secondary schools .The subtopics of Surds were; rational and irrational numbers, operation on Surds, rationalizing the denominator and applications of Surds. The subtopics of Further Logarithms were logarithmic notations, laws of logarithms, logarithmic expressions and, logarithmic equations. Appropriate group work for each of the sub topics were constructed and used during instruction at the beginning of each mathematics lesson. For each of the subtopics to be taught the ten steps of creating and use of Jigsaw cooperative learning strategy was followed as recommended by Aronson (2000). The group work was assigned to the groups and each student in the group assigned questions. The students with the same questions formed the expert group where they discussed their written answers to the questions. The students then went back to their initial group to present their findings to the other members of the group. All this was done with close supervision of the teacher. The teachers then evaluated the learners by asking questions that demanded written answers and gave them feedback. Finally MAT post-test was administered.

1. Divide students into 5- or 6-person jigsaw groups. The groups should be diverse in terms of gender and ability.
2. Appoint one student from each group as the leader. Initially, this person should be the most mature student in the group.
3. Divide the day's lesson into 5-6 segments corresponding to the number of the groups.
4. Assign each student to learn one segment, making sure students have direct access only to their own segment.
5. Give students time to read over their segment at least twice and become familiar with it. There is no need for them to memorize it.
6. Form temporary "expert groups" by having one student from each jigsaw group join other students assigned to the same segment. Give students in these expert groups time to
7. Discuss the main points of their segment and to rehearse the presentations they will make to their jigsaw group.
8. Bring the students back into their jigsaw groups.
9. Ask each student to present her or his segment to the group. Encourage others in the group to ask questions for clarification.
10. Float from group to group, observing the process. If any group is having trouble (e.g.,

a member is dominating or disruptive), make an appropriate intervention. Eventually, it's best for the group leader to handle this task. Leaders can be trained by whispering an instruction on how to intervene, until the leader gets the hang of it.

11. Give quiz at the end of the session on the material learnt.

The Jigsaw strategy places great emphasis on cooperation and shared responsibility within groups. The success of each group depends on the participation of each individual in completing their task. This means the Jigsaw strategy effectively increases the involvement of each student in the activity. (See "Some suggestions for forming groups" for more information on groups).

2.6 Academic performance and interest

In active learning in the SCALE-UP environment in the US, students are not required to attend class. Despite this, average attendance in the University of North Carolina is as high as ninety percent. Most of the students choose to study in this format in their second year of studies on the basis of recommendations from fellow students. The percentage of dropouts from active courses using this approach was measured at Florida International University and was found to be one fourth of the dropout rate for similar courses using traditional teaching approaches.

The level of satisfaction of students and teachers at FIU with the course using the active teaching method was particularly high in comparison to other courses. Following their exposure to this teaching method, ten to twenty percent of students chose to focus on science studies (Kramer, Brewe, & O'Brien, 2008). In conclusion, most researchers who examined active learning identified an improvement in the following indices: conceptual understanding, test achievements, reduced dropout rates, student satisfaction, team work, and problem solving.

Moreover, in these approaches the focus of the learning is on memorizing content. Thus, in these teaching approaches learners are passive and play little part in their learning

(Mayer in Richardson, 2003:1623–1640; Schunk, 2000:23-28); (Swan, 2005:43- 57). However, in active learning/student-centered learning approaches, students participate actively in their learning and become autonomous learners who actively construct new meaning within the context of their current knowledge, experiences and social environments. They mainly construct knowledge through solving realistic, relevant problems, often in collaboration with others.

2.8 Research findings in support of peer teaching and jigsaw teamwork active learning strategy

This study was conducted on the title effects of peer teaching and jigsaw teamwork active learning approaches on grade 9 students learning performance and interest in physical education theory class. Under this topic there were four research questions responded by teachers and students and data was obtained through questionnaires, tests, interviews and observation analyzed using independent t test, paired t test and frequencies of responses by the help of SPSS software.

There are many research findings that support the finding of the effect of peer teaching and jigsaw teamwork active learning strategy, there are also studies that did not consider active learning strategy effective in learning performance. This section of the literature study describes some of these findings which are aligned with finding of this research.

Based on the findings of the study by Mbacho, Naomi 1, Bernard, 2002), which was carried out in District mixed-sex secondary schools of Laikipia East District of Kenya, it was concluded that students who are taught mathematics topics using Jigsaw learning strategy perform better in the topics than those taught by use of conventional teaching methods.

Effects of jigsaw technique on academic achievement and attitudes to written

expression course by Abdullah ahin After the analysis of the data, it was found that Jigsaw II technique was more effective than instructional teacher- centered teaching in the development of writing skills of the students, in the experimental group.

In turkey, a study conducted by COC, et.al (2010) concluded that teaching chemistry using jigsaw method was more effective in enhancing students' achievement compares with the conventional method. Another study conducted by Mengduo, Xiaoling, (2010) tried to examine the effectiveness of jigsaw strategy in teaching English language. The results show motivation and reinforcement of students' participation.

A research on effectiveness of jigsaw by (Francis Hull Adams 2008) the study revealed that jigsaw is very useful. Through the use of the technique pupils naturally develop the interest of working with their colleagues and through that they learnt from each other and hence learnt better. They also cultivate good attitudes from each other.

Other researchers who studied active learning approaches in mathematics education have also shown that the implementation of active leaning methods develops positive attitudes in students towards the approach. For instance, the study conducted by Zan and Martino (2007:159-164) indicates that students in the experimental group held positive attitudes towards active learning in mathematics education. Vaughan's (2002:359-364) study affirms this. Niess (2005:509-523) also finds that students in the experimental group held positive attitudes toward mathematics education.

Mathematics students' interests and attitudes towards active learning affect their learning. Students with positive attitudes to the teaching and learning methods and those who show interest in the subject will score high grades and succeed.

A research showed that the significant differences between control group and experimental group in performance and interest scores. Thus, the meaningful differences that obtained in the present research suggested that the active learning method has a significant role in performance and interest rather than traditional (teacher-centered) learning method. Several studies have demonstrated both quantitative and qualitative

indication regarding the effectiveness of active learning techniques.

The active learning method can be observed as instructional activities involving students in teaching learning process as part of the method changing the role of students from passive listeners to active recipients of knowledge.

Other researchers who studied active learning approaches in mathematics education have also shown that the implementation of active learning methods develops positive attitudes in students towards the approach. For instance, the study conducted by Zan and Martino (2007:159-164) indicates that students in the experimental group held positive attitudes towards active learning in mathematics education. Vaughan's (2002:359-364) study affirms this. Niess (2005:509-523) also finds that students in the experimental group held positive attitudes toward mathematics education. Mathematics students' interests and attitudes towards active learning affect their learning. Students with positive attitudes to the teaching and learning methods and those who show interest in the subject will score high grades and succeed.

On Effects of jigsaw technique on seventh grade primary school students' attitude towards mathematics by Sare ŞENGÜL a, Yasemin KATRANCI b* When the findings of the study are examined, it can be seen that the interest of students towards physical education prior to the application of the peer teaching and jigsaw technique were significant and high. When the literature relating to the active learning is examined, it can be seen that the effects of this method on students' performance and interest towards the physical education theory class were investigated. When the findings of the study obtained after the application of the jigsaw technique are examined, it is seen that there is very slight change in students' interest towards physical education.

The present study that investigated the effect of Lasher's active learning instruction on Grade 11 learners' achievement in Newton's laws of motion has not been carried out before in South Africa. Thus the findings add to the available body of knowledge.

Some findings are consistent with findings reported in literature. The present study also

established positive effects on Grade 11 students' achievement in Newton's laws of motion.

Learners exposed to the ALA were found to have performed significantly better than learners taught with TDI. Secondly, the learners who were taught with the ALA retained knowledge of Newton laws of motion better than those taught with TDI but the difference in the mean scores of the retention of knowledge test was found to be insignificant. Furthermore, the study found that the Lasher's active learning approach improved the learning style of the learners who were subjected to it. Generally, the study indicated that the ALA had positive effect on the achievement of Grade 11 learners in Newton's laws of motion.

In addition, the research by Bilesami and Oludipe (2012: 307-325) corroborated the effectiveness of cooperative instructional strategy in enhancing academic achievement. Their study investigated the effect of cooperative instructional strategy on junior secondary school learners' academic achievement in science. The sample consisted of 120 learners selected from three intact classes. The two experimental groups were taught using cooperative instructional strategies (learning together and jigsaw) while the control group was taught using conventional teaching method. The findings of the study showed that cooperative instructional strategy was more effective in enhancing learners' academic achievement and retention in science than the conventional teaching method.

The effectiveness of cooperative instructional strategy in enhancing academic achievement is also supported by the research study of Samuel and John (2004: 26- 35). The researchers investigated the effects of cooperative class experiment (CCE) teaching method on secondary school learners' chemistry achievement in Kenya's Nakuru District. The findings of the study showed that cooperative instructional strategy facilitated learners' chemistry learning and achievement more than the regular teaching method. The support for the effectiveness of cooperative instructional strategy in enhancing academic achievement comes from the study of Adeyemi (2008: 691-708).

The researcher investigated the effects of cooperative instructional strategy on junior secondary school learners' achievement in social studies. The sample consisted of 150 learners (80 boys and 70 girls) selected from three public schools. The results showed that learners exposed to cooperative instructional strategy performed better than their counterparts taught using the traditional teaching method.

Similarly, Christian and Pepple (2012: 109-120) found that cooperative instructional strategy resulted in enhanced academic performance. The researchers carried out a four week study involving 370 senior secondary school learners. Learners in different groups were taught chemistry using cooperative, individualistic, and conventional teaching strategies. At the end of the study, learners were post-tested to evaluate the effects of the teaching strategies. The results showed that learners in the cooperative group performed better than their counterparts in the individualistic and conventional learning groups.

In the same vein, Armstrong et al (2007: 163-171) compared cooperative instructional strategy and traditional lecture method in an undergraduate biology course. Their results showed that the experimental group that was instructed through cooperative instructional strategy showed greater improvements in overall test scores than the control group that was taught using a traditional lecture method.

Further affirming the effectiveness of cooperative instructional strategy in enhancing academic performance is the study of Effandi and Zanaton (2007: 35-39). The researchers investigated the effect of cooperative instructional strategy on the academic performance of learners in mathematics. Their results showed that learners in cooperative group instruction performed better than learners taught using the traditional lecture method. The findings of Fengfeng and Barbara (2007: 249-259) corroborates that of Effandi and Zanaton (2007: 35-39). They investigated the effects of teams-games-tournament (TGT) cooperative learning method on learners' achievement in mathematics. Multivariate analysis of variance was used to analyze the data collected. The results showed that cooperative games instructional strategy was more effective in

enhancing learners' mathematics achievement than conventional teaching method. Similarly the result of the study of Barcin and Leman (2007: 349-373) on the impact of cooperative instructional strategy on the grade 09 learners' understanding of metallic bonding showed that the mean score of learners in cooperative learning group was significantly higher than the mean score of their counterparts in the traditional lecture method.

2.9 Research findings not supportive of peer teaching and jigsaw teamwork active learning technique

As there are many research findings that support effectiveness of jigsaw teamwork active learning technique, there are also studies that did not consider jigsaw teamwork as active learning technique effective in learning performance. This section of the literature study describes some of these findings which are not aligned.

Şimşek, Doymuş and Karaçöp (2009) investigated the effects of jigsaw and cooperative learning techniques on democratic attitudes of higher education students. According to the results of their study conducted with 116 students during 8 weeks, they found that there were no significant differences between the classes based on both pre-test and post-test results of the democratic attitude scale applied. No significant differences were found between the pre-test and post-test attitude scores in this study either.

A research by Maden, (2011), who made comparison between jigsaw strategy and conventional method with regard to the development of written expression skills. It was found that there was no significant difference between the two methods. Moreover, the study of Martin and Rowland (2007: 29-41) does not consider cooperative instructional strategy effective in enhancing academic achievement. They compared the effects of jigsaw method of cooperative instruction and traditional teaching method on the achievement of grade 12 learners in physics. Their results revealed no significant differences between the two groups of instruction in learners' achievement in physics.

2.10 Active Learning in Academic Institutions

Numerous evaluation studies have been undertaken in the United States to examine the advantages of active learning in appropriately-adapted classes. One of the active learning environments developed at the start of the twenty-first century is the SCALE-UP (*Student-Centered Active Learning Environment for Undergraduate Programs*) environment. This approach emphasizes active learning by students in large classes including fifty or more students. Classrooms in this environment were described in detail by Beichner. Beichner, Saul, Allain, Deardorff, and Abbott, (2000); Beichner et al., (2007), who developed the approach. Students in these classes sit at round desks, each of which has room for nine students. Every three students form a group. A significant proportion of the lesson time is devoted to activities by the students, such as problem solving, simulation, laboratory investigations, researching websites, writing a position paper, or undertaking a task. The researchers ran tests in institutions adopting this teaching method in order to gauge the level of conceptual understanding of the studied subjects at the beginning and end of the course.

These tests were identical to the accepted tests in the academic world in the US and, accordingly, could provide a basis for fair comparison between traditional teaching and active teaching. The researchers interviewed students, held discussions with focus groups, examined the students' files, undertook observations, and prepared audio and video recordings of hundreds of hours of active teaching (Beichner et al., 2007).

2.11 Active Learning and Conceptual Understanding

A wide range of evidence supported the concept that active learning students achieve higher conceptual understanding compared to other students who studied the same courses according to the traditional learning approach (Dori & Belcher, 2005). The idea that "active learning only supports the under-achiever student and neglects future stars" is in many cases invalid. In a large scale study of 6500 students studying according to active learning methods, Hake (1998) found that stronger students exhibited greater

improvement of conceptual understanding of Newtonian physics compared to other less skilled-students.. Nevertheless, according to Hake's study, both populations improved their conceptual understanding more than students who studied according to traditional learning methods. (Pundak,Hershkowitz, Shacham, & Wiser-Biton 217).

2.12 Traditional direct instruction

Traditional direct instruction (TDI) has been the most popular method to teaching for many years Killen, (2000). It is all about teaching the child everything in explicit detail just because the teacher knows everything and the learner is still naive Kuszewski, (2011). The teacher seeks information that is supposedly the only truth and transmits it to learners Kuszewski, (2011). Thus, the teacher tells the learners all the facts about the topic and occasionally validates what has been said with a demonstration. Robson (2002) states that, teachers who decide to use TDI to teach a topic usually believe that to learn is equivalent to remembering (i.e. to acquire knowledge which is an approved 'truth' or 'fact').

2.12.1 Advantages of Traditional Direct Instruction

Killen (2000) lists a number of advantages to the lecture method. For example, a lecture is a convenient way to instruct large groups. If necessary, a public address system can be used to amplify the speaker's voice. Direct instruction can be used to present information that would be difficult for the learner to understand other ways, particularly if the students do not have the time required for research, or if they do not have access to reference material.

Direct instruction can usefully and successfully supplement other teaching devices and methods for example a brief introductory lecture can give direction and purpose to a demonstration or prepare learners for a discussion by telling them something about the subject matter to be covered. In a lecture, the teacher can present many ideas in a relatively short time. Facts and ideas that have been logically organized can be concisely presented in rapid sequence. Lecturing is unquestionably the most

economical of all teaching methods in terms of the time required to present a given amount of material (Cangelosi, 2003).

The lecture is particularly suitable for introducing a new subject and for explaining the necessary background information. By using a lecture in this way, the teacher can offer learners with varied back-grounds a common understanding of essential principles and facts. Ross and Kyle (1987) and Berliner (1982) in Killen (2000) suggest that direct instruction is particularly suited to teaching low achieving learners. It is argued that low achieving learners often lack the skill to locate, organize and interpret information Killen, (2000). Direct instruction creates non-threatening and reasonably stress-free environment for low achieving learners because they are not forced to participate and become embarrassed.

2.12.2 Challenges of Traditional (teacher-centered) teaching method

Although the lecture method can help the teacher meet special challenges, it does have several disadvantages. Too often the lecture inhibits learner participation and, as a consequence, many learners willingly let the instructor do all the work Killen, (2000). Learning is an active process, and the lecture method tends to foster passiveness and teacher dependence on the part of the learners. As a teaching method, the lecture does not bring about maximum attainment of certain types of learning outcomes. Motor skills, for example, can seldom be learned by listening to a lecture (ibid). The only effective way students can perfect such skills is through hands-on practice.

According to cognitive scientists Gopnik, (2011); Bonawitz et al, (2011); Buchsbaum, (2011), Showing a learner what to do, instead of letting her figure out the solution herself severely affects the learner's ability to independently and creatively solve problems, or to find different possible hidden solutions in Kuszewski (2011).

According to (Killen 2000) a lecture does not easily allow the teacher to estimate the learners' understanding as the material is covered. This emanates from the fact that within

a single period, the teacher may unconsciously present more information than learners can absorb. Also, the lecture method provides no accurate means of checking learner progress (ibid). Many teachers find it difficult to hold the attention of all learners in a lecture throughout the class period (Killen, 2000).

To achieve desired learning outcomes through the lecture method, a teacher needs considerable skill in speaking. As indicated by research, a learner's rate of retention drops off significantly after the first 10-15 minutes of a lecture period (Killen, 2000); (Cangelosi, 2003). In addition, the amount of material retained after a lecture is about five per cent after 24 hours (ibid). Another shortcoming of TDI, which can also be considered as rote memorization method of teaching, is that it requires learners to stay in their seats, pay attention, watch the teacher, and imitate what the teacher does (Kuszewski, 2011).

2.13 Theoretical framework

The theoretical framework to guide the study was based on the approach that teaching and learning process has inputs and outputs. The input to teaching and learning process consists of people, resources and information, and the output consists of people whose performance, skills and interest have to be improved in some desired way.

To get good results (output) the input must have suitable materials. It was, therefore assumed that learners' failure can be blamed on quality of teaching and not lack of learners' ability to learn (Bloom, 1981; Levin, 1985).

Learners' performance was influenced by various factors. These factors include: learner characteristics, classroom environment and teacher characteristics as shown in figure 2.1. These were the inessential variables that needed to be controlled. The teacher characteristics determine the content knowledge and how effective the teacher will use each approach. The study used the researcher who is qualified and has over 3 years' experience teaching physical education in high school to control the teaching variable.

The learners' age and their class determine what they are taught. Grade 9th learners of approximately the same age 14-20 participated in the study. The type of school as a teaching environment affects learners' performance. The two classes of grade 9th 01 & 9th 03 used were in the same school and had almost the same number of and that controlled the effect of classroom environment to a large extent.

The independent variables were Jigsaw teamwork active learning strategies and the traditional teaching method. The Jigsaw teamwork active learning strategy and traditional teaching method generated the dependent variables, learners' performance and interest of physical education class, which were measured. The traditional teaching method used an instructional model in which the teacher transferred information to learners. In contrast, the Jigsaw teamwork active learning strategy used to promote learning, in contexts in which learners play an active role in learning. Roles of the teachers and learner were shifted, as the teacher collaborated with her learners in order to help facilitate meaningful construction in the learners. Learning therefore became a give-and-take experience for the learners and teachers.

Conceptual framework

The conceptual framework of the study was based on the Ausubel's model of meaningful reception learning and systems theory developed by Ayot and Patel (1987). The framework shows Jigsaw teamwork learning teaching strategy as an intervention in the teaching and learning process of physical education.

Table 2.1 The representation of the relationship among variables within the conceptual framework is shown in Figure 2.1

Teacher/learning process;	Teacher characteristics	Student's
Jigsaw teamwork as active learning strategy. traditional (teacher-centred) learning/teaching methods.	Training Experience Learners' Gender	Interest and learning Performance in Physical education scores

The framework shows Jigsaw teamwork as active learning/teaching strategy as an independent variable of the study. The dependent variable was the students' interest and learning performance in physical education class. The independent variables were the Jigsaw learning strategy presented to experimental and control group students and the traditional learning/teaching methods (teacher-centered). Jigsaw teamwork learning strategy was implemented to influence positively on students' interest and learning performance in physical education class as compared to the use of 'traditional learning/teaching (teacher-centered) Methods. This assisted in knowing whether implementation of the active learning as a variable had any effect on the dependent variable after using Jigsaw teamwork learning/teaching strategy.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter contained the research design, research methods, the research population and sample, data collection instruments, data collection procedure and the data analyses methods, it also included a discussion of ethical issues considered in the study.

3.2 Research Design

This study is based on quasi-experimental design. Quasi-experimental design is an experimental design, where the researcher doesn't randomly assign participants to comparison groups usually because, random assignment is not practicable. The main purpose of it is to determine cause and effect (McMillan & Schumacher, 2010: 22). A common situation for implementing quasi-experimental research involves research in which several classes or schools are used to determine the effect of teaching methods. In such a situation, it is possible to give an intervention to some of the classes and treat other classes as the control group.

In this study, a mixed method approach specifically quasi-experimental design and case study was used to collect data. A mixed method design is a research in which the investigator collects and analyzes data, integrates the findings, and draws inferences using both qualitative and quantitative approaches or methods in a single study (Tashakkori & Cresswell, 2007: 4). Similarly, quasi-experimental design is a research in which there is no random assignment of subjects. It was considered appropriate for this study as it allowed for comparison of the experimental and control groups, manipulation of independent variable, measurement of dependent variable, use of inferential statistics and provide for maximum control of extraneous variables (McMillan & Schumacher, 2010: 258). Random selection of learners to the experimental and control groups was not possible because secondary school classes exist as unbroken groups and school authorities do not usually allow the classes to be reorganized for research purposes (Borg and Gall, 1989; Frankel & Wallen, 2000). So it was selected purposefully. Initially there were 10 grade 9 classes and all of them were taught by two

teachers so it was designed to apply in one school two sections taking the whole students of the class.

In this research quasi experimental design, which includes “Pre-test/post-test design with control and experimental group” was used to explore effects of Jigsaw teamwork as active learning technique and traditional teaching methods on high school physical education students’ learning performance.

The pre-test was treated as a normal classroom test that students regularly take in the course of instruction while the post test was taken as a normal test that is administered after a topic has been covered. Here, the treatment group was subjected to an intervention involving an active learning approach. On the other hand, the comparison group was subjected to traditional teaching methods in order to explore the difference between the two groups’ performance of physical education.

The Jigsaw teamwork active learning technique was employed after the first semester break. Before the first semester break, teaching was done using the traditional teaching methods. The post-test was administered immediately after using the active learning techniques. Thus, the data was collected at the same school and at the same time. The treatment group was taught using the Jigsaw teamwork active learning approach and the comparison group was taught using traditional teaching method. Both groups received the same pre-test before the treatment and then two months later performance was measured by administering the post-test items to the learners. In addition to this questionnaire of

Likert scale was responded by the experimental group before and after implementation to examine the effect of peer teaching and Jigsaw teamwork active learning techniques on students’ interest towards physical education class.

3.3 Research Methods

In this study a mixed methods approach was followed. Mixed methods research

purposefully involves a multiple set of approaches; all approaches were valuable and have something to contribute to understanding, but only partially. The use of several approaches and methods leads to a better understanding of the issue under investigation quantitative analysis using tests (Cohen, Marion and Morrison, 2003:31-34). The pre-test/post-test design was used. The study was carried out with total of 102 students (52 experimental group and 50 control group) studying at a high school located in Yeka sub-city in Addis Ababa, purposes.

Gay and Airasian (2000:201) point out that triangulation gives broad coverage of education characteristics and allows for crosschecking of information. The aim of triangulation is to ensure the validity and reliability of the findings. Hence, tests, questionnaires, observation and focus group discussion were employed for data gathering in the present study as follows: In the qualitative phase, focus group discussion was employed for gathering the information required for the study. All the information gathered through the focus group discussion and observation checklists were used as additional information to complement the data gathered through questionnaires. In a mixed methods approach, the study adopts data triangulation.

3.4 Population and Sampling Techniques

The population was 556 grade nine students of yeka sub-city Edget Chora secondary school physical education students because grade 10 students were participants of national exam. The school was selected purposefully because (1) the researcher works as teaching learning vice principal in the school (2) the learners' interest and performance in physical education has not been generally good and (3) the school is new with more of new graduate teachers. The participants consisted of two different classes (control and experimental) of grade nine physical education students who attended in 2008 academic year.

3.4.1 Sample techniques

Purposive sampling was used for the study. the researcher selects particular elements from the population that will be representative or informative about the topic of interest Purposive sampling is appropriate where the researcher has previous knowledge of the population and has a specific purpose for the study and therefore relies on personal judgment to select a sample that includes subjects with needed characteristics (McMillan & Schumacher, 2010: 138). Purposive sampling is based entirely on the judgment of the researcher on the elements that will facilitate an investigation.

In this study, the researcher used purposive sampling to select two classes with comparable characteristics in terms of learning performance, learners' discipline and teachers' performance of teaching. Purposive sampling was based on what the researcher wishes to discover, understand, and gain insight and therefore must use a sample from which the most can be learnt (Merriam, 2002: 61). One of the classes was purposefully assigned as experimental group (participants of jigsaw teamwork), and the other was purposefully assigned as control group. In control group students were taught physical education theory class through the traditional teacher-centered method whereas in experimental group students were subjected to the jigsaw teamwork as active learning technique in order to compare the effect of active learning approach and traditional teacher-centered method on physical education students' interest and learning performance.

In order to select the groups for the study, two pre-tests were conducted on the two classes that offered physical education in the school to prove their homogeneity between the students. In both pre-tests, it was discovered that there was no significant difference between the mean scores of the two classes. Two classes were selected by purposive sampling with similar number of students and status of performance for the study. The groups selected were Grade 9th 1 as experimental class as a whole and grade 9th 3 as control class as a whole. The samples in each of the two selected classes are shown below:

Table 3.1: Participants in experimental and control Groups

Participants	Total Number	Male	Female	Age
Group 1: Treatment / Experimental group	52	15	37	14 – 20
Group 2: Comparison / Controlled group	50	17	33	14 – 20
Total Number of teachers	10	8	2	24-37

3.5 Data collection instruments

The objective of this research was to investigate the effects of jigsaw teamwork active learning approach in physical education class. Four measurement instruments such as tests (pre-test and post-test), questionnaire, interview and observation checklist, were used to collect data to address the purpose of this study. Students' interest in a teaching approach can be predictor of their academic performance and students' interest towards physical education theory class can be measured using questionnaire.

As it was mentioned on research method the aim of triangulation is to ensure the validity and reliability of the findings. Hence, tests, questionnaires, observation and focus group discussion were employed for data gathering in the present study as follow:-

3.5.1 Pre-test/post-test

The physical education test was included 20 multiple choices. This design with control-experimental group" was used in this research. The purpose of the test was to compare effects of Jigsaw teamwork active learning approach in physical education class and traditional instructional teacher-centered teaching method on grade nine students' performance in physical education class before and after application. The participants consisted of two different classes of 102 students who were attending 2008 academic year. One of the classes was purposively assigned as experimental group (n= 52), and the other one as control group (n= 50).

3.5.2 The interest Likert scale

The interest Likert scale for this study contained 10 close ended items conducted to grade 9 sample students (experimental group) to assess their interest towards physical education theory class before and after the implementation of jigsaw teamwork as active learning approach.

Interest Likert scale that was well designed, properly managed and its results carefully interpreted are valid and reliable tools, and can provide valuable information to the researcher. The questionnaire was prepared in English for teachers and Amharic (which is translated from English) for students. Responses were coded on a five-point Likert Scale with the following meanings: 1= strongly disagree, 2 = Disagree, 3 = not sure 4= agree, 5= strongly agree for positive and negative statements.

The sample students in the treatment group gave responses to the questionnaire. The comparison group was not asked to answer the questionnaire because the group was not exposed to active learning instructional approach apart from the traditional teaching method. The treatment group was exposed to both traditional teaching method and jigsaw teamwork active learning. So was in a position to compare the two teaching approaches.

The purpose of the questionnaire was to collect data regarding to the effect of the active learning approaches on grade 9 students' interest towards physical education, especially the experimental group.

3.5.3. Focus group discussion

The classroom focus group discussion was used to determine the effectiveness of the jigsaw teamwork approach and also as a follow up on the students' interest towards physical education. The treatment group leaders' were given group discussion to verify some of the findings of the questionnaire. A treatment leaders' focus group discussion was discussion with a small group of four to eight people who are discussed together on a specific topic (Bless & Higson-Smith, 2000). So focus group discussion was conducted

with 8 students' selected from the sample treatment group classroom, one group leader student from each one to five study program by using purposive sampling method because the selected interview group sample could give the information needed about the jigsaw teamwork active learning and traditional teaching approach.

The questions were designed to ask information to determine the sample students' responses to the teaching approach used the effect on their interest and performance. In this research, focus group discussion was used for collecting rich information regarding the nature of the teaching–learning process in line with the active learning approach and the effect of this approach in physical education students' interest and performance at high school. A flexible approach was used regarding the focus group discussion.

3.5.4. Observation checklist

In this study the purpose of the observation is to collect qualitative data about active learning approaches and traditional method of teaching to enhance and support the quantitative data as information.

The observation method of data collection was used practically to assess the effect of implementation of jigsaw teamwork active learning approach in physical education class. It was focused on specific activities of the classroom taking into account only qualitative incidents.

3.6 Validity and Reliability of the instruments

Reliability; is the extent to which a questionnaire, test, observation or any measurement procedure produces the same results on repeated trials. In short, it is the stability or consistency of scores over time or across scorers.

Validity: Validity is defined as the extent to which an instrument measures what it claims to measure (Bless & Higson-Smith, 2000). Validity may be measured in different forms.

These forms include: content validity, face validity, criterion-related validity (predictive validity), and construct validity, factorial validity, concurrent validity, convergent validity and divergent or discriminant validity Golafshani, (2003). The first four are most commonly referred to in reference to the validity of an instrument. For this study the researcher was applied Content validity and face validity.

Validity of the tests establishes that items or questions are relevant to the various components of what was studied and that the learners interpret the questions and answers in the same way the researcher intended” (Saul, 1998; p.109). Content validity was established for the question papers by judgment of the subject teachers and approved by the department heads of the school. The questions for pre-test and post-test were selected from grade 9 students’ text book for first semester mid-exam.

The teachers established the same questions for both groups and were prepared in line with the school’s mid-exam for grade 9 physical education students to assess performance of both experimental and control groups prior to the implementation of jigsaw teamwork active learning approach to measure their physical education performance. The interest Likert scale questionnaires were selected from different similar researches on active learning approaches and modified related to the research question. These questionnaire items were about 25 in number but discussed with experienced teachers and selected the best ten items for this study.

The purpose of the focus group discussion was to find out if the sample students enjoy and interested on the jigsaw teamwork approach to traditional teaching methods or not. Focus group discussions are usually associated with qualitative research. The comparison group was excluded from the interview because the group did not experience the jigsaw teamwork approach. It was checked and approved by experienced teachers to the selected samples before administering and was conducted by the researcher. This process was carried out of the classroom for a while not more than 30 minutes in consideration of ethical issues. The process therefore also eliminated subjectivity on the part of the researcher. An important issue here is the fact that the researcher is not their teacher, so

group focus group discussion allowed students the freedom to express themselves without fear.

The questionnaire was initially administered as a pilot test to one section of grade 9 physical education classes which was not selected including 22 students. Cronbach's Alpha should be positive and usually greater than 0.70 in order to provide good support for internal consistency reliability. The result of Cronbach's alpha was 0.535 and there was low consistency between the items. The purpose of this technique was to test understanding of the items in the questionnaire. Based on the feedback changes were made, after the changes questionnaire was tried again on another group Cronbach's alpha showed 0.77. The modified questionnaire was accepted for the research. The questionnaire was administered by the researcher to the treatment (experimental) group, which comprised of twenty two learners from out of the selected sample classes and it was translated to Amharic in order to make it easy understand by respondents.

3.7 Procedure of data collection

Murali et al. (2004: 1) defined data collection as the process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions, test hypotheses, and evaluate outcomes. For Creswell (2001: 185), data collection steps involve setting the boundaries for the study, collecting information through tests (pre-test and post-test), Likert scale test, observation and focus group discussion, as well as establishing the protocol for recording the information. The discussion that follows in the next section describes in detail the procedure used to collect data in this study.

3.7.1 Pre and post test

To prepare and administer the tests the researcher first discussed with physical education teachers. Determine of the number of questions, date and time of administering the pre-test. Then after, pre-tests were administered to both groups prior to the beginning of the

jigsaw teamwork technique. Learners in the experimental group were taught using jigsaw teamwork approach while learners in the control group were taught using traditional teaching method. The treatment lasted two months after which a post-test was administered to both the treatment and the comparison groups. The pre and post-tests are scored by the teacher.

In this study, the researcher used physical education test to collect data. At the beginning of the study, learners in both the experimental and control group were pretested using the physical education. Both the pretest and posttest was administered under similar conditions in both the experimental and control group.

3.7.1.1 Treatment / experimental group

In the experimental group, learners were divided into groups of six members. Each group consisted of a mixture of high-and low-ability learners with an equal number of boys and girls but in the school's context the number of girls was greater than the boys. The basis for forming heterogeneous groups was to maximize strength (Asherson, 2008: 14). A total of 9 teams (52 learners) were formed in the experimental group.

The jigsaw technique, which was introduced by Aranson et al (1978) to improve peer cooperation and create team solidarity among students through division of tasks (Sharan, 1980), involves each student in a group to assume learning responsibility. So, students work in two different groups: main groups and jigsaw (expert) groups. The day's lesson was dividing into 5-6 segments equivalent to the number of the groups. The group work was assigned to the groups and each student in the group assigned questions. The students with the same questions formed the expert group where they discussed their written answers to the questions. The students then went back to their initial group to present their findings to the other members of the group. All this was done by the teacher and with close supervision of the researcher. The teachers then evaluated the learners by asking questions that demanded written answers and gave them feedback. Finally, physical education post-test was administered.

3.7.1.2 Control group

The control group consisted of 50 learners who were taught using the traditional teaching method. In this method, the teacher presented information on the topic to the whole class while learners listened and wrote notes at the end of the lesson. Learning activities were done by learners individually. The topics taught in the experimental and control group were the same. The treatment in both the experimental and control group lasted for a period of eight weeks. Finally physical education post-test was administered.

3.7.2 Interest Likert scale test

After the completion of proving the validity and reliability of the prepared questionnaire the researcher tried to translate it for students from English into Amharic to enhance their understanding of each item, so that can help them to respond simply. The researcher also gave orientation to sample students about the way of giving responses before distribution of the questionnaires. After distribution of questionnaires students completed within one period of time and teachers within two days.

The interest Likert scale test was used to determine the effect of jigsaw active learning approach interest of sample students towards physical education. This scale has 10 questions which were responded by grade 9 physical education students. In addition to these total of 20 questions based on the research questions were responded by teachers to get responses on 1. To what extent are physical education teachers implementing jigsaw as active learning approach, 2. And the factors that hinder the implementation of jigsaw teamwork as active learning strategy, The responses were coded on a five-point Likert Scale with the following meanings: 1= strongly disagree, 2 = Disagree, 3 = not sure 4= agree, 5= strongly agree.

3.7.3 Focus group discussion

The focus group discussion was conducted by the researcher. The researcher went to the experimental class during the researcher's normal physical education period. The

researcher selected the one to five group leaders 8 students and oriented the group to understand about the questions and respond. Learners were told to give their honest opinion about the instructional method.

After the learners had finished writing down their responses, the researcher discussed on their responses with them to ensure how he understood their responses were the same as what they intended in writing. The researcher then wrote a summary of the answers.

3.7.4 Observation checklist

The classroom observations focused on the following main areas:

1. What teachers and students do at the start, during and at the end of a lesson?
2. The extent to which appropriate active learning methods were applied/implemented by teachers or not and its effect on the students activity? And
3. Whether students individually or in a group were free to express their opinions and to interact with each other and their teachers. The researcher in the participants' class during their regular physical education class and use an observation checklist to record what he saw, heard, and experienced during a teaching session. Two teachers from each two sample classes were observed.

3.8. Data analysis Methods

Data analysis according to refers to the process of applying statistical and logical techniques to describe, illustrate, condense, recap, and evaluate data. For De Vos et al. (2005: 335), data analysis is a method of categorizing, ordering, manipulating and summarizing data to attain answers to a specific research question.

A key characteristic of data analysis in research is the production of high quality, meaningful and relevant data that makes it possible for valuable insights to emerge (Creswell, 2003: 203). Shepard (2002: 169-183) argues that an essential component of ensuring data integrity is the accurate and appropriate use of statistical analysis as improper statistical analyses could distort scientific findings, mislead casual readers, and

may negatively influence the public perception of research. In line with this viewpoint, Murali et al. (2004: 1) list a number of issues that researchers should be cognizant of with respect to data analysis. They include: having the necessary skills to analyze, concurrently selecting data collection methods and appropriate analysis, following acceptable norms for discipline, determining statistical significance, providing clearly defined and objective outcome measurements; and providing honest and accurate analysis.

The data analysis method for this study was the t-tests. The t-test was used because the mean scores of learners were compared in the experimental and control group. According to McMillan and Schumacher (2010: 300), t-test is used in a situation when there is a comparison between two values to see if they are different.

The quantitative data obtained from physical education teachers and students through the Likert scale items were analyzed by using frequencies, independent t-test, paired t-test mean and SD values. No hypotheses were tested as this is not the aim of the study. Qualitative data obtained through observation of classes and interviews with the students and teachers were analyzed qualitatively (using words). To this end, the following method to analyze qualitative data was used.

Descriptive statistics

According to Trochim (2006), descriptive statistics provides a summary about a sample. Thus, the descriptive statistics was used to report what was found in different ways. In this study, the mean, standard deviation, mean difference, p-value and t-value of the tests were calculated. For each test, the statistic for the treatment group was compared with and differentiated from that of the comparison group.

3.9 Ethical issues

For research to be conducted at an institution such as a university, approval for conducting the research should be obtained before any data are collected. Such permission was obtained from the institutions and from the respondents/participants themselves. Letters of permission were used. These facilitated the support and cooperation of participants.

In this study, the researcher delivered the permission paper to get on the research to Yeka sub-city Edget Chora secondary school principal. The principals were informed about the purpose of the study and the main features of the design, and grade 9 physical education teachers and students who were selected for the study. The researcher provided orientation about the study and its purpose to the selected respondents in order to make clear the procedures. Learners were made aware that the study involves no harm to them instead it was conducted for their advantage, and that they can withdraw their participation at any time without consequences.

3.10 Summary

The study was conducted in one school of Yeka sub-city Addis Ababa. One pre-test for controlled test in Physical education and Mid-year examination were used to compare two grade 9 classes, which were selected purposefully. Participants in this study were 102 grade 9 Physical education classes. They comprised of 52 and 50 learners forming the treatment - and the comparison group respectively. A post-test was used to assess learners' learning performance in physical education class.

Interest Likert scale (questionnaire) items were also used to collect data from the learners in the treatment group to assess the effects of jigsaw active learning approach on grade 9 students' interest towards physical education class. In addition to this, the learners in the treatment group were subjected to a group discussion of 8 students to verify the effectiveness of the instruction.

CHAPTER FOUR RESULTS AND FINDINGS

4.1 Introduction

This chapter presents the results of the data analysis. The study examined the effects of jigsaw teamwork active learning strategy on the learners' interest and learning performance in physical education class.

The interest Likert scale questionnaire was followed by focus group discussion and observation to find out whether the active learning approach influenced the learners' interest or not. In addition to this a test was administered as pre-test before the application and as post-test after application of the active learning approaches again to measure the learning performance of physical education by both the treatment and the control group two months later. In order to collect data for this study, the following research questions were formulated in.

- To what extent are physical education teachers implementing jigsaw teamwork as active learning approach in physical education class?
- What are the effects of using jigsaw teamwork active learning approach on grade 9 students' performance in physical education class.?
- What are the effects of using jigsaw teamwork active learning approach on grade 9 students' interest towards physical education class?
- What are the main challenges (obstacles) in implementing jigsaw teamwork active learning approaches in physical education class.?

To answer these research questions, data were collected by means of tests questionnaires quantitatively, group discussion and observation in qualitative way. In this chapter, the data collected in this study were analyzed, interpreted and discussed.

4.2 Statistical analysis

Statistics according to McMillan and Schumacher (2010: 149) are methods of organizing and analyzing quantitative data. They serve as tools that help the researcher to organize and interpret numbers derived from measuring a trait or variable. Statistical techniques are broadly categorized into two namely: descriptive and inferential statistics McMillan & Schumacher, (2010: 149). The descriptions of the descriptive and inferential statistics are provided below.

Descriptive statistical analysis transforms a set of numbers or observation into indices that describe or characterize the data. It uses mathematical formulae to organize and reduce large quantities of observation into a few numbers which represent the observation in each group of interest McMillan & Schumacher, (2010: 149). The analysis below shows the descriptive statistical analysis of the pretest and posttest scores of the experimental and control group.

Observation

The researcher visited both the experimental and the control group. During teaching and learning in the classroom, the researcher made the following observations: Experimental class for the first time before implementation of the active learning approach. The teacher was using active lecture method that was asking questions to the whole class and motivating them to participate. She was not familiar with jigsaw teamwork active learning approach. Then used after the class the researcher discussed with the teacher about the study, its procedures and her contribution on the study and informed as a teacher who was selected to apply the active learning approaches for the next two months.

For the second time after implementation the researcher visited. The teacher in class with grade 9 physical education students she greeted the students and informed them of the day's learning objective and ordered one student to clean the chalkboard.

Immediately then asked the students to form groups and ordered the experts (in jigsaw team work there are two groups main and experts' group) to discuss with their main group for checking up of the progress of the students. Then she summarized the lesson of the day. The class was active and the students were busy of helping each other.

1. Before the lesson the students were busy working their assignments individually and in group for presentation. As expert finding references individually and practicing with his friends.

2. During the lesson the teacher guided the students and they form their mother group, Discuss, present and participate actively.

3. After the discussion the teacher summarized the topic and provided corrections she segmented the next topic and distributed to each group.

In this observation what the researcher observed was that unless there was preparation and strong classroom management it was hard to use time save and meet the goal. Control group for the first time, the researcher observed the teacher, a physical education teacher of grade 9th

4. He greeted the students and informed them of the day's learning objective: "to review physical education class. The teacher ordered the class to take out their physical education books and note books worksheets and page to a clean sheet of paper. The teacher then taught the students using traditional teaching method. For the second time the researcher visited teacher, the teacher in 9th grade class. The teacher presented the topic using traditional teaching method; the class was passive listener and the teacher taking notes and sometime answering questions.

1. Before the lesson the students do not have group or individual assignments every one doing one's own work.

2. During the lesson the teacher command the students to take out their exercise books asking about previous lesson. Explain the lesson he asked questions and gave note.

3. After the lesson the teacher summarized the topic and complete. The classroom was passive compared to experimental group. The students were not disturbing the class, and better management of time. Generally, both the experimental and control groups were observed by the researcher that during traditional teaching lessons, learners were usually engaged in writing notes and listening to the teacher attentively without talking to

each other. Students had no opportunity to crosscheck their understanding of the material with their peers but rather listened to the direct transmission of material by the researcher, but under the jigsaw teamwork active learning strategy, the classes were active with learners asking and answering questions and working cooperatively being experts, presenting topics.

4.2.1 The extent to which teachers implement jigsaw teamwork active learning approach in grade 9 Physical Education class.

This title was based on whether teachers implement jigsaw teamwork as active learning approach in physical education theory class or not. Its purpose was to examine to what extent were active learning approach applied compared to traditional (teacher-centered) teaching method. It containing 10 positive and negative items and responded by 10 grade 9 physical education teachers. It was concerned about physical education class.

To what extent, are high school teachers implement jigsaw active learning approach in Physical education class?

Quantitative data obtained from physical education teachers through the Likert scale questionnaires containing 10 positive and negative items to address this research question regarding to the implementation of active learning were analyzed by using frequencies, percentages and mean values using SPSS software.

Table 4.1 presents the data obtained from the questions to what extent teachers implement jigsaw teamwork active learning strategy in the sample high school of yeka sub-city Addis Ababa.

Table 4.1 analysis of frequency teachers' implement of active learning approach

	Items	Strongly Disagree		Disagree		Not sure		Agree		Strongly agree		M
		F	%	F	%	F	%	F	%	F	%	
1	I think that all teachers believe jigsaw teamwork active learning approach are the best method to teach students but no one is committed to implement.	3	30	0	0	0	0	4	40	3	30	3.5
2	I have no idea about jigsaw teamwork active learning approach.	5	50	5	50	0	0	0	0	0	0	1.50
3	I consciously create conditions to stimulate students' need to involve in teaching learning process of PE using jigsaw teamwork.	3	30	4	40	0	0	0	0	3	30	2.50
4	In our school all physical education teachers are implementing jigsaw teamwork approach.	3	30	4	40	0	0	3	30	0	0	2.25
5	I believe that jigsaw teamwork active learning is needed to help students work together as a group and never bored during the lessons.	0	0	0	0	0	0	5	50	5	50	4.50
6	I know that active learning approach is Exciting and enjoyable for students but I never use it practically.	0	0	0	0	0	0	5	50	5	50	4.50
7	I think jigsaw teamwork active learning approach is exciting and enjoyable, for students they can managed to help one another to learn and understand	0	0	3	30	0	0	4	40	3	30	3.75
8	In our school all physical education teachers do not implement jigsaw teamwork approach.	0	0	3	30	0	0	4	40	3	30	3.75
9	I don't have any awareness about how to implement jigsaw teamwork approaches.	5	50	5	50	0	0	0	0	0	0	1.50
10	I think a well prepared lecture can stimulate students to participate in PE than active learning.	7	70	3	30	0	0	0	0	0	0	1.25
Aggregate mean												2.9

1. In Table 4.1 Question 1 “I think that all teachers believe jigsaw teamwork active learning approach is the best method to teach students but no one is committed to implement” In response to the item 70% (40% agree 30 % and strongly agree) and M=3.5) respondents agreed that even though teachers know that active learning approach are important to students learning performance and interest they were not committed to apply active learning approaches.

2. In response to question 2 of “I have no idea about jigsaw teamwork active learning approach”, (50% disagreed and 50% strongly disagreed 100% and M= 1.5) of the respondents were not agreed. That means jigsaw teamwork active learning approach was familiar with teachers they had no problem on the know-how of the active learning approaches.

In response to question No 3 “I consciously create conditions to stimulate students’ need to involve in teaching learning process of physical education theory class using jigsaw teamwork”, 70% 30 % strongly disagreed and 40 % disagreed M=2.50) of the respondents were disagreed on the item. This however shows that most physical education teachers were not participating students into active learning approaches.

4. In response to question four “In our school all physical education teachers are implementing jigsaw teamwork approach”. 70% that means (30% strongly disagree, 30% disagree M=2.25) of teachers responded that in their school most teachers do not apply the active learning approaches. This response directs to that teachers were using traditional (teacher-centered) method of teaching as a media of teaching learning process which is ineffective to students’ interest and learning performance.

5. In response to question five “I believe that jigsaw teamwork active learning is needed to help students work together as a group and never bored during the lessons”. 100% (50% agree and 50% strongly agree) M=4.50 Respondents confirmed on their answer that they understand the advantages of the active learning approaches for students’ learning performance and interest towards physical education class

6. In responses to item 6 “I know that active learning approach is Exciting and enjoyable for students but I never use it practically”. Respondents were answered 100%, (50% agree and 50% strongly agree) $M = 4.50$ all were agreed and supported the item. This indicates that the respondents were clear with all the advantage of the active learning approach for student’s participation and learning but they did not fulfill their responsibilities to apply the active learning approaches.

7. In responses to item No 7 “I think jigsaw teamwork active learning approach is exciting and enjoyable, for students they can managed to help one another to learn and understand the tasks. They responded as follows; (40% agree 30% strongly agree) and the Mean=3.75, here 70% of them were agreed about the advantage of active learning approaches for students active participation.

8. In responses to item 8 “In our school all physical education teachers do not implement jigsaw teamwork approaches”. This question was supported by 70% (30% agree 40% strongly agree) and the Mean was 3.75. This confirms that teachers do not apply active learning approach.

9. In response to question 9 “I don’t have awareness about how to implement jigsaw teamwork approach”. They responded 100% (50% strongly disagree and 50% disagree), this means that they totally disagreed with the item provided on number nine. This indicates that the respondents were aware about the active learning approach.

10. In response to question 10 “I think a well prepared lecture can stimulate students to participate in physical education than active learning approaches”. 100% disagreed (70% strongly disagree and 30% disagree), so disagreed the item that means active learning approach is the best method of teaching than any lecture. This supports the above analysis.

In a research by Ato Birhanu Moges Alemu (2010) Active learning/student-centered approaches focus on students to play a more active and dominant role in their learning. Thus, it gives students the opportunity to learn through their own efforts and to take full responsibility for their own learning with the lecturers as facilitators. The results of this study indicate that the extent to which university lecturers implemented active

learning/student-centered approaches at various stages of the instructional process is low. As a summary the content of all the questions in the above tables were all concerned or based on to what extent teachers are implementing active learning approaches. And the analysis indicated that teachers do not have any problem concerning the knowledge about the advantages of the active learning approach for students, their attitude towards active learning approaches and awareness on how to implement the active learning approaches, but they are not using active learning approaches in physical education class to help students on improving learning performance and interest. Most of the findings proved through field observation before the implementation of the active learning approach that almost all teachers were using traditional (teacher-centered) teaching method and active lecture method, especially jigsaw teamwork active learning approach was not familiar method of teaching for both teachers and students.

In the focus group discussion conducted with selected students from 1 to 5 group leaders of grade 9- 01 (the experimental group) they answered the following question. Question 1 when the learners were asked: What did you know about jigsaw teamwork active learning approach before the implementation? Their response was we know nothing. And this confirmed before this research that the students were not familiar with the active learning approach. So teachers were not using active learning approaches in this school. From the finding of the study conclusion was:- that even though teachers do not have any problem concerning the knowledge of advantages, awareness and attitude towards active learning approaches, they were not implementing jigsaw teamwork active learning approach in physical education class. This indicates that they were still using the traditional (teacher-centered) teaching method which could affect the learning performance and interest of the students.

4.2.2 Effects of jigsaw teamwork active learning approach on grade 9 students' performance in physical education class.

This title was based on students' learning performance in physical education theory class comparing the pre and post-test scores before and after implementation. The purpose of

this research question was basically to examine the effects of jigsaw teamwork active learning approach on learning performance of grade 9 learners' in physical education class. In order to address this research question, the 102 grade 9 learners' participants were divided into experimental and control group, with each group consisting of 52 and 50 learners respectively. At the beginning of the study, both the experimental and control group were pretested with physical education test. The study or treatment period lasted for two months during which the experimental group was taught with jigsaw teamwork active learning approach and the control group was taught using traditional (teacher centered) teaching method. The topics covered in both groups were the same and the questions in the posttest were based on the topics that were covered in both the experimental and control groups.

In order to determine what the effect of the different teaching strategies had on the performance of the learners, both the experimental and control groups were tested (Posttest) using physical education test. The following tables below represented the pretest and posttest scores of learners in the experimental and control groups. The scores obtained by learners in the tests were used as measure of their performance in physical education.

What is the effect of peer teaching and jigsaw teamwork active learning approaches on students' performance in PE class?

The data obtained from pre-tests administered to both experimental group and control group before implementation of the active learning approaches and post-test was applied to both groups after implementation. The data was analyzed by the inferential statistics of independent samples t-test with the help of SPSS version 21 software.

Findings relating to the second research question ("What is the effect of jigsaw teamwork as active learning approach on students' learning performance?") and their interpretations are provided below: Table 4.2 shows an independent-sample t-test that was conducted to compare learning performance in physical education class comparing **pre-tests** of experimental and control groups of grade nine physical education

students before the implementation of jigsaw teamwork active learning strategy in physical education.

Table 4.2 analysis of pre-test scores

Test	Group	N	Mean	S.D	MD	t	df	P
Pre-test	Experimental	52	77.98	15.09	-3.88	-1.380	100	.171
	Control	50	74.10	13.197				

In the above table 4.2 comparing pre-tests of experimental and control groups it shows that groups achieved the different pretest mean scores (M= 77.98 SD=15.09) for the experimental group and (M = 74.10, SD =13.197) for the control group. Therefore the data was clear that the pre-test means of experimental group was greater than that of the control group. The mean difference was 3.88 and further statistical test using an independent t test was used in order to explore whether there were differences between the experimental and control groups in terms of their learning performance test scores after the experiment. The t score (-1.380) related to the differences between physical education performance pre-test scores of the experimental and control group students was found to be non-significant ($p > 0.05$). The results confirmed that there was no statistically significant difference between experimental and control group pre-test scores of the ninth grade students in the two selected classes, prior to application of jigsaw teamwork active learning strategy.

In the next table 4.3 the result of the physical education class post-test was further analyzed to determine the levels of learning performance by learners in the experimental and control group after implementation of the active learning approach. The analyzed data is presented in the table below.

Table 4.3 analysis of post-test scores

Test	Variable	N	Mean	SD	MD	T	Df	P
Post-test	Experimental	52	85.96	11.633	-8.56	3.354	100	.001
	Control	50	77.40	14.078				

The results presented in table 4.3 analyzed data post-test of experimental group and control group of students using independent sample t-test. The data indicated that the mean result of the experimental group was (M=85.96) (SD=11.633), the mean result of control group was (M=77.40) (SD=14.078) and the mean difference (MD=8.56). Thus the mean gain of experimental group was higher than the mean gain of control group. This difference can be attributed to the jigsaw teamwork active learning strategy influence on students learning performance on the physical education class.

In the analysis of the table the t score (3.354) related to the differences between the experimental and control group of students' scores from physical education performance post-test was found to be significant that ($p < 0.05$). This result shows that statistically a significant difference between experimental and control group students in terms of their physical education performance post-test scores.

The analyzed data in table 4.3 clearly show that learners who were exposed to the jigsaw teamwork active learning strategy performed better in the posttest than learners in the control group who were taught using traditional teaching strategy.

In table 4.4 below the deviation (posttest-pretest) of experimental and control group scores were analyzed using independent sample t test to investigate the cumulative result that can help to give general statistical description about the scores regarding physical education tests.

Table 4.4 Analysis of deviation (posttest-pretest) scores

Deviation	Group	N	Mean	SD	MD	T	Df	P
Post-pre	Experimental	52	-7.981	8.4612	11.281	7.615	100	.000
	Control	50	3.300	6.2776				

In table 4.4 above shows that the statistical result of independent t test of experimental group posttest-pretest scores and control group posttest-pretest scores of grade 9 physical education test results. The mean deviation of experimental group students (M= -7.981, SD=8.4612) and the mean deviation of control group students (M=3.300, SD=6.277). So the mean deviation of control group was greater than experimental group students. In this result, the calculated t-value for deviation of the groups was 7.615 and there was a significant difference between the mean scores deviation of control group with experimental group. This result can confirm that students exposed to the active learning approaches scored better than the students exposed to traditional teaching method. Even though the researcher of this study didn't get researches about physical education based on jigsaw teamwork as active learning approach there were mathematics, chemistry and other natural science researches which support the findings of this research in different ways.

Based on the findings of the study by Mbacho W. Naomi 1, Prof. Bernard Nyingi Githua, PhD, (2002) which was carried out in District mixed-sex secondary schools of Laikipia East District of Kenya, it was concluded that students who are taught mathematics topics using Jigsaw learning strategy perform better in the topics than those taught by use of conventional teaching methods. Effects of jigsaw technique on academic achievement and attitudes to written expression course by Abdullah Ahin (2010) after the analysis of the data. It was found that Jigsaw technique was more effective than instructional teacher-centered teaching in the development of writing skills of the students, in the experimental group.

In turkey, a study conducted by COC, et.al (2010) concluded that teaching chemistry using jigsaw method was more effective in enhancing students' achievement compared to the conventional method. Another study conducted by Mengduo, Xiaoling, (2010) tried to examine the effectiveness of jigsaw strategy in teaching English language. The results show motivation and reinforcement of students' participation.

A research on effectiveness of jigsaw by Francis Hull Adams (2012) revealed, that jigsaw is very useful. Through the use of the technique pupils naturally developed the interest of working with their colleagues and through that they learnt from each other and hence learnt better. They also cultivated good attitudes from each other.

As there were many research findings that support the effect of nd jigsaw teamwork active learning strategy, there were also studies that did not consider active learning strategy effective in learning performance. This section of the literature study describes some of these findings which are not aligned with finding of this research some of these findings which are not aligned with the finding of this research.

Şimşek, Doymuş and Karaçöp (2009) investigated the effects of jigsaw and cooperative learning techniques on democratic attitudes of higher education students. According to the results of their study conducted with 116 students during 8 weeks, they found that there were no significant differences between the classes based on both pre-test and post-test results of the democratic attitude scale applied. No significant differences were found between the pre-test and post-test attitude scores in this study either.

A research by Maden, (2011), who made comparison between jigsaw strategy and conventional method with regard to the development of written expression skills, found out that there was no significant difference between the two methods.

As a summary it was indicated in the analysis of table 4.4 above, the mean scores before the treatment (77.21) for the experimental group was greater than (74.13) of the control group; and this indicates that experimental group achieved greater than control group. But comparing the pre-tests between the two groups the mean difference was (3.88) this was statistically no significant difference. In their posttest mean scores in table 4.3 (85.96) for the experiment group was greater than (77.40) of the control group. The mean difference between them was (8.5), and there was a significant difference. In table 4.4, the mean deviation of experimental group students ($M=7.981$) ($SD=8.461$) and the mean deviation of control group students ($M=3.300$) ($SD=6.278$). So the mean deviation of experimental group students was greater than control group.

Before application of the active learning approaches the experimental and control group students were almost on the same status of learning performance. There was no significant difference. But after application of the active learning approaches the significant gain observed that posttest score of experimental group was greater than the control group. In the study, the effects of Jigsaw active learning technique was investigated, it was found that after the treatment (application) that there was a significant difference on the posttest scores between the experimental group in which Jigsaw active learning technique was used and the control group in which traditional teacher-centered method was used.

Based on the findings of this study, it can be conclude that students who were taught physical education topics using peer teaching and Jigsaw teamwork active learning strategy have better learning performance in the topics than those taught by means of traditional (teacher-centered) teaching methods. The reason students in the experimental group had greater results than those in the control group can be because students in the experimental group completely learn their subject topics by participating in the teaching learning process as expertize in the jigsaw teamwork , and try to make their friends understand the topic, have effective interactions with their friends, and are all actively involved in the process develop their interest towards physical education. And

this was supported by many researchers who conducted researches about different active learning approaches.

4.2.3 Effects of jigsaw teamwork active learning approach on grade 9 students' interest towards physical education class.

The title was based on comparing effects of jigsaw teamwork active learning approach on grade 9 students' interest towards physical education class before and after implementation. The interest Likert scale questionnaires were administered before and after implementation of the active learning approaches in experimental group class. The data on this issue were collected by means of interest Likert scale questionnaire contained 10 items of positive and negative questions, responded by 52 ninth grade experimental group students the results were presented in tables followed by classroom observation and interviews.

What is the effect of jigsaw teamwork active learning approach on students' interest in physical education class?

The quantitative data obtained from grade nine students who were selected as experimental group through the interest Likert scale was analyzed by means of t-test independent equality of means and descriptive statistical analysis by the help of IBM SPSS software to identify the Mean standard deviation and Mean Difference.

No hypotheses were tested as this was not the aim of the study. For each item, the statistics for the treatment group results were compared as before and after implementation of jigsaw teamwork active learning approach. Here the control group was not exposed to response questionnaires.

Table 4.5 Scores of grade 9 students' interest towards Physical education class before and after application of the peer teaching and jigsaw active learning techniques. The table shows mean, mean difference and SD of each item. In addition it shows the average.

Table 4.5 analysis of interest Likert scale items

No	Items	Test	N	Mean	MD	SD
1	I like to participate in physical education class.	Pre	52	4.73	-.231	.910
		Post	52	4.96		.194
2	I don't like physical education totally.	Pre	52	4.63	-.250	1.01
		Post	52	4.88		.583
3	Most of the time I don't attend in physical education class.	Pre	52	4.65	-.308	.968
		Post	52	4.96		.194
4	Physical education class is more interesting when it is practical class.	Pre	52	4.52	-.308	1.16
		Post	52	4.83		.617
5	I get a sense of satisfaction when I actively participate in physical education class.	Pre	52	4.77	-.058	.831
		Post	52	4.83		.706
6	I get fed up in physical education theory class.	Pre	52	4.58	-.308	1.05
		Post	52	4.88		.583
7	I would prefer to learn another class, instead of physical education class.	Pre	52	4.58	-.154	1.12
		Post	52	4.73		.952
8	It is not necessary to learn physical education, because it is not included in national exam.	Pre	52	4.44	-.423	1.21
		Post	52	4.87		.595
9	In our school most students are not interested to learn physical education	Pre	52	4.71	-.096	.848
		Post	52	4.81		.793
10	Physical education classes are enjoyable learning time for me.	Pre	52	4.65	-.173	.926
		Post	52	4.83		.617
Average		Pre	52	4.5663	-.22404	.251
		Post	52	4.7904		.167

In table 4.5 regarding effects of the active learning approaches on students' interest in all the 10 questions comparing the means before and after implementation of jigsaw active learning approach the means after implementation are greater than means before implementation. This indicates that after the application of the active learning approaches there was very slight change in students' interest towards physical education class.

As a summary comparing the average means before and after implementation of active learning approaches was AV. M=4.7904 and SD=.251 AV.M= 4.5663 and SD=.167 control the deviation was -.22404. This indicates that there was a slight difference. In

this study the influence created on grade 9 students' interest through application of the active learning approaches did not show significant difference before and after the implementation. The reason here could be because of lack of follow up of teachers and proper application of the active learning approaches, lack of deep knowledge of teachers on method of applying the approaches.

According to Thorndike, how hard learners work on a given task is determined by their level of interest. The greater their interest, the harder they will work, and the lower their interest the less hard they will work (Mwamwenda, 2004: 184)

In table 4.6 below the deviation of interest Likert scale responses (posttest-pretest) of experimental group scores were analyzed using paired samples t test to investigate the cumulative result that can help to give general statistical description about the scores regarding to effects of the active learning approach on students' interest towards physical education before and after application.

The responses of the learners to the interest Likert scale test revealed that the students' interest was improved in the physical education theory class through active learning approach. Also, the active learning approach encouraged them to relatively learn stronger which made them to achieve slightly better than those who were taught with traditional teaching method.

4.6 Analysis of experimental group pre and post-test deviation

Deviation	Test	N	Mean	SD	MD	T	df	P
Experimental	Pre-test interest	52	4.566	.251	-.224	-5.844	51	.000
	Post-test	52	4.790	.167				

As it was shown on table 4.6 the mean deviation of pre-test is equal to (4.566) SD= (.251) Post-test equal to (4.790) SD= (0.167), here the post-test was greater than pre-test

mean deviation. Further statistical test using t-test at $\alpha=0.05$ significance level.

On Table 4.6 the mean difference scores and the t-value between pre-test and post-test deviation was (MD-.224, t-value -5.844), and this is clear that there was no significant difference as it was expected, the reason can be lack of strong follow up, lack of know how to apply the active learning approaches, lack of commitment of teachers etc.

This was confirmed by many researches who conducted researches about active learning approaches in different subjects. These findings are in parallel with the other findings in literature (Ernst and Byra, (1998); Wilson, (1998); Huang, (2000); D'Arripe-Longueville et al., (2002); Johnson and Ward, (2001); Barrett, (2005); Ward and Lee, 2005; Tunçel, 2006). According to the findings relating to students' views on written expression courses, it was determined that Jigsaw technique was more effective than traditional (teacher-centered) teaching in developing positive attitudes.

Other researchers who studied active learning approaches in mathematics education have also shown that the implementation of active learning methods develops positive attitudes in students towards the approach. For instance, the study conducted by Zan and Martino (2007:159-164) indicates that students in the experimental group held positive attitudes towards active learning in mathematics education.

Vaughan's (2002:359-364) study affirms this. Niess (2005:509-523) also finds that students in the experimental group held positive attitudes toward mathematics education. Mathematics students' interests and attitudes towards active learning affect their learning (NCTM 2000:37). Students with positive attitudes to the teaching and learning methods and those who show interest in the subject will score high grades and succeed.

In their study Sare ŞENGÜL a, Yasemin KATRANCI () stated that, when the findings of the study are examined, it can be seen that the attitudes of students towards mathematics prior to the application of the jigsaw technique were significant and high. When the literature relating to the cooperative learning is examined, it can be seen that the effects of this method on students' attitudes towards the course Altıparmak & Nakipoğlu,

(2005); Avşar & Alkış, (2007); Karakoyun, (2010), and on the attitude and motivation Aydın, Efe, (2011) investigated, and the findings of the study obtained after the application of the jigsaw technique were examined, it was seen that there was very slight change in students' attitude towards mathematics.

As it was mentioned on the above jigsaw active learning approach was effective than traditional (teacher-centered) teaching methods and can have positive influence to students' interest towards physical education class. It was confirmed in the focus group discussion conducted with 1to5 group leaders of the grade 9 class which was selected as experimental group. The group was responded question 2. What did you know about jigsaw teamwork active learning approach after the implementation? What did you get? Learners' responses to this question were summarized in the following way: as a group they know that peer teaching and jigsaw active learning approaches are;

- 1). attractive methods after the intervention of the approaches.
- 2). It helps us to explain our opinions by ourselves in class.
- 3). It made most of us active participants in the teaching learning process"
- 4). It provided an opportunity to refer, read and write to present assignments.
5. Enable us helping each other and strengthen our social interaction.

Question 3 Are jigsaw teamwork active learning approach more enjoyable? The learners explained to the researcher that their need to learn was increased after the approach was introduced; so they responded that the approaches are enjoyable and interesting. The group discussion conducted on the treatment group revealed only one learner dislike the approach; felt that the teacher engaged too much responsibility on them for their learning. As it was mentioned on the group discussion, the reasons that the students in Jigsaw teamwork group worked in this technique for the first time, they found the method exciting, and they had good interactions with their friends may be regarded to have affected the development of their interest in this technique when compared to the traditional (teacher- centered) teaching method.

As a summary under this topic research question three "What is the effect of jigsaw teamwork active learning approach on students' interest in physical education theory

class?” was summarized. Based on the findings of research question three of this study, Experimental group students’ scored after implementation of the active learning approaches were better than scores before implementation, and the conclusion is students who were taught physical education topics using Jigsaw teamwork active learning strategy can improve their interest in the topics than those which were taught using traditional (teacher-centered) teaching methods.

4.2.4 What are the major challenges/obstacles in implementing active learning approaches in this high school?

The purpose of this section is to reflect on the problems that affect the implementation of an active learning approach learning as a step forward to overcoming them. Challenges/obstacles which were considered to be responded by teachers included in the questionnaire (Likert scale) were the following.

Teachers have negative attitudes, they believe too much work load effort expected, No challenges in implementing active learning strategies, teachers, Prearranged annual plan and portion, Large class size, Fertile ground (Conducive atmosphere), Lack of commitment of teachers, Lack of administrative support and Lack of teachers’ awareness. As it was analyzed on research question number three the finding confirmed that teachers do not have any problem in attitude and awareness about the advantages of active learning strategies, but they are not willing to apply. So under this title, the researcher needs to assess the challenges or obstacles that hinder the application of active learning strategies.

Table 4.7 presents the data obtained from Likert scale questionnaire about challenges (obstacles) that hinder the implementation of jigsaw teamwork active learning strategy in the sample high schools of yeka sub-city Addis Ababa. In order to address this research question, 10 positive and negative items were presented to physical education teachers, and were analyzed by the frequency.

Table 4.7 analysis of challenges/obstacles in implementing the active learning approaches.

No	Items	Strongly Disagree		Disagree		Not sure		Agree		Strongly agree		Mean
		1		2		3		4		5		
		F	%	F	%	F	%	F	%	F	%	
1	I feel that physical education teachers have negative attitudes towards peer teaching & jigsaw teamwork active learning	7	70	0	0	0	0	0	0	3	30	2.00
2	To involve students in jigsaw teamwork active learning will add too much to my work load.	0	0	0	0	0	0	0	0	10	100	5.00
3	I think there are no challenges in implementing jigsaw teamwork active learning strategy.	3	30	2	20	0	0	3	30	2	20	2.5
4	I think physical education teachers attitude is not transferred from traditional to contemporary teaching method.	5	50	2	20	0	0	0	0	3	30	2.25
5	It is difficult to cover the prearranged annual plan & portion if teachers apply jigsaw teamwork active learning strategy.	3	30	0	0	0	0	0	0	7	70	4.00
6	It is impossible to implement jigsaw teamwork active learning in large classes.	3	30	0	0	0	0	0	0	7	70	4.00
7	There is Conducive atmosphere in high schools to implement jigsaw teamwork active learning strategy.	5	50	0	0	0	0	0	0	5	50	3.00
8	I think the basic challenge of implementing jigsaw teamwork active learning strategy is lack of commitment of teachers.	0	0	0	0	0	0	0	0	10	100	5.00
9	I think that lack of administrative support (e.g. financial, facilitating) inhibits the implementation of active learning in class.	2	50	0	0	0	0	0	0	2	50	1.00
10	I think that every physical education teacher has awareness about active learning strategy. And awareness can't be the challenge.	5	50	5	50	0	0	0	0	0	0	5.00
Aggregate mean												3.375

Table 4.7 shows challenges/obstacles on the implementation of jigsaw teamwork active learning approach. Ten factors were assumed to hinder the implementation of active learning and are presented in Likert scale as positive and negative items; the following were mentioned as the most important challenges hindering the implementation of active learning approaches.

1 . Teachers in general have negative attitudes in the analysis of table 4.7 it was indicated that (strongly disagree/disagree 75% and mean= 2.0), which means respondents were disagreed. This shows that teachers don't have a problem regarding to attitude and this can't be one of the challenges in promoting active learning approaches. In this study respondents confirmed that teachers' too much work load effort expected, Prearranged annual plan and portion, lack of commitment of teachers And large class size are the main challenges in implementing active learning approaches, but as a matter of fact these all are insignificant obstacles that can be solved if there is positive attitude.

This was supported by many researches for example a research by Ato Birhanu Moges Alemu (2010) indicates how lecturers' attitudes strongly affect their efforts in achieving the objectives of active learning approaches. For example, according to Table 4.7 about half of the respondents indicated that lecturers in general had negative attitudes towards group work. On the other hand, the application of active learning should not be the sole responsibility of the individual lecturer. Changes in teaching and learning approaches are likely to mean that the universities' resources will become more important to the quality of teaching and learning in general and implementation of active learning approaches in particular.

Research conducted on attitudes and views on teaching approaches has shown lecturers'

and students' attitudes influence their teaching and learning behaviors Gruber & Boreen, (2003:17-18). In this study, some teachers indicated that students had negative attitudes towards active learning.

According to the interviewees the students preferred to sit passively and listen to lecturers rather than being actively involved in activities – they view lecturers as spoon-feeders. These findings are consistent with the findings of other authors. For example, some students wish others would do the work for them. And this was confirmed in this study by student opposing active learning he said he don't believe on students ability of transforming the objectives of the topic properly, so the teacher should take full time. The other

2. Too much work load effort expected from teachers, this was responded (100%, strongly agree $M= 5$); this confirms that too much work load was the main challenge that can hinder teachers to implement active learning approaches for the sake of students learning performance and interest towards physical education theory class. This shows that teachers think applying active learning approaches is heavy burden to them. Too much work load is expected from teachers in process of preparation, segmenting topics and distributing of assignments, organizing the class into groups, managing the classroom and participating all students in the class. This all needs positive attitude and full commitment.

3. No challenges in implementing active learning strategies (50% disagree 50% agree $M=2.5$), this question was responded fifty fifty by respondents but as it was seen during observation especially in experimental class the teacher did not got any obstacle in implementing the active learning approaches. The mentioned challenges were not beyond the capacity of the teacher to solve. There was no need of any additional material to start

implementing the active learning approaches. It is only positive attitude and commitment of teachers.

4. Teachers' attitude is not transferred from traditional to contemporary teaching method. (Strongly disagree 50% disagree 25% strongly agree 25 M=2.25) respondents disagreed on teachers' as it was mentioned on item one teachers don't have a problem regarding to attitude.

5. Prearranged annual plan and portion 75% (Strongly disagree 25%, strongly agree 75% and M=4.0) of respondents agreed that prearranged annual plan and portion coverage is one of the challenges in implementing active learning strategies. Most high school teachers believe that the portions can't be covered at the designed annual plan if active learning approach was put into practice. Because they think to participate, all learners in the class into active learning approaches in 40 minute period need more time of preparation and implementation for teachers and students. So portions could not be covered according to the annual plan.

6. Large class size; According to Table 4.7 the respondents believed large classes prevented implementation of active learning approaches. Although questionnaire responses indicated that teachers believed that large class size was difficult for group work, as it was mentioned on 5. Prearranged annual plan and portion of this research because teachers think participating all learners in a large class size into active learning approaches in 40 minute period need more time of preparation and implementation for teachers and students, but classroom observation showed that most of the classes had enough space for group discussions 55 is the average class size in the school.

7. There is conducive (fertile ground) in high schools to implement (strongly disagree 50%, strongly Agree 50% and M=1.0) they agreed and disagree fifty fifty. But it was

proved on observation that this time secondary schools are more or less in a good teaching learning situation. There is no need of extra materials to apply active learning approaches except commitment and preparation.

8.Lack of administrative support; According to the analysis of this item teachers responded 50% strongly disagree and 50% strongly agree they were fifty fifty. For the effective implementation of active learning approaches the principals and department heads also need to recognize active learning approaches in physical education as building blocks for lifelong learning and producing of physically and mentally healthy students and they should provide the support required from them.

9.Lack of commitment of teachers.(100% strongly agree and mean gain= 5.0) 100% of the respondents were strongly agreed and this can tell us that lack of commitment is the most challenging factor in implementing active learning strategies. Even though the respondents disagreed on attitude as one of the challenges, but lack of commitment is the reflection of attitude.

10.Lack of teachers' awareness about active learning strategies, (50% strongly disagree/50% disagree M=5) 100% of the respondents disagreed on lack of awareness on teachers. This indicates that teachers are aware about active learning strategies and this can't be one of the challenges. But observation was proved that most students and teachers were not familiar with active learning strategies, particularly with jigsaw teamwork approach. On interview of this research that was conducted with students it was confirmed that the students did know the active learning approaches. When the learners were informally asked: What did you know about peer teaching and jigsaw teamwork active learning approaches before the implementation? Their response was we know nothing. It is our first time to involve in such kind of activity of physical education class.

As it was mentioned on the interview students gave their opinion on question students' lack of awareness about the active learning approaches, and the leader of group 9 responded as follows. I don't like the approaches because we were losing our time I do not feel comfort on students presentation, instead of telling us everything we needed to know, the teacher always forced us to work out things for ourselves and to present in front of the students can't help this was difficult for us. (1student) the act of disturbing of students during active learning approaches as challenges.

This idea was supported by McKeatchie and Svinicki (2005:7-9), class size was also a factor they stated that in a large class, individualization of instruction is limited. Thus, the most frequently used instructional method is the lecture-centered approach, without group participation. In such classrooms even oral student-lecturer communication was minimized, written work receives less lecturer attention, and students are also less well known as individuals by their lecturers.

The finding of item 5 was similar to a research conducted by Birhanu Moges Alemu (2010). Based on their experience, a large number of lecturers thought that active learning would take up more time than the traditional way of teaching. Lecturers believed that due to time constraints, active learning could not be applied in a short period of time. They also believed that the students were passive and that it took a long time to motivate them.

Changes in teaching and learning approaches are likely to mean that secondary school resources will become more important to the quality of teaching and learning in general and implementation of active learning approaches in particular. For example, respondents had lack of time to actively involve students in their classroom teaching especially in

physical education where there is only two periods a week which is difficult to cover the contents. Although teachers may find active learning approaches to be more enjoyable and lead to improved student learning, they still have questions about the amount of time and content that needs to be covered using the approaches Burns and Myhill, (2004:41-45).

According to research by Birhanu Moges Alemu (2010) students were expected to be silent unless they are commanded to respond. This is associated with lecturers' and students' lack of prior experience of active learning approaches. Active learning approaches demand lecturers not only to be experts in their fields, but also in their understanding of how students learn. Without such understanding, it is not easy to motivate lecturers to participate in active learning/student-centered approaches Derebssa, (2006:136). Most of the challenges/obstacles in implementing active learning approaches were matched with the research by. In order of importance (as indicated by the percentages and means), the following were mentioned as the most important factors hindering the implementation of active learning approaches.

- Lack of classroom space that inhibits group work
- Large classes size
- Lack of time to actively involve students in teaching.
- Rigidity of the time table that prevents implementation of active learning technique
- The amount of content to be covered.
- Lack of resources to implement problem-based learning.
- Lack of instructional materials.
- Lack of administrative support.
- Too much effort expected from lecturers.

As summary on the above list of items 1, 4, and 10 (concerning about attitude and awareness) respondents were disagreed on lack of awareness and attitude. This means that lack of awareness and attitude towards the active learning approach were not the main challenges for teachers to implement. So based on the findings of this study it can be concluded as among the ten main challenges/obstacles assumed to hinder implementing of active learning approaches presented in the Likert scale questionnaires were large class size, too much work load, amount of content to be covered, lack of administrative support and lack of commitment of teachers were the main challenges.

CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND RECOMMENDATION

5.1 Summary

In this study, data was collected through tests, Likert scale group discussion and observation from 102 Grade 9 students who were assigned into two groups of 52 students in the treatment group and 50 students in the comparison group and ten teachers.

Data was analyzed based on four research questions using independent sample t test, paired sample t test and frequency by the help of SPSS version 21 focus on the research questions.

1. To what extent are physical education teachers implementing jigsaw teamwork active

learning approach in class?

2. What are the effects of using jigsaw teamwork active learning approach on grade 9 students' performance in physical education class?
- 3 What are the effects of using jigsaw teamwork active learning approach on grade 9 students' interest towards physical education class?
4. What are the main challenges (obstacles) in implementing jigsaw teamwork active learning approach in physical education class?

In this research quasi experimental design which includes “Pre-test/post-test design with control and experimental group” was used to explore effects of Jigsaw teamwork active learning technique and traditional teaching methods on high school physical education students' learning performance on physical education class. The comparison group was taught using traditional teaching method and the treatment group was taught using jigsaw teamwork active learning approach.

5.2 Findings

The goal of this section is to recognize the effects of jigsaw teamwork active learning method on secondary school students' performance and interest in physical education class. There has been much work done on the effect of active learning and teaching methods on student interest of learning physical education class. The relationship between active learning/student-centered teaching methods on student learning has consistently shown a positive effect (of such approaches) on students' interest and performance. In general, the use of jigsaw teamwork as active learning approach is

important to have a positive impact on the quality of the students' learning process and effects. A primary goal in active learning is that each student becomes a diverse groups to master the content. Each student in jigsaw teamwork was not only responsible for learning the material as expert, but also for helping their group-mates learns. Here after the introduction next was followed by conclusion of the four research questions. Each research question was concluded in sequence.

1. To what extent are physical education teachers implementing jigsaw teamwork active learning approach in class?

From the results of the study it found out that even though teachers do not have any problem concerning the knowledge, awareness and attitude towards active learning approaches, they were not implementing jigsaw teamwork as active learning approach, instead it was traditional teaching method that was dominant in the school. This could affect the learning of students in physical education class.

2. What are the effects of using jigsaw teamwork active learning approach on grade 9 students' performance in physical education class.?

Based on the findings of research question it was determined that students who were taught physical education topics using peer teaching and Jigsaw teamwork active learning strategy have better learning performance than those taught by use of traditional (teacher-centered) teaching methods.

3. What are the effects of using jigsaw teamwork active learning approach on grade 9 students' interest towards physical education class?

Comparing the mean scores before and after implementation of jigsaw active learning approaches the mean after implementation was greater than means before implementation. This indicates that after the application of the active learning approaches there was significant difference in students' interest towards physical education. As it was mentioned on the above jigsaw active learning approach is effective than traditional (teacher-centered) teaching methods and can have positive influence to students' interest towards physical education.

4. What are the main challenges (obstacles) in implementing jigsaw teamwork active learning approach in physical education theory class.?

The result under this research question shows that lack of awareness and attitude towards the active learning approaches were not the main challenges for teachers to implement. The main problems were large class size, too much work load, amount of content to be covered, lack of administrative support and lack of commitment of teachers.

5.3 Conclusions

The implementation of jigsaw teamwork as active learning approach results in better students' performance and interest in physical education. Jigsaw teamwork active learning strategy was therefore suitable methods for teaching enhancing students interest to improve their performance. But practically teachers are not implementing these approaches. However, majority of the learners strongly accepted the active learning approaches and connected with its positive values. This contributed to their learning and thus made the learners to achieve relatively better. When the findings of the study are examined, it can be seen that the interest of students towards physical education prior to the application of the jigsaw technique was significant and high. However after the

application of the jigsaw technique was examined, it is seen that there is very slight change in students' interest towards physical education.

5.4 Recommendations

It is recommended that city administration of Addis Ababa education bureau should widen the coverage of teachers training of jigsaw teamwork active learning strategy and be incorporated in teacher education programs, in-service courses for physical education teachers, and that the strategy be practiced not only in teaching physical education but also in all subjects in order to improve the development of interest and learning performance in physical education and other subjects. The bureau should assign at least one physical education supervisor for each sub-city and provide them training orientation in all Sub-Cities and Weredas to follow up, supervise and support teachers in applying active learning approaches. It is believed that training and support may motivate and improve teachers' attitudes, commitments and teaching methods

Schools should organize supervision by school administration and in built supervision among teachers help to share experiences to each other regarding to application of active learning strategy. Teachers should have positive attitude and be committed to apply active learning approaches to enhance students' participation, interest and learning performance to improve quality of education.

The teacher training colleges and universities which are producing teachers every year should emphasize peer teaching and Jigsaw teamwork active learning strategy as an effective method of teaching physical education create more awareness on new graduate teachers' interest. This study was conducted on active learning approaches in physical education theory class, but it doesn't mean that active learning approaches are not

necessarily important in practical class, because it is already active and involving students into activities. The case should be how to make the class active which active learning strategy can help to promote students' interest and learning performance. Involving students into activity doesn't mean applying active learning approaches.

Bibliography

Abdullah Ahin (2009) Department of Turkish Education, Erzurum, Faculty of Education, Atatürk University, Turkey.

Açıkgöz KÜ (2006). Aktif Örenme, 8. Edition, zmir: Bili Yay.

Adeyemi, B. A. (2008). Effects of cooperative learning and problem solving strategies on junior secondary school students' achievement in social studies. *Journal of Educational Psychology*, 16 (3) 691-708.

Ajzen, I. & Fishbein, M. (1980) Understanding attitudes and predicting social behaviors

Armstrong, N., Shu-mei, C. & Marguerite, B. (2007). Cooperative learning in industrial- sized biology classes. *CBE Life Sci. Educ.* (2007). Summer, 6 (2): 163-171.

Aronson, A. (1978). *The Jigsaw classroom*. Beverly Hills, CA: Sage. Barrett T (2005). "Effects of Cooperative Learning on The Performance of Sixth- Grade Physical Education Students", *J. Teach. Phy. Educ.*,

Aronson, A. (1978). *The Jigsaw classroom*. Beverly Hills, CA: Sage. Barrett T (2005). "Effects of Cooperative Learning on The Performance of Sixth- Grade Physical Education Students", *J. Teach. Phy. Educ.*, 24. 88-102.

Aronson, E. (2000). *Nobody left to hate: Teaching compassion after Columbine*. New York: Worth.

Aronson, E. (2002). *Building Empathy, Compassion and Achievement in the Jigsaw*

classroom in Improving Academic Achievement. Impact of Psychological Factors. New York. Academic Press.

Aronson, Elliot (2000) "Jigsaw Classroom" <http://www.jigsaw.org/index.html>

Asherson, c. (2008). Cooperative learning: We instead of me. California state university,

Barcin, A. & Leman, T. 2007. Effects of cooperative learning strategies on students understanding of concepts in electro-chemistry. International journal of Science and Mathematics education, 5 (2), 349-373.

Behr, A. L. 1983. Empirical Research Methods for the Human Sciences. Durban.

Beichner (Beichner, Saul, Allain, Deardorff, and Abbott, 2000; Beichner et al., 2007),

Bilesanmi, A. J. & Oludipe, D. I. (2012). Effectiveness of cooperative learning strategies on Nigerian secondary school students' academic achievement in basic science. British journal of Education, Society & Behavioural Science, 2 (3): 307-325.

Birhanu Moges Alemu active learning approaches in mathematics education at Universities in Oromia, Ethiopia (2010) 155-167

Bless, C., & Higson-Smith, C. (2000). Fundamentals of social research methods, an African perspective (3rd ed.). Lansdowne, South Africa: Juta.

Bligh D (2000) What's the Use of Lectures? Jossey Bass, San Francisco.

Bloom, B.S. (1981). All our children learning. New York: McGraw-Hill.

Bonwell, C., and Eison, J. Active Learning: Creating Excitement in the Classroom.

ASHEERIC Higher Education Report No. 1. Washington, D.C. School of Education and Human Development, George Washington University. 1991

Bonwell, C. and Sutherland, T. (2008) the active learning continuum: choosing activities to engage students in the classroom. *New Directions Teaching Learning* 1996,3–16.

Borg, W. R., & Gall, M. D. (1989). *Educational research*. New York: Longman.

Bransford, J., Brown, A., and Cocking, R. (1989). *How People Learn: Brain, Mind, Experience, and School*. Committee 419-454. Book..

Bucher Charles A. (1991). *Foundation of P.E.* 7th ed. U.S.A. Clyde Knapp and Patricia Hagman Leonhard, (1968). *Teaching Physical Education in Secondary School*. McGraw Hill Company, New York

Christian, M. & Pepple, T. F. 2012. Cooperative and individualized learning strategies as predictors of students' achievement in secondary school chemistry in River state. *J. Vocational Education & Technology* 2012 Vol. 9 No. 2.

Clarke, J. (1999). Pieces of the puzzle: The jigsaw method. In *Handbook of Cooperative Learning Methods*, ed. S. Sharan. Westport, CT:

Cohen, D. (1990). A revolution in one classroom: The case of MrsOublier. *Educational Evaluation and Policy Analysis*. 12(3): 327–345.

Cohen, E. (1992). *Restructuring the Classroom: Conditions for productive small groups*. Madison, Wisconsin center for Education Research, 1992. ed 347- 639

- Cohen, L., Manion, L. & Morrison, K. 2007. Research methods in education. New York: Routledge.
- Cohen, L., Manion, L., & Morrison K. (2000). Research Methods in Education (5th Edition). London: Routledge Falmer.
- Cohen, L., Marion, L. & Morrison, K. 2003. Research methods in education. 5th Edition. College Faculty Instructional Productivity. Washington, DC: The George Washington
- Creswell, J.W. 2009. Research design: A qualitative, quantitative, and mixed method approaches .Third Edition. Sage Publications. Inc.
- Daniels, H. (2001) Vygotsky and Pedagogy. NY: Routledge/Falmer
- Das, R.S. (1985), Science Teaching in School. New Delhi: Sterling Publishers. Davis, B.
- De Vos, A. S., Strydom, H., Fouche, C. B. & Delport, C. S. L. (2005). Research at grassroots. 3rd edition. Pretoria: Van Schaik.
- Derebssa, D.S. (2006). Tension between traditional and modern teaching-learning approaches in Ethiopian primary schools. Journal of International Cooperation in Education, 9(1):123-140.
- Doymuş, K., Şimşek, Ü., & Bayrakçeken, S. (2004). Effect of cooperative learning on the academic achievement and attitude in science lesson. Journal of Turkish Science Education, 1(2), 103-115.

Ebert-May, D., Brewer, C., and Sylvester, A. Bioscience, 1997, 601–607.

Ebert-May, D., Brewer, C., and Sylvester, A. Bioscience, 1997, 601–607.

Effandi, Z. & Zanaton, I. (2007). Promoting cooperative learning in Science and Mathematics Education: A Malaysian perspective. Eurasia journal of Mathematics, Science & Technology Education, 3 (1): 35-39.

Emily, S. A. & Roger, C. (2010). An invitation to social research (4th Ed). How it's done.

Federal Democratic Republic of Ethiopia. (2007) Higher education proclamation

No.351/2003 Addis Ababa: People's Representative Council.

Felder, R.M. & Brent, R. (2004). The Intellectual Development of Science and Engineering Students. 2. Teaching to Promote Growth. Journal of Engineering Education, 93(4), 279-291.

Felder, R.M. & Brent, R. 2001. Effective strategies for cooperative learning. Journal of

Fengfeng, k. & Barbara, G. 2007. Game playing for mathematics learning: Cooperative or Not? British journal of Education Technology, 38 (2): 249-259.

G. Linda Rikard and Dominique Banville High school student attitudes about physical education Vol. 11, No. 4, pp. 385_400, November 2006

Gall, M. D, Gall. J. P. & Borg, . R.(1996). Education Research: An Introduction (7th ed)

Gall, M. D., Gall. J. P. & Borg, W. R. (1996). Education Research: An Introduction (7th ed) New York: Person Education Inc.

Gay, L.R. & Airasian, P .2000. Educational research: competencies for analysis and

- application. Sixth Edition. New Jersey: Merrill Prentice- Hall.
- Gay, L.R. & Airasian, P .2000. Educational research: competencies for analysis and application (6th ed.). New Jersey: Prentice-Hall. Inferential Statistics [On-line]. Available:
- Gay, L.R., & Airasian, P. (2000). Educational research: competencies for analysis and application (6th ed.). New Jersey: Prentice-Hall. Inferential Statistics
- Germain-Rutherford, A. (2003). Student Evaluation Questionnaires: Dispelling Misconceptions and Looking at the Literature. Carleton University.
- Golafshani, N. (2003). Understanding reliability and validity in qualitative research.
- Gopnik, A. (March 16, 2011). Why Preschool Shouldn't Be Like School, Slate Magazine.
- Graham, G. (1995) Physical education through students' eyes and in students' voices:introduction,Journal of Teaching in Physical Education, 14, 364_371.
- Griffin, L. L., Mitchell, S. A. & Oslin, J. L. (1997) Teaching sport concepts and skills: a tactical games approach (Champaign, IL, Human Kinetics).
- Hake, R.R. (2000) "Re: Is Pre-post Testing a Waste of Time?" AERA-D post of 21 Oct 200016:29:48-0700;onlineat<<http://lists.asu.edu/cgi-bin/wa?A2=ind0010&L=aera-d&P=R4769>>.
- Johnson, D. W., Johnson, R. T., & Smith, K. A. (1991), Cooperative Learning: Increasing
- Johnson, D., Johnson, R.& Holubec, E. (1998). Cooperation in the classroom. Boston:

Allyn and Bacon.

Kara, I. (2007). Revelation of General Knowledge and Misconceptions about Newton's Laws of Motion by Drawing Method. *World Applied Sciences Journal* 2(S): 770-778, ISSN 1818-4952.

Killen, R. (2000). *Teaching Strategies for outcomes-based Education*, Landsdowne : Juta

Killen, R. (2007). *Effective Teaching Strategies: Lessons from research and practice* (4th Ed) Melbourne. Thompson Social Sciences Press.

Kuszewski, A. (July 7, 2011). The educational value of creative disobedience, *Scientific American*

Lasher, W.C. (2004). "Using active learning to improve technical text comprehension and increase student participation," *Ethos*, <http://pennstatebehrend.psu.edu/academic/lrc/ethos/>, Learning Workshop notes.

Liele Soltanzadeh¹, Seyed Reza Nazari Hashemi² and Sakineh Shahi Department of Management, Khozestan Research and Science Branch, Islamic Azad University, Khozestan, Iran. London: Rutledge.

Locke, L. F. (1992) Changing secondary school physical education, *Quest*, 44, 361_372.

Luke, M. D. & Sinclair, G. D. (1991) Gender differences in adolescents' attitudes toward physical education, *Journal of Teaching in Physical Education*, 11, 31_46.

Macdonald, C.A. (1990). *Crossing the threshold into standard three*. Pretoria: Human Science Research Council.

Maden, S. (2011). Effect of Jigsaw technique on Achievement in written expression skill,

educational science: theory and practice-11(2), 911-917.

Marks, H. M. (2000). Student engagement in instructional activity: patterns in the elementary, middle, and high school years. *Am. Educ. Res. J.*, 37, 153–184

Martin, H. & Rowland, B. 2007. Cooperative learning, motivational effect, and student characteristics: An experimental study comparing cooperative learning and direct instruction in 12th grade physics classes. *Learning and Instruction*, (2007) 29-41

Mayer, R.E. 2005. Cognitive theory of multimedia learning. In R. E. Mayer (Ed.) *The Cambridge Handbook of multimedia learning*. New York: Cambridge University Press:31-48.

Mayer in Richardson, (2003:1623–1640; Schunk, 2000:23-28; Swan, 2005:43- 57)

Mbacho W. Naomi ¹ , Prof. Bernard Nyingi Githua, PhD, ² Science Department, Wiyumiririe Secondary School Laikipia East District, Department of Curriculum, Instruction and Education Management, Egerton University, Njoro, KENYA.3-18

McCombs, B. L. (2001). What do we know about learners and learning? The learner-centered framework: Bringing the educational system into balance. *Educational Horizons*, 79(4), 182-193.

McCombs, B.L. (2002). Assessment of learner-centered practices (ALCP) college survey validation results. Denver, CO: University of Denver Research Institute. [Electronic transmission from author.]

McCombs, B.L. (2003). Applying educational psychology's knowledge base in educational reform: From research to application to policy. In W. M. Reynolds &

- G. E. Miller (Eds.) Comprehensive handbook of educational psychology. New York: Wiley, 7:583-607.
- McKeachie, W. J. (1986). Teaching tips: A guidebook for the beginning college teacher. (8th ed.). Lexington, MA: Heath.
- McKenzie, T. L., Alcaraz, J. E. & Sallis, J. F. (1994) Assessing children's liking for activity units in an elementary school physical education curriculum, *Journal of Teaching in Physical Education*, 13, 206_215.
- McMillan, H.J. & Schumacher, S. (2006). Research in education: Evidence-based inquiry. 6th edition. Boston: Pearson.
- McMillan, J. & Schumacher, S. (2010). Research in Education. Evidence base Inquiry. 7th Edition, International Edition Boston: Pearson Education Inc.
- McNair, R.E. (2000). Life outside the mathematics classroom: Implications for mathematics teaching reform. *Urban Education*, 34:550-570.
- Melese, B. (1999). Active learning: Notions, methods and examples. Finfinee: Oromia Education Bureau.
- Mengduo, Q & Xiaoling, J. (2010) jigsaw strategy as a Cooperative Learning technique: focusing on the Language Learners. *Chinese Journal of Applied Linguistics* Vol. 33 No. 113-125.
- Merriam, S. B. 2002. Qualitative research and case study applications in education. California: Jossey-Bass.
- Metz, K.E. (1991). Development of explanation: Incremental and fundamental change in

children's physics knowledge. *Journal of Research in Science Teaching*, 28(9), 785-797.

Meyer, C. & Jones, T.B. (1993). *Promoting Active Learning Strategies for the College Classroom*. San Francisco. Jossey-Bass.

Miller, J. S. (2004). Problem-based learning in organizational behavior class: Solving students' real problems. *Journal of Management Education*, 28(5), 578-590.

Ministry of Education [MoE]. 2002. *The education and training policy and its implementation*. Addis Ababa: Ministry of Education.

Ministry of Education [MoE]. 2001. *Indicators of the Ethiopian education system*. Addis Ababa : Ministry of Education.

Mothata, S. 2000. *A Dictionary of South African Education and Training*. Hodder & Stought, Educational Southern Africa.

Murali, K., Dan, C. & Dawn, K. 2004. *Responsible conduct in data management. Faculty development and instructional design centre. Northern Illinois University, DeKalb, IL 60115, USA.*

Muraya, N. D. & Kimamo, G. 2011. Effects of cooperative learning approach on biology mean achievement scores of secondary school students' in Machako's District Kenya.

Educational Research and reviews vol. 6 (12), pp. 726-745, 25 September, 2011.

- Neer, M. R. (1987). "The development of an instrument to measure classroom apprehension", *Communication Education* 36, pp154-166.
- Neuman, W. L. 2011. *Social research methods. Qualitative and quantitative approaches*. 5th edition. Boston. Allyn and Bacon
- Neuman, W. L. 2003. *Social research methods*. Pearson Education Inc. New York: Person Education Inc.
- Niess, M. L. 2005. Preparing teachers to teach science and mathematics with technology: Developing a technology pedagogical content knowledge. *Teaching and Teacher Education*, 21:509 -523.
- Norman, G. & Schmidt, H .2000. Effectiveness of problem-based learning curricula: theory, practice and paper darts. *Medical Education*, 34:721–728.
- Northern Ireland Curriculum (2007). *Active Learning and Teaching Methods for Key Stages1and2*.www.nicurriculum.org.uk/docs/key_stages_1.../ALTMKS12.pdf
- O.connor, M. (2000). *The open-ended approach in mathematics Education*. Nairobi; Kenya SMASSE Project.
- Olowojaiye, F.B. 2000. A comparative analysis of students' interest in and perception of teaching/learning of mathematics at senior secondary schools levels. A paper presented at MAN Conference "EKO 2000".
- Panitz, T. (1996). "Getting students ready for cooperative learning", *Cooperative learning and College Teaching*, v6 N2, winter 1996.

- Preager. Doymuş, K. (2008). Teaching chemical bonding through jigsaw cooperative learning. *Research in Science & Technological Education*, 26(1), 47–57.
- Prince, M. (2004), “Does Active Learning Work? A Review of the Research,” *Journal of Engineering Education*, 93 (3), 223-232.
- Prince, M., Felder, R. (2007). The many faces of Inductive Teaching and Learning, *Journal of College Science Teaching*, 36 (5).
- Robson, C. (2002). *Real world research*. (2nd Ed). Oxford: Blackwell.
- Robson, S. 2002. *Real world research: A resource for social scientists and Practitioner-Researcher*. Second Edition Malden MA. Blackwall Publishing.
- Sahin, A. 2010. Effects of jigsaw technique on achievement in written expression. *Asia Pacific Education Review*, 12 (3), 52-57.
- Sahin, A. 2010. Effects of jigsaw technique on achievement in written expression. *Asia Pacific Education Review*, 12 (3), 52-57.
- Samuel, w. w. & John, G. M. 2004. Effects of cooperative learning and problem solving strategies on junior secondary school students’ achievement in social studies. *Journal of Educational Psychology*. 16 (3) 691-708.
- Sare ŞENGÜL a, Yasemin KATRANCI b*a MarmaraUniversity,Education Faculty
Primary Department, İstanbul, Turkeyb Kocaeli University, Education

Saul, J.M. (1998). Beyond problem solving: Evaluating introductory physics courses through the hidden curriculum.

Setati, M. & Adler, J. 2000. Between languages and discourses: Language practices in primary multilingual mathematics classrooms in South Africa. Educational Studies in Mathematics, 43(3):243 269.

Shephard, R. J. 2002. Ethics in exercise science research, Sport Med. 32 (3): 169-183.

Silverman, S. & Subramaniam, P. R. (1999) Student attitude toward physical education and physical activity: a review of measurement issues and outcomes, Journal of Teaching in Physical Education, 19, 97_125.

Slavin RE, Madden NA, Karweit N, Livermon BJ, Dolan L (1995). Success for all: First year outcomes of a comprehensive plan for reforming urban education. Amer. Educ. Res. J., 27: 255-278.

Slavin RE (1991). Are cooperative learning and untracking harmful to the gifted? Educ. Leadersh., 48: 68–71.

Slavin, R. E. (1997). Educational Psychology: Theory and practice (5th ed).Boston: Allyn and Bacon.

Slavin, R. E., Leavy. N. L. & Madden, N. A. (1989). Effective Programs for Students at Risk. Boston: Allyn and Bacon.

Solmon, M. A. & Carter, G. A. (1995) Kindergarten and first-grade students' perceptions

of physical education in one teacher's classes, *Elementary School Journal*, 95, 355_365. Strand, B. & Scantling, E. (1994), an analysis of secondary student preferences towards physical education,

Tashakkori, A. & Cresswell, J. W. 2007. The new era of mixed methods. *Journal of Mixed Methods Research*, 1 (1), 3-7.

Taylor & FrancisDOI: *Journal of Teaching in Physical Education* monograph (Graham, 1995).

Tjeerdsma, B. L., Rink, J. E. & Graham, K. C. (1996) Student perceptions, values, and beliefs prior to, during, and after badminton instruction, *Journal of Teaching in Physical Education*, 15, 464_476.

Trochim , W. (2006). *Descriptive and Inferential Statistics, Social Research Methods*. Retrieved January 21, 2008 from University, School of Education and Human Development.

Vaughan, W. (2002). Effects of cooperative learning on achievement and attitude among students of color, *The Journal of Educational Research*, 95(6):359-366.

Vygotsky, L. (1978). *Mind in society*. Cambridge, MA: Harvard University Press.

William, L. & Gerald, S. (2003). The relationship between high school students' motivational & meta-cognitive factors in science learning and their science achievement. Texas Tech. University.

Zan, R. & Martino, P.D.2007. Attitudes towards mathematics: Overcoming positive/negative dichotomy. *The Montana mathematics enthusiasts monograph*. The Montana Council of Teacher of Mathematics, 3:157-168.

