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FACULTÉ DES SCIENCES DE

L'ÉDUCATION

DEPARTEMENT DE DE CURRICULA

ET

EVALUATION

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CENTRE DE RECHERCHE ET DE

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EN SCIENCES HUMAINES,

SOCIALES ET EDUCATIVE



REPUBLIC OF CAMEROUN

Peace – Work – Fatherland

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UNIVERSITY OF YAOUNDE I

FACULTY OF SCIENCES OF

EDUCATION

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AND EVALUATION

\*\*\*\*\*

POST COORDINATE SCHOOL

FOR SOCIAL AND

EDUCATIONAL

SCIENCE

## THE USE OF COOPERATIVE LEARNING TECHNIQUES ON STUDENTS ACADEMIC PERFORMANCE.

A dissertation submitted in Partial Fulfilment of the Requirements  
for the award of a  
Master's Degree in Curriculum and Evaluation (M. Ed)

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## CERTIFICATION

I hereby certify that this dissertation entitled *the use of cooperative learning techniques on students' academic performance*. It was carried out by DIMU TONGMO WINNIE. It has been corrected in accordance with the comments of the jury to our satisfaction. I therefore recommend that this dissertation be bound, and copies deposited in the Department of Curriculum and Evaluation of the Faculty of education in the University of Yaoundé I.

### Signatories

President of jury

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Examiner

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Supervisor

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Head of Department

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Date \_\_\_\_ / \_\_\_\_/2018

# DEDICATION

*To*

*My Beloved Parents*

*(Justice Dimu Dako.T. David and Mrs. Dimu Comfort.P. Ngandab).*

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## LIST OF ABBREVIATIONS

<b>CATTU :</b>	Cameroon Teachers Trade Union
<b>G B H S :</b>	Government Bilingual High School
<b>MINESEC :</b>	Ministry of Secondary Education
<b>GPA :</b>	Grade Point Average
<b>SAT :</b>	Scholastic Assessment Test
<b>CL :</b>	Cooperative Learning
<b>STAD :</b>	Student Team Achievement Division
<b>STEP :</b>	Sequential Test of Education Progress
<b>TGT</b>	Team – Game - Tournament
<b>MAT :</b>	Mathematical Achievement Test
<b>RH1 :</b>	Research Hypothesis 1
<b>RH2 :</b>	Research Hypothesis 2
<b>RH3 :</b>	Research Hypothesis 3
<b>ANOVA :</b>	Analysis Of Variance
<b>SCT :</b>	Social Cognitive Theory
<b>SPSS :</b>	Statistical Package for Social Sciences
<b>DV:</b>	Dependent Variable
<b>IV:</b>	Independent Variable
<b>EGr:</b>	Experimental Group
<b>CGr:</b>	Control Group

## ABSTRACT

This study is titled “The use of cooperative learning techniques on students’ academic performance. Academic failure is a serious problem among students of high school institutions and all point out to the issue of misuse of innovative teaching methods in the classroom (Toth & Montagna, 2002; Goodwin, 2010). In recent years, teaching methods; especially the interactive method has been introduced. Teachers have been using these interactive methods with minimal increase in performance. It is against this backdrop that the researcher seeks to investigate if the use of cooperative learning techniques better improves students’ academic performance than the conventional teaching method in a selected secondary school.

Our purpose was to investigate if the use of cooperative learning techniques better improves students’ performance than the conventional method of teaching in a selected secondary school. The following general research question had guided our investigation: Does the use of cooperative learning techniques better improve students’ academic performance than the conventional method of teaching?

The answer to this question generated our general hypothesis which declares that the use of cooperative learning techniques significantly improves students’ academic performance than the conventional method of teaching in a selected secondary school. The operationalization of this general hypothesis was divided into three specific research hypotheses:

RH1: The use of jigsaw cooperative learning technique significantly improves students’ performance in history than conventional method of teaching.

RH2: The use of peer tutoring technique significantly improves students’ academic performance in history than conventional method of teaching.

RH3: The use of student team achievement division technique significantly produces better result on students’ academic performance in history than the conventional method of teaching.

The Quasis experimental research design specifically the pretest-posttest equivalent control group design was used to collect data from a sample of 152 students of form three, conveniently selected from the Government Bilingual High School, Etoug-Ebe in Yaoundé. A test was the main instrument used; and the data obtained were analyzed using the mixed ANOVA and the following results were obtained.

The use of jigsaw cooperative learning technique significantly improves students’ performance in history than the conventional method,  $F(1, 150) = 30.645, p < 0.001$ ; The use of peer tutoring technique significantly improves students’ academic performance in history than the conventional method,  $F(1, 150) = 57.368, p < 0.001$ , The use of student team achievement division technique significantly improves students’ academic performance than the conventional method,  $F(1, 150) = 81.625, p < 0.001$ .

The results were interpreted using the social learning theory of Vygotsky (1978) and social cognitive theory (SCT) of Bandura (1986) which made us to understand that students get to interact with their peers, learning is impacted; thus, performance of students is improved. The findings of this study led us to make recommendations to the school administrators, students and teachers which can bring about an improvement in students’ performance.

## RESUME

Notre étude intitulée « L'utilisation des techniques d'apprentissage coopératif sur les performances scolaires des élèves ». L'échec scolaire est un problème sérieux chez les élèves du secondaire et tous soulignent la mauvaise utilisation en classe, des méthodes d'enseignement innovantes (Toth & Montagna, 2002, Goodwin, 2010). Ces dernières années, de nombreuses méthodes d'enseignement ont été introduites, en particulier la méthode interactive. Les enseignants ont dès lors utilisé ces méthodes interactives avec une augmentation minimale des performances scolaires des élèves. C'est dans ce contexte que le chercheur s'est penché sur les effets de l'utilisation des techniques d'apprentissage coopératif sur les performances scolaires des élèves, et voir si ces techniques d'apprentissage coopératif améliorent les performances scolaires des élèves par rapport à la méthode d'enseignement conventionnelle dans un lycée secondaire sélectionné.

Notre enquête a été guidée par la question suivante : Existe-t-il une relation significative entre l'utilisation des techniques d'apprentissage coopératif et les performances scolaires des élèves par rapport à la méthode d'enseignement conventionnelle ?

La réponse à cette question a fait naître notre hypothèse générale suivant laquelle l'utilisation des techniques d'apprentissage coopératif améliore significativement les performances scolaires des élèves par rapport à la méthode conventionnelle. L'opérationnalisation de cette hypothèse générale a généré trois hypothèses de recherche :

HR1 : L'utilisation de la technique d'apprentissage coopérative de la scie sauteuse améliore les performances des élèves par rapport à la méthode d'enseignement conventionnelle.

HR2 : L'utilisation de la technique de tutorat par les pairs améliore les performances des élèves par rapport à la méthode d'enseignement conventionnelle.

HR3 : L'utilisation de la "student teams-achievement division" (STAD) améliore les performances des élèves par rapport à la méthode d'enseignement conventionnelle.

Le protocole prétest-posttest à groupe équivalent a été utilisé pour collecter les données auprès d'un échantillon de 152 élèves de 4<sup>e</sup> repartie en deux groupes, commodément sélectionnés au Lycée bilingue d'Etoug-Ebe à Yaoundé. Un test et un questionnaire ont servi à la collecte des données, qui ont été par la suite analysées au moyen de l'ANOVA mixte et les résultats statistiques suivants ont été obtenus : Pour l'hypothèse de recherche N°1 :  $F(1,150) = 30.645$ ,  $p < 0.00$ . Pour l'hypothèse de recherche N°2:  $F(1,150) = 57.368$ ,  $p < 0.001$ , Pour l'hypothèse de recherche N°3:  $F(1,150) = 81.625$ ,  $p < 0.001$ .

Les résultats ont été interprétés grâce à la théorie de l'apprentissage social de Vygotsky (1978) et la théorie sociale cognitive de Bandura (1986). Ce qui nous a permis de comprendre que lorsque les élèves interagissent avec leurs pairs, l'apprentissage en est impacté et les performances scolaires des élèves améliorés. Au terme de notre étude, nous avons dès lors fait des recommandations concrètes aux administrateurs d'établissements scolaires, aux enseignants, et aux élèves. Recommandations susceptibles de remédier aux faiblesses relevées et par la suite améliorer les performances scolaires des élèves.

## **GENERAL INTRODUCTION**

Education refers to the processes by which individuals acquire physical and social capabilities required by the society in which they are born for daily functioning. According to Fonkoua (2007), it is through education that knowledge, skills and values are transmitted from generation to generation. A key goal of education is to ensure that every individual has a chance to excel especially in school and in life. Therefore, education is an important ingredient for advancement in every nation. And that only a well-educated population can contribute meaningfully to the development of a society and participate significantly in national and international distribution of wealth.

In this era of globalization and technological revolution, education is considered as a first step for every human activity. It plays a vital role in the development of human capital and is linked with an individual's well-being and opportunities for better living. It ensures the acquisition of knowledge and skills that enable individuals to increase their productivity and improve their quality of life. This increase in productivity also leads towards new sources of earning which enhances the economic growth of a country. The quality of students' performance remains a top priority for educators.

Fonkeng (2007) points out that academic achievement represents the indispensable starting point for a person's effective integration into a society, the construction of a society capable of significant achievements in the economic, cultural, and industrial spheres. For these reasons, education specialists, economists and politicians have focused on academic performance with an incessant search for efficient methods to improve students' performance.

For instance, Adem (2005) in his study which investigated factors affecting students' academic performance in high schools revealed that the number of graduates from high school institutions is far fewer than the number of entrants to freshman programs because some students drop out before completion of their studies. Another study, in which the researcher investigated major causes of student failure in high school, also reported that the rates of failure, mainly due to low academic performance were high in the secondary school (Fonkeng, 2007). This situation creates high rate of repetition in the educational system. Meanwhile, Johnson & Johnson (2008)

have insisted repeatedly that teachers have a greater role to play through the teaching methods they used in improving students' academic performance.

Huge sums of money have been invested in developing teaching methods for improving performance at every level of education, from elementary school through university studies (Tanyi, 2009). This has introduced transformative teacher education that presupposes the preparation of teachers who can in their practices ensure transformative learning, where teacher and learner, learner and learner are co-constructors of knowledge. As studies revealed (Toth & Montagna, 2002; Goodwin, 2010), academic failure is a serious problem among students of high school institutions and all point out to the issue of misuse of innovative teaching methods in the classroom.

In recent years, there has been a lot of debate on teaching methods; especially the interactive methods which has been introduced. Teachers have been using these interactive methods with minimal increase in performance. Among the various interactive methods, cooperative learning teaching method have been ignored in all these efforts; meanwhile the use of cooperative learning techniques in the classrooms could foster learning, motivate students' engagement and involvement in the lesson thus increasing performance. For instance, considering the subject history, the Historical Association (2008) believes that cooperative learning teaching method is a powerful tool that history teachers can adopt in today's classrooms.

Using cooperative teaching method facilitates learning by encouraging group discussion (Felder, 2007). This view confirms the fact that benefits occurs when cooperative learning is used for instruction by improving students' grade; since they show longer retention of information, transfer information to other course and have better class attendance. In accordance with this view, the purpose of this study is that examine if the use of cooperative learning techniques (jigsaw technique, student's team achievement division (STAD) and peer tutoring) influences students' academic performance than the conventional method of teaching in a selected secondary school. This study is divided into five chapters:

Chapter one presents the research problem, the research objectives and questions. It also includes the significance of research, justification of the study and the delimitation of study. Chapter two deals with the review of literature related to the problem under investigation,



theoretical framework of the study, hypothesis, definition of research variables and a recapitulative table including variable and indicators of study. Chapter three is concerned with the methodology used in the research work. It presents the population and sample of study, sampling techniques, and research instruments, procedure of data collection and method of data analysis. In chapter four, we organise the data, presents our results and describes them. Chapter five deals with interpretation of results and discussion of findings.

# **CHAPTER ONE**

## **INTRODUCTION**

### **1.1. BACKGROUND OF THE STUDY**

Education is a social phenomenon and an important vehicle for advancement in the contemporary world. Education has therefore become an important ingredient for advancement in knowledge-based economy of the modern world. It is essential for the construction of viable economies and societies with outstanding democratic credentials. According to Fonkeng (2007), it is through education that knowledge, skills and values are transmitted from one generation to the other, to ensure the development, the progress and the advancement of every country. Also, education ensures acquisition of knowledge and skills that enable individuals to increase their productivity and improve their quality of life. This increase in productivity also leads towards new sources of earning which enhances the economic growth of a country. The quality of students' productivity remains a top priority for educators, education being geared towards making a difference locally, regionally, nationally and globally.

Students' productivity in literature is conceptualized as performance, achievement, outcome and output (Fonkeng, 2007; Johnson & Johnson, 2008). Fonkeng (2007), point out that academic achievement represents the indispensable starting point for a person's effective integration into a society, the construction of a society capable of significant achievements in the economic, cultural, and industrial spheres. A major goal of higher education is to promote higher level of academic achievement (student's performance). For these reasons, education specialists, economists and politicians have focused on academic performance. Due to the importance of this issue of academic performance, number of countries including Cameroon; have invested considerable research efforts for the purpose of identifying the factors that influence academic achievements.

In Cameroon, it is has been noticed for some years now (MINESEC, 2009-2014), academic performance in our secondary schools progressively reduces bringing about a fall in the rate of academic achievement of students regardless the numerous efforts consented by various parties. This can be seen from the annual statistics from the MINESEC 2009-2014 in Cameroon, the rate

of academic failures in official examination like the GCE O Level and A Level is higher than expected. We noticed for example in 2014 that 96056 students sat in for GCE ordinary level examination, just 33054 passed. Where as many as 63002 students failed given an achievement rate of just 34.41% Success and 65.59% failure which is quite deployable. This diminishing rate of academic performance which has hindered scientific, technological, economic and social progress has become a source of concern among academicians as well as government officials.

Enormous efforts have been deployed by the government, stakeholders, parents and nongovernmental organizations to see to it that education achieves its aims; that of improving on the quality of education by improving the students' academic achievement (Fonkeng, 2007). The government of Cameroon has put in place strategies that are progressively transforming teacher education so as to provide an education for sustainable development, given that teachers have a vital role to play as far as the education and academic performance of learners is concerned.

During a national forum organized in June 2013 by the Cameroon Teachers Trade Union, issues raised was the reforms in the school curriculum, financing of education, human resource development as well as text book policies. The CATTU emphasized in their document these problems plaguing the educational sector in Cameroon, suggesting that a new applied and integrated educational system which blends general education with vocational and technical training, adequate funding for both private and public schools, professional development and a national book policy which promotes indigenous authors and publishers stood out as best suggestions at the end of the forum.

As it has been consistently demonstrated in empirical studies, many students are not successful in academic performance and discontinue their education because of academic dismissal. For instance, Adem (2005) in his study which investigated factors affecting students' academic performance in high schools revealed that the number of graduates from high school institutions is far fewer than the number of entrants to freshman programs because some students are just dropout before completion of their studies. Another study, in which the researcher investigated major causes of student failure in high school, also reported that the rates of failure, mainly due to low academic performance, were high in the secondary school (Fonkeng, 2007). This situation creates high rate of repetition in the educational system. Meanwhile, Johnson & Johnson (2008)

have insisted repeatedly that teachers have a greater role to play through the teaching methods they used in improving students' academic performance.

Huge sums of money have consequently been invested in developing teaching methods for improving performance at every level of education, from elementary school through university studies (Tanyi, 2009). This has introduced transformative teacher education that presupposes the preparation of teachers who can in their practices ensure transformative learning, where teacher and learner, learner and learner are co-constructors of knowledge. As studies revealed (Toth & Montagna, 2002; Goodwin, 2010), academic failure is a serious problem among students of high school institutions and all point out to the issue of misuse of innovative teaching methods in the classroom.

There have been several shifts from one pedagogic approach to the other, from teacher centered approach to student centered approach, and presently Competency Based Approach. Competency based approach was introduced in secondary schools in the academic year 2012/2013, with the aim of enabling teachers to teach using more integrated approach that will make pupils become more competent learners thereby constructing knowledge by themselves. According to Oakley, Felder, Brent & Elhadj (2004), there are several teaching methods used to teach subjects in schools. These teaching methods can be broadly categorized into two: conventional (teacher centered method) and the learner teaching method (student centered method).

The conventional method of teaching also known as the traditional method of teaching does not encourage students to question what they have learnt or to associate with previously acquired knowledge. Bligh, (1972) as cited in Scott (2003) believed that it was less effective in promoting thinking, creativity or changing attitudes. Also, the teaching and learning process in a traditional class was characterized by the traditional layout of desks in rows for whole class. This teaching method is least practical, more theoretical and memorizing (Teo & Wong, 2000). Students simply obtain information from teacher without building their engagement level with the subject being taught. The teacher delivers the lecture content and students listen to the lecture, thus the learning mode tends to be passive and learners play little part in the learning process thereby influencing the students' performance negatively. Chin, Zakaria & Daud (2010), argues that teaching should not merely focus on dispensing rules, definitions and procedures for students to memorize, but

should also actively engage students as primary participants. Johnson and Johnson (2009) assert that, cooperative learning is more advantageous than the conventional teaching method.

The student-centered method of teaching deals with learners that are actively involved in the process. According to Nilson (2010), student centered teaching tends to improve students' satisfaction with the learning experiences and deepen students' understanding of how the knowledge may be valued in their own lives. There are several types of student centered teaching methods used, but our point of interest is the cooperative learning method of teaching. Ranjani (2004) suggests that this teaching method can be utilized to enhance and promote students' performance. Most teachers today apply this approach to promote interest, analytical research, critical thinking and enjoyment amongst students (Hesson & Shad, 2007). This teaching method is more effective since it does not centralize the flow of knowledge from the teacher to the student. In addition, this teaching method also motivates goal oriented behavior among students; hence the method is very effective in improving student performance (Slavin, 1995).

Slavin (1994), defines cooperative learning as an instructional program in which students work in small groups to help one another master academic content. He equally suggests that cooperative learning has the potential to capitalize on the developmental characteristics of adolescents in order to harness their peer orientation, enthusiasm, activity, and craving for independence within a safe structure. Based on Johnson and Johnson (2002), the society cannot survive when there is no cooperation. For this reason, members must come together to work to accomplish shared goals. Cooperative learning method has been one of the most researched kinds of instructional methods used in the classroom. Research has found that cooperative learning improves not only learning but also social development skills and communication skills.

This instructional method of teaching had existed long before the pre-colonial era that started in 1884 (Fonkeng, 2007), where students learned in small groups; but it was relatively unknown and largely ignored by educators. This supports the view of Montagu (1965) which says that, in the mid-1960s, cooperative learning was not widely known; it was greatly ignored by educators for what dominated our elementary, secondary as well as the universities was the competitive and individualistic learning. However, competitive teaching involved students who worked against each other to achieve an academic goal such as grade "A" that only one or a few students can

attain. Individualistic teaching is that which students are independent of one another and their success depends on their personal efforts.

It has been argued that since the nature of our society is competitive, learners must be educated to succeed in a 'survival for the fittest' world. Hence competition is presently the most dominant approach to teaching and learning. The danger to competition is that it creates losers and winners thereby instilling feeling of 'them-us' within students. Meanwhile, cooperative learning promotes greater efforts to achieve positive relationships and greater psychological health than do competitive and individualistic learning. These outcomes indicate that when cooperative learning is used, the majority of the school day, diversity among students can be a potential source of creativity and productivity cooperation (Johnson and Johnson, 2005).

In the case of Cameroon, cooperative learning began before the First World War through evangelization and was mostly used by missionaries in their educational efforts (Fonkeng, 2007). They studied the bible in small groups moving from one place to another, since evangelization was the main objective for schooling (Tambo, 2003). The dominant approach of teaching was drill and repetition which was to ensure quick and accurate responses. It was intended to establish associations that can be reproduced without thinking. The effective method of learning was rote memorization which is known for cramming facts thereby hindering critical thinking. With the advent of formal education in Cameroon this issue of teaching methods has evolved till date where in our educational institutions like the secondary school, conventional teaching methods is still preferred by teachers.

Many reforms aimed at ameliorating the effectiveness of the educational system have been applied but the situation of buoyancy is still aggravating; meanwhile, the cooperative learning method of teaching is an innovative method of teaching which insist in making the learner active and productive in the construction of his knowledge (Tambo, 2003). Putnam (1998), states that cooperative learning serves as a powerful tool in creating effective inclusive classrooms of diverse learners.

There exist more than 100 cooperative learning techniques, but this study will limit itself to techniques such as jigsaw technique, student's team achievement division (STAD) and peer tutoring. Johnson (1973) suggests that cooperative learning techniques could improve students'

academic performance towards self, peers and schools. Many teachers mistakenly believe that cooperative learning takes place whenever teachers have students work in groups in class. This is only successful when group members work as a team to accomplish a common goal. Working in group facilitates learning by encouraging group discussion. This supports Felder's (2007) view which says that benefits occur when cooperative learning is used for instruction by which students' grade are improved; since they show longer retention of information, transfer information to other course and have better class attendance.

This method is used in our present education whose objective is to allow students construct and develop knowledge for themselves. Also, it focuses on competencies or skills such as cooperation, interactive, communicative skills to be mastered by learners so as to resolve real life problems. It is learned centered focused and works naturally with independent study with the instructor as the role of facilitator. Cooperative learning is used by teachers because students are provided with more opportunities to get assistance from peers and exchange ideas with others, enhance students' participation and increases students interest and confidence (Xuan, 2015).

According to the Historical Association (2008), cooperative learning teaching method is a powerful tool that history teachers can adopt in today's classrooms. History is made up of three sections. This includes Cameroon history, Africa history, and World history. There is therefore the study of pre-colonial era in Africa, each history or section has its own syllables which are prescribed in Cameroonian educational curriculum. The fact of knowledge containing history widens as students move from one class to another, from secondary to higher education. In this, the scope and sequence of history broadened, and this becomes complex as you move forward. History as a subject is very important both to the students and the society as a whole. Carr (2000) had maintained that the importance of history is felt both by individual and the society. The importance of history helps to develop a critical mind. History is seen as nothing else but reality and the best teacher to reality is experience which is what cooperative learning techniques offers to history students. Cooperative learning can be beneficial to history students because it enables students to develop their oral communication skills where by students get to explain their historical reasoning (Maxwell & Shillah, 2014). In addition to that it provides instant feedback to teachers and students. The study of history helps to develop a critical mind towards positive thinking (Vasina, 2004). Students studying history eventually cultivate the attitude of looking at

things at two sides. The eventually based their interest on digging evidence to come out with facts to support their claims. History is therefore a social subject that embodies the class of people, their experiences, the societal norms and laws. Therefore, the concept of history should be properly handled by teachers for easier understanding. Knowing that students constitute the future generation and builders of the future society, their firm grasp of history are primordial.

Despite the passage of time, the importance of involving all students in their own learning continues to resonate strongly with students, educators, and researchers. There is a shortage or lack in research and information related to the use of cooperative learning techniques students' academic achievement in secondary school. The purpose of this work is to critically examine if the use of cooperative learning techniques improves students' academic performance than the conventional teaching method in secondary schools.

## **1.2. STATEMENT OF RESEARCH PROBLEM**

Education in Cameroon is aimed at preparing every student to become intellectually, morally, emotionally and physically upright, and be able to fit into the society, while contributing to its growth and development (Fonkeng, 2007). That is for the individual to live a valuable life within any given community, while emulating the appropriate skills, values, attitudes, knowledge and competences for the development of the society. With education geared towards attaining short term and long-term goals, the government, educational stakeholders, parents, have been deploying enormous efforts to ensure that these goals are met to its full potential. A good number of research studies have shown that the only, if not the greatest factor that creates as well as increases the academic achievement of students is a knowledgeable, skillful teacher. To this effect, the state and the private sector have done a lot to provide schools, and didactic materials so as to foster learning and bring about responsible citizens (Fonkeng, 2007). However, despite all these efforts, students' academic performance continues to decrease and raise an issue of concern to educational stakeholders.

Many solutions have been attempted to improve students' academic performance. Szell (2013) has suggested that there are variables inside the school and outside the school that affect the quality of students' academic achievements. They grouped these variables under factors relative to the students, factors relative to the family, factors relative to the school as well as factors



relative to peers. Formal investigations on the role of demographic factors such as age, gender, geographical belongingness, ethnicity, socio-economic status, parents' level of education, and religious affiliation have been investigated.

Besides the aforementioned factors, socioeconomic status is one of the most researched and debated factor among educational professionals that contribute towards the academic performance of students. The most prevalent argument is that the socioeconomic status of learners affects the quality of their academic performance. Most of the experts argue that the low socioeconomic status has negative effect on the academic performance of students because the basic needs of students remain unfulfilled and hence they do not perform better academically (Tanyi, 2009). Though, some studies have attributed this students' drop in academic performance to the misuse of the various methods of teaching in various schools, less attention have been paid to the use and their effects of the various teaching methods could have on students' academic performance.

In recent years, there has been a lot of debate on teaching methods; especially the interactive methods which has been introduced. Teachers have been using these interactive methods with minimal increase in performance. Among the various interactive methods, cooperative learning teaching methods have been ignored in all these efforts; meanwhile the use of cooperative learning techniques in the classrooms could foster learning, motivate students' engagement and involvement in the lesson thus increasing performance. For instance, considering the subject history, the Historical Association (2008) believes that cooperative learning teaching method is a powerful tool that history teachers can adopt in today's classrooms.

Many teachers mistakenly believe that cooperative learning takes place whenever teachers have students work in groups in class. This is only successful when group members work as a team to accomplish a common goal. Working in group facilitates learning by encouraging group discussion. This supports Felder's (2007) view which says that benefits occurs when cooperative learning is used for instruction by which students' grade are improved; since they show longer retention of information, transfer information to other course and have better class attendance. In accordance with this view, the purpose of this study is to investigate on the use of cooperative learning techniques (jigsaw technique, student's team achievement division (STAD) and peer

tutoring) on students' academic performance in secondary school. A comparative study of the effects of cooperative learning techniques and conventional method of teaching.

Usage of cooperative learning techniques such as Jigsaw, peer tutoring and students' team achievement division in the classroom fosters learning, retention, creativity, and good human behavior such as patients. But the observation in field revealed that most teachers show no interest in the usage of these techniques in history. It is against this backdrop that investigating the use of cooperative learning techniques improves students' academic performance of students than the conventional method of teaching appears to be an alternative to deepen the understanding of the issue of academic achievement.

### **1.3. PURPOSE OF THE STUDY**

The purpose of the study is to investigate if the use of cooperative learning techniques improves student academic performance more than the conventional method of teaching history.

### **1.4. OBJECTIVES OF THE STUDY**

The objectives are stated both in the general and specific form.

#### **1.4.1. General Objective**

According to Creswell (2012), a research objective is a statement of intent for the study that declares specific goals that the investigator plans to achieve in a study. This study seeks to investigate “. Investigate if the use of cooperative learning techniques better improves students' performance than the conventional method of teaching history in a selected secondary school”.

#### **1.4.2. Specific objectives**

- To verify if the use of jigsaw technique improves students' academic performance more than the conventional method of teaching history in a selected secondary school.
- To find out if the use of peer tutoring improves academic performance of students more than the conventional method of teaching history in a selected secondary school.
- To assess if the use of Student Team Achievement Division produces better results on students' academic performance than the conventional method of teaching history in a selected secondary school.

## **1.5. RESEARCH QUESTIONS**

Research questions according to Creswell (2012) are interrogative statements that narrow the purpose statement to specific questions that researchers seek to answer in their studies. In specific terms, these following research questions define the research problem and guide the study.

### **1.5.1. General research question**

Does the use of cooperative learning techniques improve students' academic performance than the conventional method of teaching in history in a selected secondary school? This main research question was operationalized into the three following specific research questions:

### **1.5.2. Specific research questions**

- Does the use of jigsaw cooperative learning technique improve students' academic performance more than the conventional method of teaching history in a selected secondary school?
- Does the use of peer tutoring improve students' academic performance more than the conventional method of teaching history in a selected secondary school?
- Does the use of Student Team Achievement Division technique produce better results on students' academic performance than the conventional method of teaching history in a selected secondary school?

## **1.6. RESEARCH HYPOTHESIS**

To guide the step of our research, the following research hypothesis (general hypothesis and specific hypothesis) were formulated.

### **1.6.1. General Hypothesis**

The use of cooperative learning techniques significantly improves students' academic performance more than the conventional method of teaching in history.

### **1.6.2. Specific Hypotheses**

The operationalization of this general hypothesis has yielded the following specific hypotheses:

- The use of jigsaw cooperative learning technique significantly improves students' performance more than the conventional method of teaching history.

- The use of peer tutoring technique significantly improves students' academic performance more than the conventional method of teaching history.
- The use of Student Team Achievement Division technique significantly produces better results on students' academic performance than the conventional method of teaching history.

## **1.7. DELIMITATIONS OF THE STUDY**

The scope of the study is divided into three sections which includes; thematic delimitations, geographical or spatial delimitations and temporal delimitations.

### **1.7.1. Thematic delimitations**

There are many factors that can improve students' academic performance, but this research is limited to cooperative learning techniques such as Jigsaw, peer tutoring and Student Team Achievement Division were examine under to see how these techniques do improves students' academic performance. This study is based on the secondary school level of education.

### **1.7.2. Geographical or spatial delimitation**

This research was carried out in Etoug-Ebe a neighborhood in Yaoundé, in the Government Bilingual High School, Yaoundé in the Mfoundi division of the Centre Region of Cameroon. The study was carried out during the 2017/2018 academic year.

### **1.7.3. Temporal delimitation**

At this stage, the researcher ought to answer the question when our study took place. The work began on the 27<sup>th</sup> of September and ended on the 13<sup>th</sup> of November 2017 with the deposition of our document to the competent authority.

## **1.8. SIGNIFICANCE OF THE STUDY**

*To school administrators:* concerned with the general management of school, they will encourage their collaborators who are the teachers to use this method of instruction. This could be done by training the teachers on the use of these cooperative techniques through pedagogic seminars as well as inviting resource persons to train the teachers. They can equally encourage the use of

cooperative learning techniques through providing the necessary equipment's for the implementation of cooperative learning in the institutions.

*To Teachers:* this study is going to enlighten them on the instructional method to use in order to facilitate the acquisition of knowledge as well as the comprehension of learners in the different disciplines and subject matters. It is equally going to give them an understanding on how to use constructive cooperative learning to enhance learner's output through the different techniques used by cooperative learning examined in this study. It enables teachers to be capable of framing problems, drawing lessons beyond their immediate setting and solving problems thus providing instant feedback to the teachers and students

*To Students:* With an understanding that cooperative learning will influence student's performances, they will take work given to them seriously. They will be conscious and motivated to work in their different groups where they are assigned, being aware of its importance. It enhances learners to be able to get more involved and inculcate the ability to think critically and state personal opinions, ideas with original frame of mind thus actively engaging the learners in the learning process by creating opportunities for learning and teaching to occur between peers.

*Curriculum and Evaluation Process:* Curriculum consists of the learning contents as well as the manner in which instruction is carried out. Looking at the fact that cooperative learning is an instructional method of transmitting the said learning contents, studies like this will enlighten stakeholders on how to better use this instructional method so as to bring out fruitful results. With regards to evaluation, a study like this will throw more light on how to evaluate the individual members in a group and also educate them on aspects that should be taken into consideration when evaluating learners in a group.

*To Policy makers and the state:* This study will help government to understand the importance of using cooperative learning in classroom and its influence on learner's productivity, thereby impacting the quality of education. Thus, the state and policy makers who are concerned with the drawing up of school syllabuses will see into it that, instructional methods used in exploiting teaching and learning contents should utilise constructive cooperative learning techniques. It will guide policy makers to be able to formulate policies in higher teachers training colleges where by, it will enable policy makers to formulate rules and regulation which will influence decision

making in training teachers colleges that will facilitate cooperative learning techniques to be used effectively in order to improve the performance of secondary school students in history.

## **1.9. DEFINITION OF TERMS**

*Cooperative learning:* Johnson and Johnson (1989) explain Cooperative learning as an instruction that involves students working in team to accomplish a common goal.

*Academic performance:* it is the outcome of education to which a student, teacher or instruction has achieved through educational goal. Also, it is a concept used to describe a student's progress in an academic setting. Academic performance can be measured by a student's test scores, final course grades, and grade point averages. For the purpose of this study, academic performance focused on students' self-report marks performance as measured by the teachers in their class test.

*Secondary school:* It's an intermediary learning level or institution between the primary and university education. Secondary Education (school) occupies a very strategic place in the academic ladder, this is because it serves as a link between the primary and university levels of education. According to Asikhai (2010) as cited in Ekundayo & Alonge (2011), secondary education is the foundation and bedrock towards higher knowledge in tertiary institution. It is at the same time an investment and instrument used to achieve adequate economic, social, political, scientific, cultural and technological advancement.

*Cooperative learning techniques:* it is defined as techniques where heterogeneous groups of learners collectively work together to attain a common aim. In this study, the techniques are jigsaw technique, students' team achievement division, peer tutoring.

*Conventional learning:* it is defined as a teaching method whereby the main dominant approach of teaching was drill and repetition which was to ensure quick and accurate responses. It is intended to establish associations that can be reproduced without thinking. The effective method of learning was rote memorization which is known for cramming facts thereby hindering critical thinking. In this study, it is defined as a teaching method whereby the teacher is seen as the sole provider of knowledge.

*Cooperative groups:* In this study, cooperative groups are considered to be a group of 8-10 persons because of the large class sizes that the study can be dealt with in fewer groups to facilitate interaction and be sure that the students are doing the real work together controlled and supervised by the teacher

*Jigsaw cooperative Learning technique:* This is where student of a home group specializes in one aspect of a learning unit. Students meet with members from other home groups who are assigned the same aspect, after mastering the material, return to their home group and teach the material to their group members (Arosen, 2000).

*Expert:* An expert is a person with special knowledge, skills, training in something. In this study, it refers to a group of learners with identical tasks who come together for discussion.

*Students Team Achievement Division (STAD):* In this context, it is a technique in which groups of seven to nine members work within their teams to master a lesson presented by the teacher. Students take individual quiz and compared to past performance and the team scores are put together based on the extent to which the students in the group surpass past performance.

*Peer tutoring:* It is a flexible educational strategy that involves students serving as academic tutors and tutees. In this study, it involves high achieving students and low achieving students working in a group.

*Classroom interaction:* In this study, classroom interaction is considered to be the way students think and share ideas with mates, participate in classroom discussions, contribute ideas and also the willingness to ask for help or readiness to offer such help freely without reservation.

*Positive Independence:* Group members conceive that each member is personally linked with one another in such a way that the groups cannot do without all efforts put together.

*Individual and Group Accountability:* In this study, it will mean each individual feel or has a personal responsibility and must be liable for contributing his or her own quota of work ideas, knowledge, skills and facts towards the achievement of the shared goal for the group.

*Face to face interaction:* this means promoting positive face to face interaction by teaching the students how to engage simultaneously in learning subject matter and functioning effectively as a group and maintaining effective working relationship.

*Group processing:* In regard to this, it's a situation where by it reflects and discusses how well the group is functioning as a unit and how effective is their working relationship.

*Social skills:* In regard to the study, it means students become aware of the human interaction skills involved in effective group cooperation.



## **CHAPTER TWO**

### **REVIEW OF LITERATURE**

This chapter ascertains what others have written on the nature of cooperative learning techniques and its impacts on students' academic performance. This chapter looks at the conceptual framework which is related to the variables of the study, the theoretical framework which involves discussing the theories in detail and relating it to this work and empirical framework.

#### **2.1. CONCEPTUAL FRAMEWORK**

##### **2.1.1. Students' Academic Performance**

Academic Performance (achievement) is the outcome or extent to which a student, teachers or institutions achieves his/her educational goals. It is commonly measured through examinations or continuous assessments (sequence). Academic achievement represents performance outcomes that indicate the extent to which a person has accomplished specific goals that are the focus of activities in instructional environments. Marlow (2003) as cited by Chukujindu (2012) & Christiana (2013), points out that, written test has been used for more than one hundred and fifty years now to measure the rate of Academic Achievement. It represents performance outcomes that indicate the extent to which a person has accomplished specific goals that were the focus of activities in instructional environments, specifically in school, college, and university. School systems mostly define cognitive goals that either apply across multiple subject areas (e.g., critical thinking) or include the acquisition of knowledge and understanding in a specific intellectual domain like numeracy, literacy, science, history (Steinmayr, Meißner, Weidinger, and Wirthwein, 2014). Gibson and Rankin (2015) defined students' academic achievement can be defined as: *“student success, engagement in educationally purposeful activities, satisfaction, acquisition of desired knowledge, skills and competencies, persistence, attainment of educational outcomes, and post-college performance”*, (Gibson and Rankin, 2015, p.5).

Academic performance can be considered as a multifaceted construct that comprises of different domains of learning. However, because the field of academic achievement is very wide-ranging and covers a broad variety of educational outcomes, the definition of academic achievement

depends on the indicators used to measure it. Academic achievement in the secondary level of education is very important, because it defines whether one has to continue education in higher levels like university and also based on the educational degrees attained, it influences one vocational career.

Studies carried out by Steinmayr, Meißner, Weidinger, & Wirthwein, (2014) show that in developed societies, academic achievement plays an important role in every student's life. Academic performance as measured by the GPA (grade point average) or by standardized assessments designed for selection purpose such as the SAT (Scholastic Assessment Test) determines whether a student will have the opportunity to continue his or her education (e.g., to attend a university). Therefore, academic achievement defines whether one can take part in higher education, and based on the educational degrees one attained, influences one's vocational career after education. Besides the relevance for an individual, academic achievement is of utmost importance for the wealth of a nation and its prosperity.

Teaching is an interactive act which can't be done in isolation; it requires cooperation and interaction in the process of the activity. According to Tambo (2003) teaching method refers to standard procedure used in presenting subject matter as well as the organization of student/teacher interaction during lesson. In addition to that, teaching methods can be broadly categorized into two: conventional (teacher centered method) and the learner teaching method (student centered method). Amongst the student-centered methods, we have laboratory method, dramatization and role play without leaving out cooperative learning which is the point of interest.

In the conventional (traditional) method, the teacher is the sole provider of knowledge. The traditional (conventional) methods of teaching did not encourage students to question what they have learnt or to associate with previously acquired knowledge (Teo & Wong, 2000). The teacher delivers the lecture content and the students listen to the lecture thus the learning mode tends to be passive and the learners play little part in the learning process thereby influencing on the students' performance negatively. Bligh, (1972) as cited in Scott (2003) believed that lecturing promotes low level learning of factual information. It was less effective in promoting thinking, creativity or changing attitudes. This method resulted to poor academic performance of students

### **2.1.2. Cooperative learning teaching method**

Cooperation deals with the interaction between more than one person to accomplish shared goals (Johnson and Johnson, 1989). Within cooperatives activities, individual seeks outcomes that are beneficial to themselves and to other group members. Learning is a relatively permanent change in behavior that is brought about by experience and interaction of other factors (Fontana, 1988 as cited in Tchombe, 2003). Social constructivist scholars view learning as an active process where learners should learn to discover principles and facts for themselves hence encouraging group learning. In addition to that, the essential core of constructivism is that learners construct their own knowledge from their own experiences. Social constructivist scholars view learning as an active process where learners should learn to discover principles and facts for themselves hence encouraging group learning. In addition to that, the essential core of constructivism is that learners construct their own knowledge from their own experiences. Santrock (2004) asserted that social constructive theory focuses on collaboration with others to produce knowledge and understanding. He further suggests that when students work together, they can ask for help, clarification, exploration, talk in turn, encourage others to participate, listen attentively and check that others understand thereby influencing student's performances.

Cooperative learning is a teaching method which involves two or more persons to work together to accomplish a common task (Siegel 2005). In addition to that, it's a method in which pupils work in small, mixed ability learning teams. Organizing classroom activity in this method, pupils interact with one another, learn from one another, learn from the teacher and learn from the world around them (Clarke, Wideman & Eadie, 1990 as cited in Tambo, 2003). Cooperative learning is the instructional use of small groups so that student's works together to maximize their own and each other's' learning (Johnson, Johnson & smith, 1991). The concept of Cooperative learning is not having students sit side by side at the same table and talk with others as they do their individual assignments, assigning a report to a group where one student does all the work and other put their names on it (Johnson & Johnson, 1994). However, Kagan (1994) suggested that the key of cooperative learning is Team spirit which is stressed with students learning how to learn by participation with their peers. Vygostky (1987) submit that, "What a child can learn to do in cooperation with other, he will learn to do alone". What the learner does with his team mates in the course of studying the task assigned to them; he will be able to do the same task alone. Gillies (2003), also stresses that students working together are more motivated to achieve

than they would be when working individually. Therefore, the motive of cooperative learning is to enhance learning and achievement by encouraging peer-peer interaction and cooperation.

Johnson, Johnson & Holubec (1993), Cooperative learning is the instructional use of small groups so that students work together to maximize their own and each other learning. The learners in the team use a variety of learning activity to improve their understanding of the subject. That is to say, learners or team mates are not only responsible for learning that which is taught, but equally help other team mates learn, thus creating an atmosphere of achievement. Within cooperative groups, students discuss the material to be learned with each other, help and understand each other to understand it and encourage each other to work hard.

### ***2.1.2.1. Groups used in cooperative learning***

In a Cooperative learning groups, students work together to accomplish shared goals. Students seek outcomes that are beneficial to all the members of the group, they discuss materials with each other, help one another understand the material and encourage each other to work hard. However, individual performance is checked regularly to ensure that all students are contributing and learning. The result is all students perform higher academically than they would if they worked alone. They are three types of cooperative learning groups. There are; formal, informal and base cooperative learning groups.

***Formal cooperative learning group:*** According to Johnson, Johnson and Holubec (2008), consists of learners working in group or together for a period or let say one class period to several weeks to achieve share learning goals as well as complete jointly specific task and assignments. The teacher performs the following role in for cooperative learning.

- Making pre-instructional decision: Here the teacher performs the following, he formulates the objectives which could be academic and social skills, he decides on the size of the group, chooses a method for assigning learners to particular group which establishes role independence. He equally arranges the classroom or working environment as well as the didactic material learners need to accomplish the task, thus the establishment of environmental interdependence and resource interdependence. The above enables the teacher to easily monitor each group which brings about an increase in individual accountability and equally provides data for group processing.

- Explaining instructional task and cooperative structure; the teacher defines the role of explaining the academic assignment to learners, he equally explains the criteria for success, he structures positive interdependence, he structures individual accountability, he explains behavior to be used by the learner and emphasizes intergroup cooperation. By so doing it eliminates the aspect of competition amongst the learners and brings about positive goal interdependence to the class as a whole.
- Monitoring student's learning and intervening to provide assistance; To complete the given task successfully, the teacher plays the following role, the teacher monitors each learning group and intervene when need arises. This is accomplished through monitoring individual accountability, because whenever the teacher monitors a group, it makes the member to tend to feel accountable, constructive and also enable teacher to collect specific data on promotive interaction.
- Assessing students' learning and helping student process how well their group functioned; This could be done through the teacher bringing closure to the lesson, assessing and evaluating the quality and quantity of learner's achievement, ensure students to discuss the effectiveness of their learning group or how they worked together, have students plan for improvement as well as have the learners celebrate the hard work of group members. Students' achievement assessment brings about individual and group accountability that is how well each student performed, thus indicating whether each group achieve its goals that is focusing on positive goal interdependence. The feedback given during group procession is aimed at improving learner's use of social skills as well as bringing about individual accountability.

***Informal cooperative learning group:*** According to Johnson, Johnson and Holubec (2008), It consist of making learners to work together to achieve a joint learning goal in temporary, ad-hoc groups' that last from a few minutes to one class period. This instructional method could be used during lessons such as lecture, demonstration or film in order to focus learner's attention to that which is to be learnt. The teacher has to set a conducive learning mood, set the expectation of what will be covered in a class session, ensure that student cognitively process and rehearse the material being taught, summarized all that was learnt and provide closure to instructional session. To keep learners focused through the use of informal cooperative learning entails having focused

discussion before and after the lesson. Two important aspects of using informal cooperative learning groups are to make the task and instructions explicit and precised and also to produce a specific product (such as written answer). To achieve these two important aspects the teacher uses the following procedure.

- Introductory focused discussion; Here the teacher assigns students to pair and explains to them what it takes to answer the questions in 4-5 minutes time and the positive goal interdependence of reaching census. Discussion here enables the learners to organize what they already know in advanced concerning the topic to be presented and establishing expectation about what the lecture will cover.
- Intermittent focused discussions; here lecture is divided by the teacher in to about 10-15 minutes segment for it is believed that are such length of time, motivated adult can concentrate on information being presented. That is to say, after every segment of 10-15 minutes learners are asked to turn to the person next to them and work cooperatively in answering a question. The question should be specific enough so that it can be answered in about 3minutes.

Closure focused discussion; learners are given an ending discussion task lasting for about 4-minutes by the teacher. The task learners are to carry out here is to summarize what they have learnt from lecture and integrate in to existing conceptual frame works. Informal cooperative learning ensures that students are actively involved in understanding what is being presented. It also provides time for teachers to move around the class listening to what students are saying. Listening to student discussions can give instructors direction and insight into how well students understand the concepts and material as well as increase the individual accountability of participating in the discussions.

***Cooperative Based Group:*** they are long-term, heterogeneous cooperative learning groups with stable membership. Learners that constitute the group have the following primary responsibilities to see to it that all members of the group are making academic progress (that is positive goal interdependence): hold each other accountable for striving to learn (individual Accountability) as well as support, encourage and assist each other in completing assignment (that is promotive interaction). In order to ensure that this cooperative based group functions effectively and

periodically, teachers should educate group members on needed social skills and have the group's process how effectively they are functioning. This type of group is heterogeneous in membership especially in terms of achievement, motivation and task orientation. Such groups meet regularly, it could be daily or bi weekly and last for the duration of the class which could be a semester or a year or preferable for several years. Here the teacher plays the following roles; forms heterogeneous groups of about 3-4 persons, schedule their regular meeting time which could equally be at the beginning and end of each class session or beginning and end of the week.

According to realities, effective cooperative learning techniques works better in smaller classes than in big classes for instance in the case of a cooperative classroom, teachers will find out that their instructions with cooperative learning technique will be more effective in smaller classes than in bigger classes thereby influencing students' performance. Ehrenberg, Brewer, Gamoran & Willms (2001) points out that the number of students in a class has the potentials to affect how much is learned in a number of different ways thereby affecting students' performance. Moreover, the smaller the class size, the more likely individual attention is given, the more learners' performance is influenced positively. Literature reveals there is conflicting evidence from the research that smaller classes have effects on students' achievement (Toth and Montagna, 2002) because it has been proven that students in smaller classes have better learning outcomes than students in larger classes.

For cooperative learning techniques to be integrated in the classroom, it must take into consideration the five characteristics, principles and elements of cooperative learning. These include positive interdependence, individual accountability, and face to face interaction, group processing and small and interpersonal skills. Cooperative learning offers a proven, practical means of creating exciting social and engaging classrooms environments to help students to master traditional skills and knowledge as well as develop the creative and interactive skills needed in today's society and economy. Li & Lam (2013) are of the opinion that to apply cooperative learning techniques in the classroom such as jigsaw, student team achievement division, peer tutoring must be put into place to impacts students' academic performance in secondary school.

### ***2.1.2.2. Characteristics of cooperative learning;***

Teachers must take these elements into consideration in order for cooperative learning to be effectively implemented in classroom so as to impact student performance. According to Tambo (2003), these are five principles of cooperative learning. This includes positive independence, individual and group responsibility, social skills, group processing and face to face interaction.

***Positive Interdependence:*** According to Johnson and Johnson (1989), Positive interdependence is the perception you are linked with others in such a way that you can succeed unless they do (your work benefits them and their work benefits you). In other words, the success of one group member is connected to the success of the others on the team. Within every cooperative lesson, positive goal interdependence must be established through mutual learning goals (learn the assign material and ensure all members of the group learn the assign materials). To Thomas (2000) suggest that positive interdependence needs to be constructed in cooperative learning groups so as to help students to work and learn together. Kagan (1994) stressed on the fact that participation in cooperative learning is obligatory and not voluntary. Positive interdependence provides students with the idea that each student is connected to each other along with success. For the group to be successful each member of the group must succeed. For a learning situation to be cooperative, students must perceive that they are positively interdependent with other members of their learning group. According to Johnson & Johnson (1989), it is positive interdependence that creates the realization that group member has two responsibilities which are,

- To learn the assigned material
- To ensure that all members of their group learn the assigned material.

According to Research, there is a positive effect of a positive interdependence on students' performance (achievement) and productivity. Johnson and Johnson (2005) points out that, positive interdependence produces higher performance (achievement) and productivity. This is due to the fact that group member's performance affects the success of other group members and tend to create "Responsibility of force" that indicates an increase in each member's effort to achieve (Mesch, Johnson and Johnson1998), group members will come to the awareness that their personal efforts are very much needed for the success of the group. This will make the members to know that it will not be possible for them to get" a free-ride" as each has a unique contribution to make to the group's effort.



***Face to Face Interaction:*** According to Johnson and Johnson (2008), Face to face Promotive interaction comes into play in cooperative learning, as group members encourage and facilitates each other effort to accomplish group goal. Face to face encourages students to take an active role in the success of the group. Students can accomplish this by helping each other learn the assign learning material. Once teachers establish positive interdependence, they need to maximize the opportunity for students to promote each other's efforts to team. Here, students must arrange time when students can meet with each other in person (Johnson & Johnson, 1999). The discipline of using cooperative groups ensures that group members must meet face to face to work together to complete task and promote each other success.

Here the learners interact verbally with one another on learning task which is even one of the conditions for a successful cooperative learning. Verbal and non-verbal responses provide important information's on students' performance, Johnson and Johnson (2008), equally holds that, the quality of interaction depends on the size of the group and the frequency of student's cooperation on their learning tasks. Silent students are involved students who are not contributing to the learning of the other as well as themselves. That is to say groups have to be small when students begin learning together in order to facilitate the development of cooperative learning skills and improvement of students' performance.

***Individual Accountability:*** Individual accountability is the belief by each individual he or she will be accountable of her learning and her performance. Johnson and Johnson (2008), sees student's individual responsibility as the students ask for assistance, that is; do their best work, present their ideas, learn as much as possible, take their task seriously, help the group operate well and take care of one another. Slavin (1996), sees individual accountability in terms of the extent to which group's achievement is depended on individual learning of each group member, this will motivate group members to see into it that everyone should have a good mastery of the material which is being studied. Johnson and Johnson (2008) assert that there is a need for both group and individual accountability; "two levels of accountability must be structured into cooperative lessons. The group must be accountable for achieving its goals and each member must be accountable for contributing his or her share of the work. Individual accountability exists when the performance of each individual is assessed, and results are given back to the group and the individual in order to ascertain who needs more assistance, supports and encouragement in

learning. The first step in promoting individual accountability in an environment suitable for cooperative learning is to build the teams in a productive manner.

According to Hooper (1989), examining cooperative learning on students learning, it was noticed that cooperation resulted in higher performance when individual accountability is structure than when it was not. They equally argued that, lack of individual accountability may reduce feeling of personal responsibility. According to Yamark (2007), for cooperative activities to be effective, members must be assigned to a specific task and all members must take individual accountability for their group member's achievement. Johnson and Johnson (1994), Individual accountability can be maintained through the size of the group, because the smaller the size of the group, the greater the individual accountability may be. Brewer (1983), say the smaller the size of the group, the better the communication amongst group members for they will tend to communicate more frequently, and this might increase the amount of information that will be used in arriving a decision. Individual accountability is checked by giving individual test and each student randomly examined individual orally to present his or her group work to the entire class.

***Social Skills:*** Social skills are the ability to relate and function with other people. Contributing to the success of a cooperative effort requires interpersonal and small group skills. To Johnson and Johnson (2006), they cannot be the production of any effective work if socially unskilled learners are arranged in to one group. Learners must be taught the social skills for high quality cooperation and be motivated to use them. These skills are required for interacting effectively with peers from other ethnic groups. To Slavin (1996), group members should know how to manage group, how to make decisions and how to solve conflict that arise amongst them, that is to say if such skills are not taught, then cooperative learning activities will hardly succeed.

To Ladd & Burgess (2001) say Social skills are behaviors that promote positive interaction with others and the environment. Some of these skills include: Showing empathy, Participation in group activities, Generosity, negotiating, communicating with others, Helpfulness and Problem solving. Johnson and Johnson (1989), say the more skillful participants are, the more social skills are taught and rewarded, and the more individual feedback participants receive on their use of skills, the higher the performance (achievement) and productivity of the cooperative groups will tend to be. Social skills do not only promote higher achievement but equally contribute to the building of a more positive relationship among group members.

**Group Processing:** Group processing occurs when students are able to self-evaluate the working, accomplishment of the group. It is an essential part of cooperative learning experience. Here, it is important for students to reflect on what went well in their groups as well as what could be improved during future collaborative work that is learners are able to identify the strengths and weaknesses of groups in terms of collaboration, over all achievement. Yamark (2007) says the purpose of group processing is to clarify and improve the effectiveness of member in contributing to the joint effort to achieve group goals. Groups' needs to describe what actions are helpful and unhelpful and make decision about what behaviors to continue.

According to Johnson and Johnson (1989) when dealing with group processing, Students must also be given the time and procedures for analyzing how well their learning groups are functioning and the extent to which students are employing their social skills to help all group members to achieve and to maintain effective working relationships within the group. Such processing (a) enables learning groups to focus on group maintenance, (b) facilitates the learning of social skills, (c) ensures that members receive feedback on their participation, and (d) reminds students to practice collaborative skills consistently. Some of the keys to successful processing are allowing sufficient time for it to take place, making it specific rather than vague, maintaining student involvement in processing, reminding students to use their social skills while they process, and ensuring that clear expectations as to the purpose of processing have been communicated. Finally, when difficulties in relating to each other arise, students must engage in group processing and identity, define, and solve the problems they are having working together effectively.

Research has shown that group processing has many positive effects such as examining cooperative learning with group processing, examining cooperative learner without any group processing and the examination of individualistic learning. Johnson, Johnson, Stanne and Garibaldi (1990), say studies show that comparing cooperation with no processing, cooperation with instructor processing, cooperation with instructors and participants processing and individualistic effect, the results show that all the three-cooperative condition performed higher than individualistic condition

There are several types of cooperative learning techniques which includes jigsaw, numbered heads, student team achievement division, group investigation, peer tutoring and....When

cooperative learning techniques are applied to the classroom setting, the structure of the group becomes important to the overall success of the group. Simply placing students in a group does not constitute a cooperative learning strategy. Effective cooperative learning techniques, however, appears to require more than just putting students in groups and giving each student a test at the end of the learning material. Cooperative learning techniques have been proven through research to increase student achievement in the classroom (Johnson and Johnson, 1989).

Literature on the use of cooperative learning techniques and its' impacts on students' academic performance will be reviewed under the following headings.

- Jigsaw and students' academic performance.
- Peer tutoring and students' academic performance.
- Students Teams Achievement Division and students' academic performance.

### **2.1.3. Cooperative learning techniques and Students Academic Performance**

Cooperative learning techniques are techniques where heterogeneous groups of learners collectively work together to attain a common aim. In this study, the techniques are jigsaw technique, students' team achievement division (STAD), peer tutoring.

#### ***2.1.3.1. Jigsaw Cooperative Learning Technique and Students' Academic Performance***

Jigsaw is one of the best known cooperative learning technique which was developed by Elliot Aronson, 1978. The purpose of this technique is to develop teamwork and cooperative learning skills within all students (Aronson, 2000). Kagan (1994) suggested that the key to cooperative learning is team spirit which is stressed with students learning how to learn by participation with their peers. In a Jigsaw classroom, teachers are expected to make classroom environment conducive for quality interaction among students. The arrangement of the class should be in such a way that will allow students to move freely and students take specific material seriously, so they can influence the quality of expert group discussion. Moreover, it is a cooperative learning teaching technique that can be used with other teaching strategies (Aronson, 2000). In this method, students are assigned to home teams to work on academic material that has been divided into sections for Jigsaw technique of cooperative learning can be used whenever material can be segmented in to separate components (Naomi, 2013). Each member of the group discusses the information and decides on the best way to present the material to members of their home teams.

After the students have mastered the material, group members return to their home group teams to teach the other members the material. Each group member becomes an expert on a different concept (Paintz, 1996). This unique piece of information is to help the group master the assigned work. This is because each student's part is essential, each student is essential and that is precisely what makes this technique so effective. In addition to that, it discloses a student's own understanding of a concept as well as reveal any misunderstanding. The students in a history class for example are divided into four to six groups of students each. Suppose their task is on the scramble for Cameroon. In a Jigsaw group, a member is responsible for researching about background of Cameroon, another member will be assigned to list the different powers involved and their different role played by the powers involved in the scramble, 3<sup>rd</sup> group member is responsible for researching about the reasons for the scramble, 4<sup>th</sup> group member will be assigned to impacts of the scramble to Cameroonians. It encourages listening, interaction and empathy by giving each member of the group essential parts to play in the academic activity. When the unit is completed, students are tested and they each receive a reward based on their own past performance.

***Steps in carrying out the jigsaw technique;***

According to Aronson (2000), they are nine steps to carry out the jigsaw technique. There are;

- The teacher divides the student into 4 or 5 people' with diverse of gender, ethnicity, race and ability.
- The teacher appoints one student from each group as a leader who should be the most mature in the group.
- The teacher divides the lesson into 4-5 segments.
- The teacher gives each student in each group a segment of what is to be learned.
- The students are given time to write down their segment and become familiar with it
- Students from each jigsaw group join other students assigned the same task to form expert groups. The teacher gives the expert groups time to discuss their specific task and also refer from the text books.

- The teacher brings the students books to their Jigsaw groups.
- The teacher floats from group to group monitoring the process. If any group is having any trouble, the teacher makes an intervention.
- The teacher gives a quiz on what has been learnt to be marked by the teacher.

However, Jigsaw is an effective way to learn materials. Jigsaw is cooperative by design and cooperativeness facilitates interaction among all students in the class leading them to value each other as contributors to the completion of the task. Chaudron (1988), states that interaction is significant because, it is through interaction, that learner can decompose the teaching learning structures and derive meaning from classroom events. In the Jigsaw technique, no student can succeed completely unless all group members depend on one another (Aronson, 2000) thus creating an impact on students' performance. However, interdependence requires students to take active part in their learning. Jigsaw structures promote positive interdependence and individual accountability whereby each member of the group has a role to play (individual accountability) and each member of the group has to contribute to the completion of the task (positive interdependence).

The advantage of the technique is that students develop cooperative skills, perform challenging and engaging tasks in their expert groups with enthusiasm since they know they are the only one with that piece of information in their respective groups, it is possible to cover more material rapidly when students are assigned different roles and then teach each other. This encourages social interaction thus encouraging and positively influencing student's academic performance.

The primary role of the teacher in the Jigsaw is to choose learning material, structure the groups, explain the cooperative nature of group work, provide an environment conducive for this type of work, monitor group work and assist students in working with the material. One of the challenges is that when a student is absent or arrives to class unprepared, his or her home group will look that perspective thus influencing performance of students negatively. However, this technique helps to discourage absenteeism, where by incentives such as participation points can enhance students' engagement and performance of students. Students' dominance is a challenge involved when using this technique. In order to reduce this problem, each group member has an appointed leader. Students realize that the group is more effective if each student is allowed to present his or

her materials before questions and comments are made. According to Aronson (1971), thousands of classrooms have used the jigsaw technique with great success. The jigsaw classroom is a cooperative learning technique that reduces racial conflict among school children, promotes better learning, and improves student's motivation thus increases students' academic performance.

### ***2.1.3.2. Peer tutoring technique and students' academic performance***

According to Thomas (2000), peer tutoring is the process by which a competent pupil with minimal training and with a teacher's guidance helps one or more students at the same grade level to learn a skill or concept. It involves having students work in pairs with another student of the same grade or age. Many teachers prefer to use peer tutoring in their classrooms because it provides favorable conditions for students to become active and self-regulated learner. According to Topping (1988), Dr. Andrew Bell is undoubtedly the first person in the world to use peer tutoring in a systematic fashion within a school setting. Consequently, Bell is considered the innovator of peer tutoring as we know it today. However, good peer tutoring is reciprocal whereby the tutor takes the turn of the tutee and the tutee takes the turn of the tutor during the same tutoring session. The advantage is that it prevents negative feelings of always having to be the tutee and feelings of superiority of always being the tutor.

According to Robinson, Scholfield and Steer Wentzell (2005), the concept of tutoring can be generalized and categorized into peer tutoring and cross age tutoring for instance peer tutoring occurs when both the tutor and the tutee are of the same age or grade level whereas cross age peer tutoring occurs when the tutor is older and is in a higher grade than the tutee. Tutor serves to model appropriate behavior, ask questions and encourage better study habits. Cross-Age Tutoring is a peer tutoring approach that joins students of different ages, with older students assuming the role of tutor and younger students assuming the role of tutee (Scott, 2003). When selecting a tutor, teachers should take into consideration students that can be most helpful in the process. This will therefore have a positive influence on students' performance. The tutor and the tutees benefit positively from tutoring where by it is known for helping students have higher achievements (performance), improved relationships with peers, improve personal and social development and increased motivation thus impacting students' performance (Brittany & Jennifer, Jasneen, 2012).

Teachers use peer tutoring technique because the intervention in class allows students to receive one to one assistance (Brittany & Jennifer, Jasneen, 2012) and it will easily permit teachers to monitor social interaction in the classroom environment. Peer tutoring has been found to last even when students move to a class where the teacher isn't using the technique. Greenwood, Carte and Maheady (1991) found out that two years after peer tutoring was stopped, the students who had received it were making progress on some part of basic skills test than students who had not been in classrooms for peer tutoring.

In order for peer tutoring to be effective, it requires high level of cooperation. Vygotsky (1987) suggested that one can be assisted by more skilled persons such as peers. Weak students working individually are likely to give up when they get stuck, but when working cooperatively, they keep going. Strong students faced with the task of explaining and clarifying material to weaker students often find gaps in their own understanding and fill them in. However, Slavin (1980) stressed that peer tutoring has a reward structure where cooperation is at its core. Educators have discovered that students working together learn more than students who work independently. However, peer tutoring works best when students of different ability levels work together (Eskay, onu, obiyo & obidoa, 2012). Heterogeneous groups should be formulated by the teachers where by learner learn to get along and work cooperatively. Wenzel (2000) noted that students in heterogeneous groups tend to have deeper understanding of the material and remember more than in a homogeneous group.

For peer tutoring to be successful, there should be 4 to 8 sessions that should not last more than 15 minutes. The teacher should demonstrate what peer tutoring is like with another teacher or with a student in the class, using simple clear materials, such as developing system to request help, such as raising of hands. Also, the teacher should specify clear rules and expectations before peer tutoring. He/she should reward positive cooperative and appropriate behaviors during tutoring. When the time goes off, let the students switch roles, they should use game formats for they are highly motivational (Eskay et al, 2012). Teachers should interact closely with students and state specific goals to measure and examine progress. It will also help students to be better acquainted with some other people in the classroom. For peer tutoring to be highly effective, it requires a high level of cooperation. Educators, researchers, administrators, and even parents are rediscovering the fact that two or more students working together learn more than individual students working alone. All of these involve cooperative learning. Teachers should avoid putting



best friends or worst enemies in a group. It may result to group conflict thus hindering cooperation thereby influencing performance of students.

However, cooperative efforts results in participants striving for mutual benefits from one's efforts and recognizing that the group shares a common goal. They recognize that one's performance is mutually caused by one self and one's colleague they feel proud of and jointly celebrate when a member of the group is recognized for achievement. Zayum and Jibrin (2012) conducted a research on peer tutoring. They compared this instructional technique on the academic achievement of biology students with the expository method. The study found out that students taught using peer tutoring technique of learning achieved better than those using the expository method. The implication of peer tutoring technique of cooperative learning is that it has a positive influence on students' performance in biology.

Peer tutoring is characterized by specific role taking as tutor or tutees with high focus on curriculum content and usually also on clear procedures for interaction in which participants receive specific training. A tutor must possess certain qualities which include patience, friendly, caring, and encouraging and possess content mastery.

#### ***2.1.3.3. Student Team Achievement Division (STAD):***

It is a cooperative learning technique developed by Robert Slavin in which heterogeneous groups of four to six students works within their teams towards a lesson presented by the teacher. Students work together to make sure each member of the group has learnt and understood the content presented by the teacher. Johnson & Johnson (1991) states that positive independence here provides group members with a feeling of support. Members of the group know that their group members perceive that they are linked with each other in a way that one cannot succeed unless everyone succeeds. Scotts (2013), support this view by saying "a group attains if all members attain the goal". In this situation, there is a positive correlation among group attainment and the goal is beneficial to all group members. It can be administered to organized classes which can in turn participate to the success of all students.

Slavin (1995) pointed that STAD consist of four major steps which usually takes a period of three to five periods. The step begins with teacher's presentation and then group study follows where heterogeneous groups are formulated based on sex, ability, socio economic status, students'

performance level and ethnicity to study and master the content by questioning and giving elaborated explanations as they know they are interdependent and accountable for themselves and the entire group. Also, students then tutored one another until all students had mastered the content discussed from that days lectured. The lessons students take quiz independently of their group mates. Students quiz scores were compared to their own past average and points were awarded on the bases of the degree to which students met their own earlier performance. The success of this technique (STAD) lies in the concept that each member has a common goal of doing well and obtaining a group reward (Slavin, 1995) with the aid of a teacher. Moreover, it is best suited to teach well defined objectives and material for which there will be a single right answer for instance the multiple-choice questions. Jong and Chi did research on STAD support the fact that cooperative learning had a positive impact on the academic performance of individual students. Huang (2011) gave an analysis of 46 studies that researchers conducted for a specific period. Achievement was 89% better with students who adopted cooperative learning than those using the teacher centered method. Cooperative learning had a positive influence on the excellence of the students.

Student Team Achievement Division is an extra source of learning with in the groups because some high achievers act as a role of tutor which results in high achievements. The major principle behind this technique is that students cooperate to learn and should be held accountable with respect to their group members and their own achievement thereby influences performance of the learner.

#### ***2.1.3.4. Other Techniques of cooperative learning method***

They are other cooperative learning techniques which has an impact on students' academic performance in secondary schools.

***Learning Together:*** This technique was developed by David Johnson & Roger Johnson. In addition to that, this technique was characterized by five elements of cooperative learning which includes positive independence, individual accountability, group processing, small and interpersonal skills & face to face interaction. The group should be made up of four to six heterogeneous members. This occurs when a single group is given one assignment. The group completes the assignment and hands in a single assignment. Evaluation is based on how well

students work together to complete the assignment sheet and performance on completed sheets thereby influencing academic performance.

***Teams - Games - Tournaments (TGT):*** This is another cooperative learning technique widely used in classrooms. This technique was developed by David Devries, Keith Edwards and Robert Slavin. Here, teams consist of games and tournaments in which teams are formed with the students of same achievement level. In addition to that, TGT uses same presentation as STAD but replaces the test with weekly tournaments games which does not use the system of improvement score and they do not take individual quiz.

***Think-Pair-Share:*** It is one of the many techniques of cooperative learning where by students think about question asked by the teacher. They then form pair and discuss their ideas with a bench mate or partner. Then the teacher randomly calls students to report on their pair's opinion to the class.

***Group Investigation:*** This technique was developed by Shlomo Sharan & Yael Sharan in 1992. It is a general classroom organization plan in which students work in small groups using cooperative inquiry, group discussions and projects. It is said to be one of the most student-centered method as students have much freedom to choose their topics of interest for investigation, plan in carrying it out, present and evaluate the results. Each group has a different task and group create presentation to teach the rest of the class. Take active part in selecting the topic of investigation and planning the investigation and assessment procedures. In addition to that, Students are assessed on their presentation. According to Sharan & Sharan (1992), it has six steps which is determining subtopics and organizing into groups, planning investigation, carrying out investigation, planning a presentation, giving a presentation and evaluating achievements.

In conclusion, integrating cooperative learning techniques have proven to be effective in increasing student academic performance in all grades levels and subject areas (Johnson & Johnson, 1989).

***Numbered Heads together:*** Each cooperative learning team review content outside of class and understand that each member is to be held accountable for all academic information covered. Each group member is given a number (1-4). The teacher then asks the class a question and each

group must come together to find an answer. After the time is up, the teacher calls a number and the student with that number may answer the question.

**Brainstorming:** Brainstorming is a group creativity cooperative learning technique invented by Alex Osborn in 1938 by which efforts are made to find conclusion for a specific problem by gathering a list of ideas spontaneously by its members. As students get involved, the session aids the process of learning and improve academic performance. McDowell (1999) defines brainstorming as the act of defining problem or idea and coming up with anything related to the topic no matter how remote a suggestion may be.

#### **2.1.4. Cooperative learning dynamics**

Cooperative learning method of teaching is an innovative method of teaching which was adopted and implemented by schools because the direct method of teaching has failed in making learners active and productive which is required in our new educational approach. The Cameroon law No 98/004 of 14<sup>th</sup> April 1998 stipulates in section 5.6 that, education should help develop in children creativity, a sense of initiative and the spirit of enterprise. This can be realized through the use good cooperative learning techniques such as jigsaw, peer tutoring, and students team achievement division that can impact teaching effectiveness and thus leading to better performances of students in the classroom.

This method is used in our present education whose objective is to allow students construct and develop knowledge for themselves. Also, it focuses on competencies or skills such as cooperation, interactive, communicative skills to be mastered by learners so as to resolve real life problems. It is learned centered focused and works naturally with independent study with the instructor as the role of facilitator. Cooperative learning is used today because students are provided with more opportunities to get assistance from peers and exchange ideas with others, enhance students' participation and increases students interest and confidence (Xuan, 2015).

Cooperative learning dynamics deals with the different factors that varies and needs to be taken into consideration for cooperative learning to be successful in the classroom. This includes the size of the groups, use of group roles, peer assessment, extrinsic motivation, and giving individual exams.

#### ***2.1.4.1. Size of the Group***

Groupings may vary in size, structure and purpose and can be constrained by many factors including concerns with age and ability of students, and subject studied. Felder & Brent (1994); Felder & Brent (2001), propose forming four- to six-person teams for most assignments, attempting to observe the following two guidelines to the greatest extent possible: Firstly, form teams whose members are diverse in ability levels and who have common blocks of time to meet outside class and secondly, in the first two years of a curriculum, avoid isolating at risk minority students on teams. There is no consensus in the literature on the optimal team size, but most authors (Smith, 1996) agree that the minimum for most team assignments is four and the maximum is six. (There are obvious exceptions to these rules, such as laboratories with two-person work stations.) With only two people on a team, there may not be a sufficient variety of ideas, skills, and approaches to problem solving for the full benefits of group work to be realized. However, Johnson, Johnson & Smith, 1991 asserts that the shorter amount of time available, the smaller the group should be. Wright and Lawson (2005), says group work is essential for large classes. Group work helped students feel that the class was smaller and encouraged them to come to class more often. They felt more invested in the course and in the class material which promoted active learning in a large class environment.

According to Gillies (2007), for group work to be successful, group members need to have the skills to communicate effectively through listening, explaining and sharing ideas. But effective group-work involves more than this; members have to learn to trust and respect each other, and they need skills in how to plan, organize and evaluate their group work.

#### ***2.1.4.2. Using Group Roles***

Johnson (1999) says for learners to succeed while taking a comprehensive exam, teachers need to make sure that individuals are learning each objective. Students must assume some responsibility for their own learning, but teachers must steer their group interaction in a positive direction. The teacher should see in to it that there is proper distribution of work rather than isolating tasks to particular individuals. Keeping in mind that many students will naturally gravitate toward a “divide and conquer” approach, teachers insist that in the different groups members should

assume particular roles during portions of the course and that they rotate periodically. This makes group members to be implicated to the breadth of the problem that the group is trying to solve.

Also, assigning the members of the group is integral to the success of the group. Some teachers prefer to randomly assign students to groups. This has the advantage of maximizing heterogeneity of the group (Davis, 1993) and is an effective way of assigning group member in large classrooms. If the class size is small and the instructor is familiar with most of the students, the instructor can select the group members based on known attributes of the class for example, the instructor can form the groups while taking to account performance levels, academic strengths and weaknesses, ethnicity, and gender.

Johnson (1999) adds that each individual should assume each of the following roles or some suitable variation during the course of the assignment: coordinator (organizes tasks and assigns responsibilities), checker (monitors the team's solution for correctness, completeness and accuracy), recorder (writes the solution), and skeptic (plays devil's advocate to ensure various perspectives are considered in determining the final solution). These administrative responsibilities are in addition to performing work toward the actual solution.

#### ***2.1.4.3. Using Peer Assessments***

When the learners have already been grouped, teacher must continual observe team's progress as well as provide them with direction and guidance. Inorder for learners to embrace the cooperative learning environment, they must feel that there is a method of ensuring fairness in grading. According to Felder & Deborah (2000) points out that, most cooperative learning experts agree that the teaching method works best if team grades are adjusted for individual performance. If adjustment is not made, students who do little or nothing receive the same grade as does that did a great deal of the work which is unfair and works against the principle of individual accountability. Nothing will demoralize learners quickly, then for a non-contributing student to receive a high grade based solely on the other group members'efforts. Research shows that students derive a much greater sense of satisfaction and higher test scores from groups that have the ability to provide a peer assessment that is factored into grade calculation. Group member assessment should reflect the degree of contribution each team member makes toward the collective effort.

#### ***2.1.4.4. Giving Individual Exams***

Group members may find it socially difficult to provide an accurate assessment of their peers (even in an anonymous setting), resulting in peer evaluations that provide a false representation of the individual effort. To Cooper (1990), Peer evaluations will assist a teacher in determining if individual group members are contributing to the group effort, but they can be misleading. Also, while the peer assessments help to ensure that everyone is contributing toward the group goals, this does not necessarily mean that each student understands each objective for the course. Thus, the teacher may need an additional tool which could be the administration of individual exams that covers all of the objectives. Thus, avoiding a situation where only a group product or demonstration as well as performance are evaluated. The results of the exam will serve as a clear indicator of who understands the material and who does not.

#### ***2.1.4.5. Extrinsic Motivation***

Extrinsic motivation refers to the motivation one has to participate in an activity not for the joy of it, but to accomplish some external goal (Ryan & Deci, 2000) for instance if an individual who participate in an activity to receive bonus marks, as well as avoiding punishment, it is an extrinsic motivation. A final method that teachers can use to provide a cooperative learning environment that promotes individual accountability is to factor in student extrinsic motivation. Slavin, (1995), motivation should be derived from both internal and external factors. The importance of a student being truly interested in a particular topic cannot be determined.

Teachers can provide learners with the option of choosing a task they will like to work on, so that they will be motivated and implicated in the tasks. This is because, if learners are forced to work on an assignment that they don't find interesting, it will require considerable self-discipline just to get the work done. If the learners are flexible in selecting a problem they find intriguing, working toward the solution will be less of a chore and there will be an increased potential for insightful discussion, deeper research, and true learning.

#### **2.1.5. Strengths and weaknesses of Cooperative Learning**

Cooperative learning is a learning environment in which two or more students are working together to complete a common task (Siegel, 2005). Cooperative learning is beneficial to both the students and the teacher in several ways;

### ***2.1.5.1. Strengths of cooperative learning***

Cooperative learning is beneficial to teachers. According to Hamm & Adams (1992) noted that teachers who use collaborative learning become more cooperative in their own professional interaction and more willing to cooperate with their students. He added that teachers who use cooperative learning spend more time more effectively and adopt a fresh new attitude towards their jobs.

Also, a teacher who uses cooperative learning methods promotes learning because these collaborative experiences engages students in an interactive approach to processing information resulting in greater retention of subject matter. Each member of a team is responsible not only for learning what is taught but also helping team mates learn thus creating an atmosphere of achievement. Student work through assignment until all group members successfully understands and completes their task.

Cooperative learning improves academic performance among high and low achieving students. By teaching others, all of the students actually come to understand the material better (Hamm & Adams, 1992). It enables Students to be actively involved in the learning process.

Cooperative group learning can also be arranged so that there is less paper work for the teacher. Evaluating six to ten (6-10) group papers is less than evaluating thirty to sixty individual scripts. Dividing the class into groups means the teacher has six to ten scripts instead of thirty to sixty individual scripts to make contact with each day. In addition to that, the classroom is made up of thirty to sixty students. The students tend to monitor each other while creating a spirit of cooperation and helpfulness. As a result, Adam & Hamm (1992), states that employing cooperative learning techniques relieve the teacher of stress. Although the teacher is still responsible for the learning in the classroom, some of the authority is delegated to students. Even if a teacher uses cooperative learning on only a few occasions, it might welcome relief (to both the teachers and the students) from the traditional instructional format where the teacher has all the authority.

Students that are involved in cooperative learning achieve social and academic benefits. Students are likely to attain higher levels of achievement, to master the habit of critical, creative thinking and self-regulated mind needed to function as productive members of the society. Research has shown that cooperative learning techniques promotes students learning and academic



performance increase student's retention enhances satisfaction with learning experience, help develop skills in oral communication and promote positive race relations.

Students working in cooperative groups tends to be intrinsically motivated thus drastically improves students' academic accomplishment. For instance, in STAD rewarding top teams both intrinsic and extrinsic motivation is reinforced.

Students benefits from cooperative learning academically in that there is more of a potential for success work in groups. Individual tends to give up when they get stuck where as a group of students is more likely to find a way to keep going (Johnson & Johnson, 1991).

In addition to that, a discussion within the groups leads to more frequent participation because the students are constantly explaining and elaboration which in turns validates and strengthens their thoughts. Moreover, the opportunities to discuss their ideas in smaller groups and receive constructive feedback on those ideas help to build high self-esteem thereby playing an active role in the learning process in class which goes a long way to enhance learning experience. Slavin stated that, reasons for this was students who worked in groups had a liking for others in the group and this improved self-esteem. Cooperative learning creates a safe, nurturing environment because solutions come from the group rather than from the individual.

Students benefits psychologically from Cooperative learning. According to Johnson & Johnson (1989), cooperative learning experiences promotes positive attitudes towards learning and instruction than any other teaching methodologies. For instance, learners in cooperative learning have a positive feeling about themselves than those in a traditional classroom.

Cooperative learning makes a sense of an inclusive classroom because it builds upon heterogeneity and encourages supports from peers. However, it is not only valuable to the able but also to the disable that is the cooperative learning is valuable to All which includes students who have been identified as "at risks", bilingual, gifted, normal. All students need to learn within a supportive community in order to feel safe enough to take risks.

#### ***2.1.5.2. Weaknesses of Cooperative Learning***

According to Kagan (1999), despite the non-exhaustive list of strengths, cooperative learning also has some weaknesses that hinder its application in many situations. However, some of these

weaknesses may be overcome with proper planning and preparation. Here are some of the weaknesses he advanced:

- Bad experience working in a group may leave a bad impression about team work on pupils and this may negatively affect their working life in future.
- Consistent use of cooperative learning may cause learners to be dependent on each other and may negatively impact them when required to work individually.
- Consensus becomes difficult especially when it comes to matters that involve emotions
- It is a time-consuming strategy both for preparation and implementation. Therefore, the teacher may not have enough time to complete his syllabus.
- Lack of proper instructions and guidance may lead to unsocial behaviours like all members talk at the same time, some members not participating, some members trying to dominate others as well as impose their views or some members can be ignored.
- Lack of supervision may lead to lots of noise making and unnecessary discussion rather than the topic to be learnt, which will only make cooperative a waste of time.
- A learner who did his share of work honestly and would deserve a very good grade otherwise may be under graded for work not done by others in the group.

#### **2.1.6. Assessment of Cooperative Learning teaching method**

Assessment is the process of collecting, synthesizing and interpreting information to aid in decision making. It includes all the information teachers gather in their classrooms, information that helps them to understand their pupils, plan and monitor their instructions and establish a viable classroom culture as well as test and grade (Ngu, 2014). Assessments in secondary schools is done individually and not in groups. This aspect almost renders the objectives of cooperative learning abortive.

Assessment in this respect is done to check whether the teaching objectives of the lesson have been attained. In addition to that, in this context, assessment is done to check if the students have acquired personality skills required when working in groups and an improvement in their academic performance when previous performance is compared to the present performance. Also, assessment is done to find out if students are also accountable for their learning as individuals. Therefore, assessments in cooperative learning is done in many ways which includes quizzes, tests, debates, daily competitions, worksheets and other assessments (Adams, 2013). For better

management of cooperative assessment, students are provided with clear and consistent target from the beginning with the help that they are motivated to do high quality work for themselves as well as for the group. The students are told exactly what is expected from them (i.e. the level of work), motivates them to work harder to their expectations and take more pride in their final work to achieve the objectives. In addition to that, the teacher may assess what each individual learner accomplished, how well the students participated as a member of the team. All members should participate equally, and the result of the group is assign to all group members. Cooperative learning emphasizes equal participation where the goal of the team is not the group product but the development of each member of the group. They work on the principle that what benefits one, befits all. This motivates learning modes and improves performance.

#### ***2.1.6.1. Teachers' role in a cooperative learning classroom***

There are several roles teachers perform in a cooperative learning. Gillies (2003) proposed that teachers play a critical role in promoting interactions among students and involving them in the learning process.

The primary role of the teacher is to give directions, instructions, comments, and feedback to students in the course of the exercise in cooperative classes. Paintz, T. (1997) is of the fact that, in cooperation learning, the teacher maintains control of the learning environment, designs the learning activities, structures and work teams. The teacher uses cooperative learning techniques in their classroom because learners bring with them their own negatives attitudes and prejudices. When there is a mix of learners in the same class, there is the potential to diminish negative attitudes and develop positive ones depending on how interaction is structured. Eissa (2006) argues that skills and knowledge are required for the effective implementation of cooperative learning techniques in classroom so as to ensure that teachers are able to maintain discipline and encourage students' participation.

Also, the teacher's role in a cooperative class is seen as a monitor. Whereby she or he circulates in class during the process, monitors students' behavior and provides immediate feedback to the students. Furthermore, the teacher's role is to test and questions individual learners in order to promote individual accountability.

The teachers' role in the cooperative learning class is seen as a model. Scott (1994) observes that if we want our children to develop abilities in higher level thinking teacher must model teaching in ways to enhance critical and creative thoughts. Teachers must be flexible in a cooperative class whereby they must be willing to give up some of the time for lecture and use texts and workbooks just as one of the many classroom resources. Flexibility means allowing for differences in things such as learning styles, ability levels, lesson presentations.

Also, the teacher is seen as a guide in a cooperative class. He or she follows students learning achievement setting appropriately high challenging standards as well as assessing the learner and the learning progress are characteristics of cooperative learning. Effective learning takes place when students are challenged to work together towards appropriate high goals.

#### ***2.1.6.2. Challenges in the implementation of cooperative learning***

According to Gillies and Boyles (2009), teachers face the reluctance in the implementation of cooperative learning in the classroom, because it poses some problems to them; such as the control channel of communication and equally its arrangement on curriculum organization. In addition to this, Gillies (2007), says teachers may find difficulties in implementing cooperative learning in their classrooms due to the lack of understanding how the pedagogic practice works. To him, studies have shown that learners will perform better in classes where teachers have been trained on how to establish cooperative learning activities in their curricula and students are provided with the opportunity to participate in these activities on regular basis unlike those in schools where teachers have not been trained.

In addition to that, when cooperative learning and its techniques are concerned, there is need of preparing the physical space for learning and teaching, ensuring the learning tasks are challenging and engage students in higher order thinking, the number of students in that class influences the total number of students in a group which affects participation but teachers needs to be taught in their classes how to organize all activities to be involved so as to attain a positive outcome.

What is more, cooperative learning can bring uneven workloads and evaluation because at times more advanced learners do take up the project for the sake of trying to finished up in time rather

than helping the slow learners. Some teachers may also feel that cooperative learning takes too much planning time and might also take longer to cover the required portion of the curriculum.

Another challenge faced in cooperative learning is group conflict. Students need to learn to work together. It is not always something that comes naturally. Gillies (2007) asserts that conflicts amongst group members will always affect their ability to work together especially if members are still young and have not conflict resolution skills. Equally mismatch personalities can also lead unsatisfactory cooperative learning even when there is no conflict

Also, teachers who haven't previously used cooperative learning might also need to get used to the noise level in the classroom, which is raised during these activities. The larger the class size, the larger the group, the noisier the class becomes.

### ***2.1.6.3. The difference between cooperative learning and collaborative learning***

Even though some people believe that cooperative learning and collaborative learning are similar, there is a slight difference between them even though both method use division of labor

- Cooperative Learning is a philosophy of interaction whereas Collaborative Learning is a structure of interaction. Cooperative learning has an American root from the philosophical writing of Dewey stressing the social nature of learning and the works on group dynamics by Lewin while collaborative learning has a British root based on the work of English teachers exploring ways to help students respond to literature by taking a more active role in their own learning.
- Collaborative Learning method requires mutual engagement of all the learners or participants in order to solve problem or the task given them, but with cooperative learning learners take up responsibilities for specific section in the task given and they coordinate their respective parts together.
- Cooperative learning is typically used for children because it is used in understanding the foundation of knowledge, whereas collaborative learning is mostly applied to colleges and universities to teach non-foundation of learning.
- In cooperative learning, activities are structured with each student having a specific role while in collaborative learning; students organize and negotiate efforts themselves.

However, many psychologists have defined cooperative learning and collaborative learning similarly. Both are group learning mechanisms for learners to obtain a set of skills or knowledge. Some notable psychologists that use this definition for both collaborative and cooperative learning are Johnson & Johnson, Slavin, Cooper and more.

#### ***2.1.6.4. The difference between cooperative learning and conventional method of teaching***

*According to Tambo (2012) teaching method refers to standard procedure used in presenting subject matter as well as the organization of student/teacher interaction during lesson. There are different types of teaching methods which includes the conventional teaching method and the cooperative learning teaching method. There is a difference between these two methods.*

- The main dominant approach of teaching was drill and repetition which was to ensure quick and accurate responses. It is intended to establish associations that can be reproduced without thinking. The effective method of learning was rote memorization which is known for cramming facts thereby hindering critical thinking whereas cooperative learning is an interactive method of teaching and learning. It is an excellent way to allow students to think critically without relying on the teacher for answer in our society. Students are active, and learners play a greater role in the learning process thus influencing the performance.
- Teacher is the sole provider of knowledge in the conventional method of teaching while in the cooperative learning method of teaching, the teacher is the facilitator.
- Single effort is provided by the learner. Competition is encouraged amongst the students in the traditional method of teaching while in the cooperative learning, there is joint efforts in the completion of the task. Every student takes up responsibilities for specific sections in the task given and they coordinate their respective parts together.

## **2.2. THEORETICAL FRAMEWORK**

According to Mbua (2003), a theory is a systematic and deductive manner of thinking about the reality in order to better understand and describe such reality. It implies facts, model's laws or principles about a phenomenon. To Admin (2005), theories are statements about how concepts and variables are connected whose purpose is to explain why things happen as they do.

The theories used for this study are;

- Social learning theory by Albert Bandura's Social Learning.
- Behavioral Theory by Skinner Operant Conditioning
- Social constructivist by Vygotsky cognitive theory
- Social Independence Theory by Lewins.

### **2.2.1. Social Learning Theory**

The social learning theory states that the social and cognitive factors as well as behavior influences learning. Cognitive factors involve student's expectation for success where he/she may be observing her classmate in a cooperative classroom and learn from observation. Social factors such as students who see teachers demonstrate attention to theory work and time towards cooperative learning may be encouraged to develop similar traits.

Bandura observes that behavior influences cognition as studying groups can led a student achieve good grades which produces positive learning modes about the student's ability and give self confidence in observational learning. Learning occurs when a person observes and tries to imitate one's behavior. Bandura (1977) further illustrates that much learning takes place through observing, and imitating models. The major premise of social learning theory is that learners can improve their knowledge as well as retention through observing and modeling the desired behaviors, attitudes and reaction of others. Thus, through interaction in their little groups, members have the opportunity to learn from others by observing, imitating and model desired behaviors put up by team members or group members which may equally influence their learning. This can relate to cooperative learning in that students cooperate in groups and learn several skills from their peers to attain their goals. Cooperative learning on its own part put learners in groups and teams to work towards the accomplishment of a common goal. Learning together in small groups and teams (cooperative learning) permit group members to observe, to model desired behaviors and reaction of group members as they interact which enhances much learning. This can lead to self-efficiency where by students believe that one can master something and produce better outcome.

Although Bandura focuses on observational learning, he argues that such learning involves Attention, Reproduction and motivation on the parts of learners (Chance, 2004). According to

Bandura, no matter the level of observation, no matter the effort of teaching, the students can only achieve academically if he is attentive, if he retains what is observed and if he is capable of reproducing what is observed and if he is motivated. For the above to take place, the teacher needs to use different cooperative learning techniques to help students in order for attention, Retention, Motivation and reproduction to take place thus improving to the performance of the learners.

The teacher as the coach plans the phase of observation, attention, retention, reproduction and motivation. However, planning is a critical aspect of a competent teacher (Parkay and Mass, 2000). The teacher needs to decide on what they are going to teach, how they are going to teach, which cooperative learning techniques they will adopt in the lesson before they do it. For instance, the manner in which teacher will present tasks to the learner's leads to students understanding of the material. Where by integrating this in the lesson if the observed behavior is associated with images, it is easier for learners to recall and retain the observed behavior at a later time. Tanyi (2009), says that the tendency to reproduce a visually observed behavior is higher than by being told to behave in a certain way because of the attentional process.

### **2.2.2. Behavioral Learning Theory**

It is common knowledge that when a student participate in the classroom activities better results are elicited than when he or she is passive in the process. Skinner's operant conditioning helps us to better appreciate an organism involvement in a stimulus to elicit a response. When the rat manipulates the pedal, the food pellet is released. Crain (2000) holds that "in Skinners theory learning often appears to be a gradual process in which organism must move freely about and operates in the environment". Implication is that learners will work hard on those tasks for which they secure a reward and will fail to work on task that yields no reward. In a cooperative class, cooperative efforts such as incentives should be provided to members of the group to participate in group efforts in order to attain a common goal because it is assumed that individuals will not intrinsically help their classmate in order to attain a common goal.

Skinner noted that just as individual will repeat behavior for which they are reinforced, groups will behave in the same way and this will have an impact on the performance of the learner for instance Student Team Achievement Division, teams that meet the appropriate criteria may earn some kind of reward from the teacher.



### **2.2.3. Social constructivist theory**

Social learning theories help us to understand how people learn in social contexts (learn from each other) and informs us on how we as teachers, construct active learning communities through Interactions and communications with others. Vygotsky (1978) believes that students construct knowledge through social interaction that is learning takes places through interaction with their peers, teachers and other experts. Vygotsky (1962) examined how our social environments influence the learning process. He suggested that learning takes place through the interactions students have with their peers, teachers, and other experts. Moreover, he viewed interaction with peers as an effective way of developing skills. Consequently, teachers can create a learning environment that maximizes the learner's ability to interact with each other through discussion, collaboration, and feedback serves as the facilitator, guide and molders of children's learning. This can be related to cooperative learning in that teachers should create more opportunities for students to learn with their peers and teachers. Slavin (1996), believes that students cannot learn from the other if there is no social interaction. Cooperative learning techniques should be introduced in a cooperative class to enable interaction with one another in the classroom.

Also, Vygotsky (1978) stressed on the zone of proximal Development which he defines as the distance between the actual Developments as determined through problem solving under adult guidance or with more capable peer that is by collaboration where the child has the opportunity to interact with one another for the purpose of problem solving. To Vygotsky (1978), the Zone of Proximal Development should be the area where the most sensitive guidance or instruction should be given in order to allow the learners to developed skills they will use individually; because through this they will be developing their higher mental functions. To him peer interaction is an important way of developing skills and strategies. Thus, encourages Teachers to use cooperative learning exercises where in less competent children will develop through the help of skillful peers within the Zone of Proximal Development. Looking at Vygotsky (1972), Zone of Proximal Development, attention is placed on the fact that when learners work in team or small groups the weaker students benefit from the more knowledgeable ones.

Vygotsky (1972) further explained that in the zone of proximal development that learning cannot become fruits without social interactive support from peers and teachers. Vygotsky (1978) suggested that one can be assisted by more skilled persons, such as peers and teachers adjust their

supports towards his or her guidance needs, and advance in terms of his zone of proximal development.

The implication of this theory, teachers should introduce cooperative learning techniques such as the Jigsaw, peer tutoring, Students Teams Achievement Division. Cooperative learning techniques where slow learners can construct knowledge with help from more skillful peers within the zone of proximal development. Students will concentrate, be more determined to understand concepts when they work in group or with the help of a facilitator (teacher) than when he or she works independently. Vygotsky stresses the importance of cooperative activities and argues that the development of children is promoted by cooperative activities. Cooperative activities among children promotes growth because children of the same age work in one another's zone of proximal development and most behaviors which is more effective than children working individually. In addition to that, this is equally true drawn from the fact that cooperative learning is guided by the teacher or facilitator in order to orientate the work of learners in their small teams or groups. If the knowledge is not guided learners may easily go out of topic or the desired work expected of them.

Moreover, if students participate in cooperative learning activities, they will be responsible not only for their own learning but also for other's learning. Vygotsky (1978), also views peer interaction as an effective way of developing skills and strategies. He suggests that teachers use cooperative learning exercises where less competent children develop with help from more skillful peers - within the zone of proximal development.

#### **2.2.4. Social Independence Theory**

Johnson and Johnson (2005), say Social independence theory is based on the fact that, individuals' goals can be accomplished or achieved through action of others. Slavin (2011), says this perspective is based on the fact that the learners or group members help each other learn taking in to consideration that they care about their group and its members and they come to derive self identity benefit from group membership. In this light, Johnson and Johnson (2005), see this as a strong relationship between cooperative learning and social interdependence theory. According to Deutch (1949), Johnson (1970) and Johnson and Johnson (1989), social independence can further be divided in to two parts, namely: positive cooperation and negative competition.

When they talk of positive interdependence according to Deutsch (1949), it is when individuals perceive that they can only attain their goals if the individuals whom they are cooperatively linked also reach or attain their goals that is to say they promote each other's effort to attain goals. This led to cooperative learning with regards to the fact that individual goals can be accomplished through the action of others Johnson and Johnson (2005). This idea is further reinforced through Slavin (2011), who says group members derive self identity benefit from group membership.

According to Johnson and Johnson (2008), the fact that positive interdependence brings about promotive interaction as group members encourage and facilitate each other's effort to complete task as well as accomplish their group goal. Promotive interaction comprises of mutual help and assistance, exchange of needed resources, effective communication, mutual influence, trust and constructive management of conflict. Thus, throwing light to the fact that cooperative learning will enhance learning as well as improve performance.

According to Deutsch (1948) the psychological processes that come to play when we talk of positive interdependence includes: Substitutability which is the degree to which the action of one person substitutes for the action of another person. It equally includes the openness to be influenced and to influence others and finally it consists of Positive Cathexis which means the investment of positive psychological energy in object outside of oneself. Now going back to Social Interdependence Theory, we noticed that the processes try to explain how self interest is expanded to joint interest and how new goals and motives are created in cooperative and competitive situations. Throwing more light to the fact that, when learners work in teams or groups their interest and focus is not on themselves any longer but shifted to other group members because they all work for the accomplishment of a common goal thus interests are expanded to mutual interest through the actions of other group members substituting for one's own.

Cooperative learning is further reiterated here through the emotional investment in achieving goals for one self is generalized to caring and committed relationships with those with whom learners are working for the same purposes and goals (Deutsch 1949). That is to say the weaker learners are helped by the stronger ones taking into consideration that learners are grouped heterogeneously.

Moreover, group members are open to be influence so that joint efforts become more effective. That is to say it is not individual's opinion that counts but what group members jointly comes out with, taking in to consideration that they lay down the task to be accomplished in their different groups and discussed jointly on the possible solution so much so that ideas of one another influences others since they are open and flexible. The author rightly puts it when he talked of the fact that these psychological processes demonstrates the transition from self-interest to mutual interest is a very important aspect of the Social Interdependence Theory.

Johnson and Johnson (2008), equally reiterates the fact that, when there is positive interdependence we will have variables such as mutual help and assistance, exchange of needed resources, effective communication, mutual influence, trust and a constructive management of conflict. That is to say when dealing with cooperative learning, group members as they work in collaboration ends up helping each other mutually as they exchange ideas together to accomplish a common task. It is equally true that if there is no trust, members cannot work together because nobody will look in to other opinions taking into consideration those members have to be open to be influenced by others. Thus, if members have to work together to attain or accomplish the same goal they ought to be able to communicate effectively, there have to be influence mutual by each other, trust and constructively managed conflict amongst themselves as the work, there need to be exchanged of resources amongst group members considering the fact that they are working for a common goal as well as mutual help and assist each other.

To Johnson and Johnson (1989),” greater performance is obtained by cooperation than competitive or individuals effort. This is because with cooperative situation, performance has been constructed in terms of achievement and productivity, long term retention on- task behaviour, use of higher- level reasoning strategies, generation of new ideas and solutions, transfer of what is learnt within one situation to another, intrinsic motivation, achievement motivation, continuing motivation to learn and positive attitudes towards learning and school”. Moreover, in a cooperative learning classroom, students remain in charge of their own discoveries and they become truly excited about using the different cooperative learning techniques in the learning process.

## **2.3. EMPIRICAL FRAMEWORK**

### **2.3.1. The use of Jigsaw cooperative learning technique and students' academic performance**

This study was carried out by Naomi (2013) whose aim was to determine the effects of Jigsaw cooperative learning technique on secondary students' academic performance in Laikipia east district, Kenya. Two objectives of the study were formulated which were, to find out if there is a difference in mathematics achievements between students who will be taught mathematics using the jigsaw cooperative learning technique and those who will be taught using the conventional method of teaching. To find out whether Gender affects achievement when Jigsaw cooperative learning technique is used in secondary school mathematics classes. The purpose of the study was to investigate the effects of jigsaw cooperative learning strategy on secondary school mathematics.

This study used a quasi-experimental research design. The schools that participated in the study were from Laikipia east district secondary schools in Kenya which has a total of 32 secondary schools. 27 are made up of mixed sex schools. The targeted population was about 10,800 students. The accessible population was made up of form three mathematics secondary school students. Four schools were randomly selected out of the 27 mixed secondary schools. A sample of forty students per group that is the control group and the experimental group in secondary schools was used for the study by simple random sampling technique. The students were drawn from 4 secondary schools. The instrument used for the study was the mathematical achievement test (MAT) which contained thirty-six items structured items whose scores were graded on eighty marks. The analysis was centered in testing two null hypotheses to determine the effects of Jigsaw cooperative learning technique on secondary students. Pre-test and post-test were used in testing the hypotheses.

The result showed that mathematics students taught using the jigsaw technique performed better than those taught using the conventional method. It was concluded that the jigsaw cooperative learning technique is suitable for teaching. Teachers Training colleges and universities should emphasize Jigsaw learning strategy as an effective method of teaching mathematics.

### **2.3.2. The use of peer learning technique and students' academic performance**

The study was carried out by Zayum. S Jibrin, A (2012). Their objective was to investigate the effects of peer tutoring instructional technique on the academic achievement in biology among secondary school students in Zaria. The purpose of this study was to determine the mean academic achievement of students taught biology using the peer tutoring technique and those taught using the expository method. One research hypothesis was formulated which was; there is no significance difference in the academic achievement of students taught biology using the peer tutoring instructional strategy and those taught using the expository method.

The study used a quasi-experimental research design. There were 60 secondary schools with a population of 21,500 biology secondary school students in Zaria. Two schools were randomly selected through the balloting method from the area of the study. The two schools were divided into experimental and control group. Those biology students taught using the peer tutoring method achieved slightly higher than those taught using the expository method.

The critic about this study is that; the researcher concluded that those who used peer tutoring in their classes, their results were not very different from those who used the expository method the sample size was extremely large for experimentation to take place.

### **2.3.3. The use of student team achievement division (STAD) technique and students' academic performance**

It was carried out by Hafiz & Gul. (2011). The study determined the effects of STAD on students' performance in chemistry in Pakistan. The purpose of the study was to investigate the effect of a form of cooperative learning technique namely STAD with that of the traditional method of teaching. This study includes two groups which include the control group and the experimental group where the experimental group was taught using the cooperative learning technique (STAD) and the control group was taught using the traditional method of teaching. A null hypothesis which formulated which said there is no difference between the achievement of control group and experimental group.

The research design used for the study was the true experimental research design. The population of the study was made up of all chemistry students at higher secondary school in Khyber Pukhtunkhwa (Pakistan). The sample of the study was made up of 30students in government

secondary school. The students were divided into two groups that is the experimental group and the control group based on stratified random sampling technique. The study had duration of two weeks because of time constraint.

The instrument used for the study was the teacher made test (TMT) which contained whose scores were graded on fifty marks which belong to unit 1, 2 & 3 where unit one was made up of multiple choice questions of 16 marks and unit 2 was made of short questions of 24 marks and 3<sup>rd</sup> unit was made up long questions having two subsections of 10 marks.

The result shows that there was no significant difference in performance between the groups in the post-test. This might be due to the fact that, they didn't begin with the pre-test which is the base for random assignment to both control and experimental groups. The results show that student team achievement division a cooperative learning technique ought to be used for teaching chemistry in secondary schools.

The critic about this study is that; they did not begin with a pre-test which is a base for experimental research to both groups and also the time frame used for the experiment was limited to get results which could better improve the performance of students.

## **2.4. FORMULATION OF RESEARCH HYPOTHESIS**

### **2.4.1. Research Hypothesis**

To guide the step of our research focus, the following research hypothesis (main hypothesis and specific hypothesis) was formulated.

The general hypothesis of this study is formulated as follow: The use of Cooperative learning techniques significantly improves students' academic performances more than the conventional method of teaching in history in a selected secondary school.

### **2.4.2. Specific Hypothesis**

The operationalization of this main hypothesis has yielded the following specific hypothesis:

- The use of jigsaw cooperative learning technique significantly improves students' performance more than the conventional method of teaching in history in a selected secondary school.

- The use of peer tutoring technique significantly improves students' academic performance more than the conventional method of teaching in history in a selected secondary school.
- The use of Student Team Achievement Division technique significantly produces better results on students' academic performance than the conventional method of teaching in history in a selected secondary school.

### **2.4.3. Definition of Variables**

According to Amin (2005), a variable is a characteristic on which people can differ from one another. A variable is an element whose value can change and take other forms when we make an observation to another. The variables are normally classified into Dependent and Independent Variables. In this study, variables are known as experimental factors.

### **2.4.4. Independent experimental factors**

According to Amin (2005, p.93), **an independent variable** is that "*which can be manipulated upon by the researcher.*" They may be called predictor variables because they can predict or are responsible for the status of the other variables. The researcher manipulates in order to investigate the relationship with the observed states of affairs. The independent variable for this study is "cooperative learning techniques". The **indicators** of this variable are jigsaw, peer tutoring and Student Team Achievement Division cooperative learning techniques. This variable present two **modalities** which are irregularly and regularly.

### **2.4.5. Dependent experimental factors (variables)**

In the view of Amin (1999) a dependent variable is the characteristics that are used when the statements of the hypothesis are made. According to Sapsford (1998) dependent variables are variables which receive the effect of independent variables. **The dependent variable** in this study is students' academic performance. The **indicator** of this variable is the Marks obtained from the tests. This variable present five **modalities** which are Very good (16-20), good (13-15), average (10-12), poor (6-9) and Very poor (0-5).



#### **2.4.6. Indicators**

An indicator which could be seen as a true representation of a variable, are in both independent and dependent variables. In this study, the indicators of the independent variable (cooperative learning techniques) are jigsaw, peer tutoring and Student Team Achievement Division. While the indicators of dependent variable (students' academic performance) of this study, is the marks obtained from the tests.

Table 2.1: Summary table of hypothesis, variables and indicators

Hypotheses	Experimental Factors	INDICATORS	MODALITIES
GH	D. Exp. Factor : Students Academic Performance	- Marks obtained from the tests	- Very good (16-20) - Good (13-15) - Average (10-12) - Poor (6-9) - Very poor (0-5)
	I.Exp factor : Cooperative learning techniques	- Jigsaw, - Peer tutoring - Students team achievement division.	- Regularly - Irregularly
RH1	D exp Factor : Students Academic Performance	- Marks obtained from the tests	- Very good (16-20) - Good (13-15) - Average (10-12) - Poor (6-9) - Very poor (0-5)
	I. Exp Factor: Jigsaw Cooperative learning technique	- Completion of work. - Active classroom participation - Cooperative skills - social interaction increase - Communication skills. - Self-confidence	-Regularly - Irregularly
RH2	D.Exp.Factor : Students Academic Performance	- Marks obtained from the tests	- Very good (16-20) - Good (13-15) - Average (10-12) - Poor (6-9) - Very poor (0-5)
	I Exp.Factor: Peer tutoring Cooperative learning technique	- Self confidence - Enthusiastic - Cooperation skill. - communication skills - motivation skills	-Regularly - Irregularly
RH3	D Exp.Factor : Students Academic Performance	- Marks obtained from the tests	- Very good (16-20) - Good (13-15) - Average (10-12) - Poor (6-9) - Very poor (0-5)
	I.Exp. Factor: Student Team Achievement Division	- Group processing - individual accountability - Group feedback. - Interaction skills - Communication skills. - Belongingness - active classroom participation	-Regularly - Irregularly

# CHAPTER THREE

## METHODOLOGY

### INTRODUCTION

This chapter describes the procedure for executing the study under the following sub-headings: research design, area of study, population of study, sample and sampling techniques, description of the instrument, validation of instrument, reliability of instrument, method of data collection and method of data analysis.

### 3.1. RESEARCH DESIGN

Kerlinger (2006) defines a research design as “a plan and structure of investigation concerned to obtain answers to research questions”. He went further to say that a research design constitutes the blue print for the collection, measurement, and analysis of data. Creswell (2002) contends that the type of design selected for research is dependent on the research problem. A quantitative approach is the best choice if a researcher is interested in understanding the factors that influence an outcome or the utility of an intervention. However, the research problem requires one level of analysis. The researcher was aimed at investigating if the use of cooperative learning techniques better improves students’ academic performance than the conventional method of teaching. Consequently, an approach that utilizes the pretest-posttest design was used. As such, an achievement test was used in collecting students’ opinions to reveal specific activities that contributed to the study’s findings.

Groups	Pre-test	Intervention	Post test
Experimental group	O	CL (X)	1
Control group	O		O

O: Measures (academic performance in history); X: Treatment (cooperating learning)

*Figure 3.1: Diagram of pretest-posttest equivalent control group design*

The specific design used in the study was a quasi-experimental pretest/posttest equivalent control group design as displayed in figure 3.1 above. In this type of design, participants are not

randomly assigned to the treatment and control groups. Both groups receive a pretest and a posttest, but only the treatment group receives the treatment. In so doing, the researcher would be able to determine if the two groups differed initially on the dependent variable. Such a design is appropriate in educational settings because school officials are unwilling to allow displacement of students to receive a treatment (McMillan & Schumacher, 1997). It is also an appropriate design because it maximizes external validity by examining students in their natural environments (McMillan & Schumacher).

A disadvantage of the quasi-experimental design is that it lends itself to several threats to internal validity. One of the threats is pretesting. To be specific, taking a pretest can sensitize participants to the objectives of the study and ultimately affect the posttest scores. These changes in scores would be the result of the pretesting as opposed to the treatment. Once again, using the first sequence scores in history and triangulating the test mitigated the threat of pretesting by providing additional sources of data that validated the results. Because the school has a rather transient population, subject attrition was yet another threat. However, the rather short duration of the cooperative learning techniques (six weeks) should have decreased the possibility of this threat.

### **3.2. AREA OF THE STUDY**

Study area can be defined as the place for the study followed by the reasons for carrying out the research in the geographical area. The study was carried out at the Government Bilingual High School Etoug-Ebe (G.B.H.S Etoug-ebe), situated in the Yaoundé VI administrative sub-division in Yaoundé.

The school was created in 1991 as Government Bilingual Secondary School. It became a high school in 1997. It is made up of the francophone section and the Anglophone section. It is found in the center region of Cameroon, in the Mfoundi Division, Yaoundé VI sub-division. Geographically, it is situated in the heart of Yaoundé city, in the Etoug-Ebe quarter. It is surrounded by quarters such as Mendong, Simbock, Mvog-betsi, Nkolnzie, Etougebe-obili, Melen, Biyem-assi. Since its creation, it has been managed by five principals. It has a study population of about 5600 students and more than 300 teachers (2017-2018 school year). The

school is made up of Seventeen offices for the vice principals, Discipline masters, guidance counselors, bursary, school dispensaries, extra curricula activities.

The choice of G.B.H.S Etoug-ebe Yaoundé was motivated by the willingness of two teachers who accepted to collaborate with us for the trial of this teaching technique in their classroom and their poor performance last academic year (37%) Pass. Additionally, these teachers carry out group work in their classroom, which makes it easy to get students to partake in the study without influencing activities and behavior.

### **3.3. POPULATION OF THE STUDY**

Nworgu (2004) defines population as, the limits within which the research findings are applicable. In social research, the term is used in a more general sense to include all members or elements such as human beings, animals, trees, objects, events of well-defined groups. To Fraenkel & Wallen (2006) a population is the largest group to which a researcher hopes to apply the results obtained from a sample. The population of this study comprised of all the students (5600) of Government Bilingual High School Etoug-Ebe in the Mfoundi division.

#### **3.3.1. The target population**

To Fraenkel & Wallen (2006), the target population is that population the researcher would really like to generalize his findings. The target population for this study was made up of all students of form 3 students of Government Bilingual High School students Etoug-Ebe in the Mfoundi division.

#### **3.3.2. The accessible population**

This is the population to which a researcher has effectively studied. The accessible population was made up of all the students in Form 3B and Form 3C.

### **3.4. SAMPLE AND SAMPLING TECHNIQUES**

According to Goodwin (2010) a sample is specified number of items, objects or persons drawn from the target population through the sampling process. The sample of this study was made up of students from two classrooms: Form 3B and 3C of the Government Bilingual High School

Etoug-Ebe. These classrooms were assigned to us by the teachers for the purpose of this study in agreement with officials from the administration of the school.

These classrooms were selected through the **convenience sampling technique**. According to Amin (2005), convenience sampling includes as sample whoever happens to be available at a given moment and who accept to participate in the study. Since students from these classrooms were minors, an authorization of accessing the students for a purpose of ethical clearance was granted by the administration of the school. The teachers of Form 3B and Form 3C volunteered to collaborate with the researcher to experiment this new innovative teaching method since their classes were almost similar in their characteristics.

The choice of Form 3 was due to the fact that it is a foundation class where the syllabus for the General Certificate Examination (G.C.E) begins. In addition, after assuring that the students of these classrooms do not differ significantly in their performance in history, Form 3B was assigned as the experimental group with 80 students while form 3C became the control group with 72 students. These two classes exhibited similar characteristics and only differed with their teachers. This indicates that in the two groups that is the experimental group (mean=7.506), and the control group (mean=7.493) there is an insignificant difference.

### **3.5. DESCRIPTION OF THE MEASURING INSTRUMENTS**

Osuala (1991) defines an instrument as any device used in measuring or recording data. Instruments are research tools that enhance the collection of information (data). Seaman (1991) holds that data collection instruments denote devices used in collecting data, they include; questionnaires, interview, observation, tests, and checklists. The main instrument used in the study was tests.

#### **3.5.1. Achievement Tests**

Fraenkel & Wallen (2009) defines achievement, or ability tests as a measure of an individual's knowledge or skill in a given area or subject. They are mostly used in schools to measure learning or the effectiveness of instruction. Achievement tests are designed to show information on how well learners have learnt what they have been taught (Amin 2005).

Looking at the achievement test that was constructed for this study, it was based on all the work covered during the experimentation period and the learners of both the experimental and control group wrote individually. The test questions were built in relation with the objectives the history lessons given all through the intervention. The researcher administered 3 (three) different tests for the three techniques of cooperative learning which was used. The first and second type of test was short essay (two questions, 10 marks each for every question) while the third test was on Multiple Choice Questions (10 questions whereby one question was equivalent to 2 marks). All tests contain equal marks (20 marks).

### **3.6. VALIDATION OF MEASURING INSTRUMENTS**

Instrument validation is a critical step that researchers should employ in order to ensure the generation of scientifically valid knowledge (Yong-Mi, 2009). Without it, the basis of research findings and the generalization of such are threatened. This is especially true in the social sciences, a discipline in which the majority of published articles utilize subjective instruments in the collection of data. Consequently, instrument validation has increasingly become common practice in the social sciences, yet implementation of this practice differs greatly among the social-science disciplines. The assessment of instrument validation seeks to insure two important psychometric properties for the use of a research instrument: the validity and reliability.

#### **3.6.1. Validity of Measuring Instruments**

Amin (2005) refers to validity as the accuracy with which an instrument measures what it intends to measure. Validity could be seen as the extent to which a measurement instrument measures what it purports to measure. The validity of instruments for this study was established through the use face validity.

Achievement Test: The test for this study was constructed with the help of two teachers. Questions were constructed by insuring their appropriateness with the objectives of the lesson given throughout the duration of the intervention. The test was then submitted to other history colleagues in the school who checked if the test's questions were in line with the teaching objectives and appropriate for obtaining valid data in history. Corrections were made before approval of tests as good for final administration.

### **3.6.2. Pilot Testing of Measuring Instrument**

Pilot testing is a small-scale trial, where a few examinees take the test and comment on the mechanics of the test. They point out any problems with the test instructions, instances where items are not clear and formatting and other typographical errors and/or issues, while the researcher keenly observes the ease with which the participants are answering the test questions.

Achievement Test: The test questions were administered to 10 Form three D students of Government Bilingual High School Etoug-Ebe Yaoundé to determine the ease with which students could handle the questions. Their responses were analyzed to gauge the extent to which the instrument could solicit useful information relevant for the attainment of the objectives of the study.

### **3.6.3. Reliability of Measuring Instrument**

Goodwin (2010) defines reliability as the consistency with which an instrument measures what it is intended for. An instrument is reliable if it produces the same results whenever it is repeatedly used to measure trait or concept from the same respondents even by other researchers. The reliability of measuring instruments for this study was established through the use of test-retest reliability. Test-retest reliability is known as stability reliability. It refers to the degree to which scores on the same test by the same individuals are consistent over time.

Achievement Test: An instrument is reliable if it produces the same results whenever it is repeatedly used to measure trait or concept from the same respondents or participants even by other researchers. Test-retest reliability provides evidence that scores obtained on a test at one time (test) are the same or close to the same when the test is re-administered some other time (retest) (Amin, 2005).

First of all, the test was administered to 10 students. This process was conducted with 10 students (form three D which wasn't involved in the sample) of G.B.H.S Etoug-Ebe. After one week it was re-administered to the same group of students. The instrument was divided into three parts which involved questions related to the lesson given during the intervention that involve the three techniques (jigsaw, peer tutoring and Student Team Achievement Division). This was done in order to avoid multiple administrations of instrument. The score of the two administrations were correlated given index of stability of ( $r = 0.82$ ). The reason why the test was re-administered again after one week was to give the respondents the possibility to recall former responses. Also,



if we waited for too long, respondents' ability to answer questions might have changed due to intervening learning or maturation.

### **3.7. ADMINISTRATION OF MEASURING INSTRUMENT**

In order to obtain data to be analyzed for this study, we came out with the test. It was personally administered, and the responses were collected on the spot to increase the chances of getting valid information. Our intervention in this study took the researcher six weeks which is the normal sequence length. In every week, History subject occurred three times that is on Mondays, Thursdays & Fridays for 50 minutes in both the experimental and control group classes. Every cooperative learning technique was use five times before an instrument was administered for instance Jigsaw cooperative learning groups was used from the 5<sup>th</sup> of October to 13<sup>th</sup> of October 2017 while evaluation took place on the 16<sup>th</sup> of October, 2017.

#### **3.7.1. Procedure**

Here, the researcher used Form 3B students as the experimental group and Form 3C students as the control group. In addition to that, the researcher visited the selected school on the 27<sup>th</sup> of September 2017 after being authorized by the principal to carry out the experiment, to meet with the vice principal incharge of academics, meet the various teachers of the various classes. On the 28<sup>th</sup> of September 2017, the researcher observed the classes which were to be involved in the study, went through their subject syllabus, students' notes books of the various classes to see what has been covered and to compare if they were the same. On the 29<sup>th</sup> of September 2017, the researcher assisted in the setting of the questions (pretest). On the 2<sup>nd</sup> of October 2017, the researcher visited the selected school, inviligilated the test (pretest), after the test, the researcher formulated large groups according to their seating positions with the help of the history class teacher to form the various groups needed for the activity. The activity continued until the sample for each was gotten. The researcher ensured that in every group there should be at least 3 boys in every group since the experimental class was made up of 10 groups.in addition to that, all the students in form 3B (80) and Form 3C (72) were taken into consideration for the study in order to avoid bias amongst the learners. The pretest scores were obtained from the 1st sequence performance in history which was written on the 2nd of October 2017 in form 3B and form 3C. The pretest was based on their previous knowledge taught in class. They had the same lesson

notes in the same subject. This was to measure their performance and see if the two classes had a similarity in results. Pretest is that type of test that determines students' knowledge about the lesson. In this study, a pretest was administered to both the experimental group and the control group to determine if student's knowledge differs significantly about the lesson and if there was a similarity amongst the groups. It was assessed before the cooperative leaning activity was introduced. In addition to that, it was to ensure if performances of history students in form 3B and form 3C are similar. After the pretest, the researcher introduced cooperative learning in experimental class rooms and split the students in groups. This teaching method introduced was used only in the experimental group. The posttest was administered after five class periods of the exercise and on the six periods, evaluation was done for every technique used. Posttest seeks to determine if students have improved on knowledge of learning objectives. In this context, a posttest was administered to the experimental group and control group. A posttest was administered after cooperative activities were carried out to both the experimental group and control group. This was to access if the experimentation (intervention) has improved students' performances in History in Form 3B than in form 3C.

### **3.7.2. Experimentation**

**Objective: To find out if the use of cooperative learning techniques improves students' academic performance.**

The researcher taught lessons from the official syllabus for 6 weeks (18 class periods) to instruct both the experimental and the control group. The researcher had three class periods a week with 50 minutes on Monday, Thursday and Friday with the experimental group and the control group. The experimental group was made up of form 3B students while the control group was made up of form 3C students. The experimental group had a total number of 80 students in class with ten (10) groups where the group was made up of eight (8) students per group. The groups were large because of the large class size. The experimental group was taught using three types of cooperative learning techniques which include the Jigsaw, the peer tutoring and the student team achievement division while the control group was made up of 72 students and they were taught using the conventional method. Every cooperative learning technique was used after six class periods and on the six class periods, the technique was evaluated. For example; the jigsaw technique was done from the 5<sup>th</sup> to the 13<sup>th</sup> of October and the 16<sup>th</sup> of October was evaluation

done for that technique, peer tutoring was done from the 19<sup>th</sup> to the 28<sup>th</sup> of October and the 30<sup>th</sup> of October was evaluation done for that technique and Student Team Achievement Division was done from the 2<sup>nd</sup> of November to the 10<sup>th</sup> of November and the 13<sup>th</sup> of November 2017 was evaluation done for that technique.

The researcher introduced the different techniques that was to be used in the subject during the first history class period after their pre-test (2<sup>nd</sup> of October) and how they were to handle other feelings, communicate with teachers and their peers. Also, the researcher's laid emphasis on equal participation of students, Promotive interaction between team mates, respects for one another and points was taken off from group members who always fight or argue during the exercise. In addition to that, the researcher formulated large groups according to their seating positions few days before the class with the help of the history class teacher.

On the 5<sup>th</sup> of October, during the class period, researcher gave a brief revision of the previous knowledge (2minutes) since it was a continuation of the lesson. In addition to that, the researcher presented and gave directives on what was expected from them to the learners, presented lessons and gave notes (20 minutes). The students took their various positions at the beginning of the class. The students belonging to each group were put together (circular manner) and taught how interaction was to take place (5 minutes). Students worked in their various groups on the tasks assigned to them. The groups of students in their experimental class had the same topic, same objectives and same tasks to do in their various groups. Since the class was large, every group had to work at once and every student had to effectively participate in the completion of the tasks in order to manage the class size, space and time given to the researcher. In order to contribute to the success of the work, each group member had a leader, secretary and a disciplinarian; they were told to coordinate the groups during the exercise. These leaders helped each group to maintain tranquility during the exercise. The students were told to ask the teacher questions through gesticulations where they had doubts. Each technique was used for 15 minutes except for the jigsaw technique that was used for 20 minutes. This was because during this group exercise, students had expert groups and home groups. The expert groups were 10 in total. In addition to that, these groups were made up of 10 students per group who were working on the same tasks. They work in their various expert groups for the first 8 minutes and return to their home groups to share their knowledge to the other members for the last 12 minutes.

After time given to students to work on their tasks elapsed, they all sat back in their formal way in which the class was structured. The students were being asked questions by the researcher on the task given to them and had to choose at least four members from each group list to answer the different questions there by checking for accuracy. This exercise was done to evaluate or assess if every learner contributed to the completion of the work, understood the objectives of the tasks and be accountable for their learning. This exercise was done for 3 minutes. The purpose of this exercise was done to ensure that students had acquired personality skills such as communication skills, cooperative skills, interactive skills which they did not have.

Every after two weeks of using each technique (5 class periods of teaching history), the six class periods were used to evaluate students' performance in regard to the respective technique. On the day of evaluation (six days of using the technique), the researcher goes to class and evaluate experimental and control groups of students based on what was taught for 30 minutes (post-test). This was to find out if the use of cooperative learning techniques improves students' academic performance in form three B history students.

After the correction of test scripts, the researcher did remediation to both the weak students and the brilliant students in the experimental group. The weak students were put on the 1<sup>st</sup> and 2<sup>nd</sup> column while the brilliant students were put on the 3<sup>rd</sup> to the 5<sup>th</sup> column. The researcher asked questions to the weak students on what they did not understand in regard to the test and clarified them on what they did not understand on the tasks that was given to them during the test. This was to ensure that every learner is clarified on what was required and the objectives have been met. Later, similar activity was given to them to do in their exercise books while the brilliant students were placed on something else.

### **3.8. METHOD OF DATA ANALYSIS**

This study is experimental by his nature and applies the quasi-experimental research design which seeks to measure the extent to which the treatment causes student's academic performance to improve. Experimental research provides a systematic and logical method for answering the question, 'if this is done under carefully controlled conditions, what will happen'. Experimenters deliberately and systematically manipulate certain stimuli, treatments or environmental conditions and observe how the conditions or behaviour of the subject is affected or changed.

Both descriptive and inferential statistics are used to analyze data and verify the hypotheses. Also, the Statistical Package for Social Sciences (SPSS) version 23.0 will be used for data analysis. To organize and give meaning to our data, we use various statistical tools: descriptive statistics, mean, standard deviation, the independent and dependent t-test, the univariate Analysis of Variances (ANOVA), the Multivariate Analysis of Variances (one-way MANOVA) and the mixed analysis of variances.

### **3.8.1. The t-test**

The t-test for independent and correlated means were used to compare the mean scores of the student before and after a treatment was given, to assess if there's any significant observed gain since the research design involves two matched groups. It is also used when the same subjects receive two different treatments in a study.

### **3.8.2. Univariate Analysis of Variances**

When researchers desire to find out whether there are significant differences between the means of more than two groups, they commonly use a technique called analysis of variance (ANOVA), which is actually a more general form of the t-test that is appropriate to use with three or more groups. (It can also be used with two groups.) In brief, variation both within and between each of the groups is analyzed statistically, yielding what is known as an F value. As in a t-test, this F value is then checked in a statistical table to see if it is statistically significant. It is interpreted quite similarly to the t-value, in that the larger the obtained value of F, the greater the likelihood that statistical significance exists. When only two groups are being compared, the t-test is sufficient to tell the researcher whether significance has been achieved. When more than two groups are being compared, the T-test will not, by itself, tell us which of the means are different.

The research was conducted with a sample of students that have personal characteristics and the univariate analysis of variances (one way-ANOVA) was used to determine the variability of the students' academic performance by personal characteristics (group, gender and age).

### **3.8.3. Multivariate Analysis of Variances**

Multivariate Analysis of Variance (MANOVA) differs from ANOVA in only one respect: It incorporates two or more dependent variables in the same analysis, thus permitting a more powerful test of differences among means. It is justified only when the researcher has reason to

believe correlations exist among the dependent variables. The specific value that is calculated is Wilk's lambda, a number analogous to F in analysis of variance.

#### **3.8.4. Mixed Analysis of Variances**

The mixed-model design ANOVA gets its name because there are two types of variables involved, that is at least one between-subjects variable and at least one within-subjects variable. The mixed-design ANOVA tests for mean differences between two or more independent groups whilst subjecting participants to repeated measures. Thus, in a mixed-design ANOVA model, one factor (a fixed effect factor) is a between-subjects variable and the other (a random effects factor) is a within-subjects variable. The primary purpose of a mixed ANOVA is to understand if there is an interaction between these two factors on the dependent variable. When running an analysis of variance to analyze a data set, the data set should meet the following criteria:

- Normality: scores for each condition should be sampled from a normally distributed population.
- Homogeneity of variance: each population should have the same error variance.
- Sphericity of the covariance matrix: ensures the F ratios match the F distribution.

For the between-subject effects to meet the assumptions of the analysis of variance, the variance for any level of a group must be the same as the variance for the mean of all other levels of the group. When there is homogeneity of variance, sphericity of the covariance matrix will occur, because for between-subjects independence has been maintained. For the within-subject effects, it is important to ensure normality and homogeneity of variance is not being violated. If the assumptions are violated, a possible solution is to use the Greenhouse & Geisser or the Huynh & Feldt adjustments to the degrees of freedom because they can correct for issues that can arise should the sphericity of the covariance matrix assumption be violated

This chapter of research methodology deals with the introduction, research design, area of study, population of study, samples, instruments and method of data analysis. The critical examination of this chapter as shown above served as a stepping stone for the presentation of results and analysis of data collected from the field.

## **CHAPTER FOUR**

### **PRESENTATION AND DATA ANALYSIS**

This chapter presents the results of data that were collected through test constructed in relation to the variables under study. The technique used in presenting the data is one where data are organized, presented and analysis are made to show their impact on the whole study. It uses tables and charts to give a descriptive representation of results. The first part of this chapter starts with the analysis of background characteristics, and then proceeds with the analysis of different variables, while giving attention to the existence of possible relationship between variables.

#### **4.1. PRESENTATION AND DESCRIPTION OF DATA**

This section deals with the presentation of data and description of the sampled population with respect to the background characteristics of the students. The data obtained from the test are presented through percentages, tables, charts and graphs to draw the trends.

##### **4.1.1. Distribution of respondents according to Groups**

Table 4.1 and Figure 4.1 below present the distribution of respondents according to groups. With a total of 152 respondents, it can be seen that the highest number of respondents (80) in the sampled population came from the experimental group making a percentage of 52.63% students. Meanwhile the control group was made up of 72 respondents, making up 47.37% of the sampled population.

*Table 4.1: Distribution of respondents according to Groups*

	<b>Frequency</b>	<b>Percentage</b>	<b>Cumulative Percentage</b>
Comparison Group	72	47.37	47.37
Experimental Group	80	52.63	100.00
Total	152	100.00	

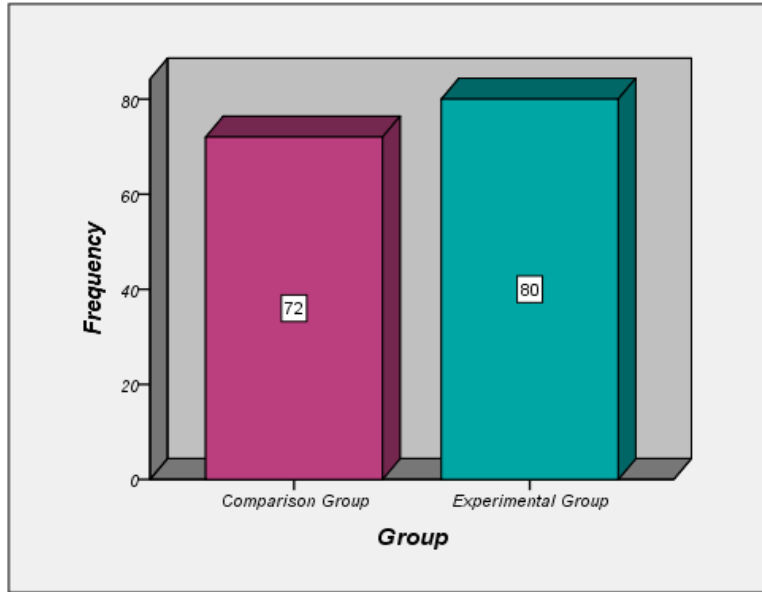


Figure 4.1: Diagram of the distribution of the respondent according to groups.

#### 4.1.2. Distribution of respondents according to their age

Age is considered a very significant factor in this study because the competence of individuals matures by age. Distribution of the sampled population according to age would effectively provide a proper view to the research question. Figure 4.2 below presents the histogram of age of the respondents. It reveals that the mean age of students is ( $M = 13.42$ ) with a standard deviation of ( $SD = .895$ ), showing a small dispersion of age among students of our sample population.

Table 4.2: Distribution of respondents according to age

Age	n	Minimum	Maximum	Mean	Std. Deviation
Comparison Group	72	12.00	17.00	13.41	.915
Experimental Group	80	12.00	17.00	13.42	.882
Combined Group	152	12.00	17.00	13.42	.895
n= 152					



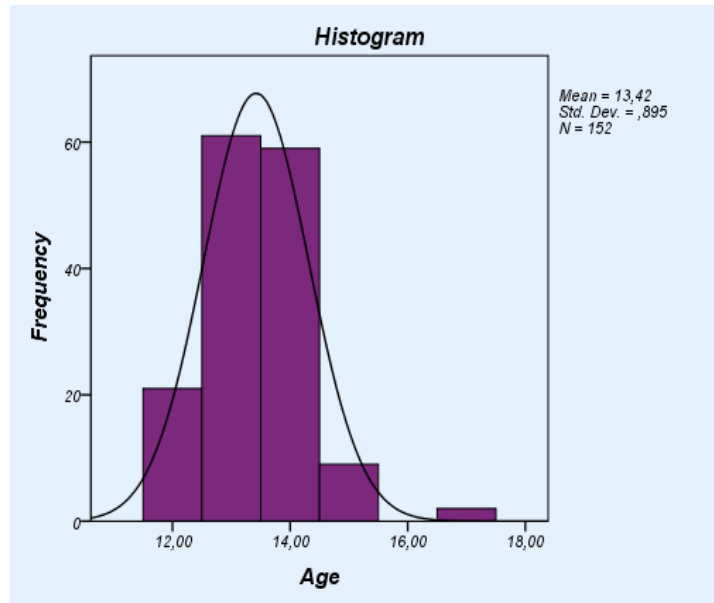


Figure 4.2: Diagram of the distribution of the respondent according to age

#### 4.1.2.1. Distribution of respondents according to their age category

Table 4.3: Distribution of respondents according to age category

	EGr	CGr	Frequency	Percentage	Cumulative Percentage
<14 yrs	42	40	82	53.95	53.95
14 yrs	33	26	59	38.82	92.76
>14 yrs	5	6	11	7.24	100.00
Total	80	72	152	100.00	

When the ages of students are categorized, the results obtained, as revealed by table 4.3 shows that the majority of students were less than 14 years old, with the total number of 82 students making up 53.95% of the total sampled population. Still from the table 4.3 above, it can be seen that another important proportion (7.24%) of students are of age greater than 17years, that is, 11 students.

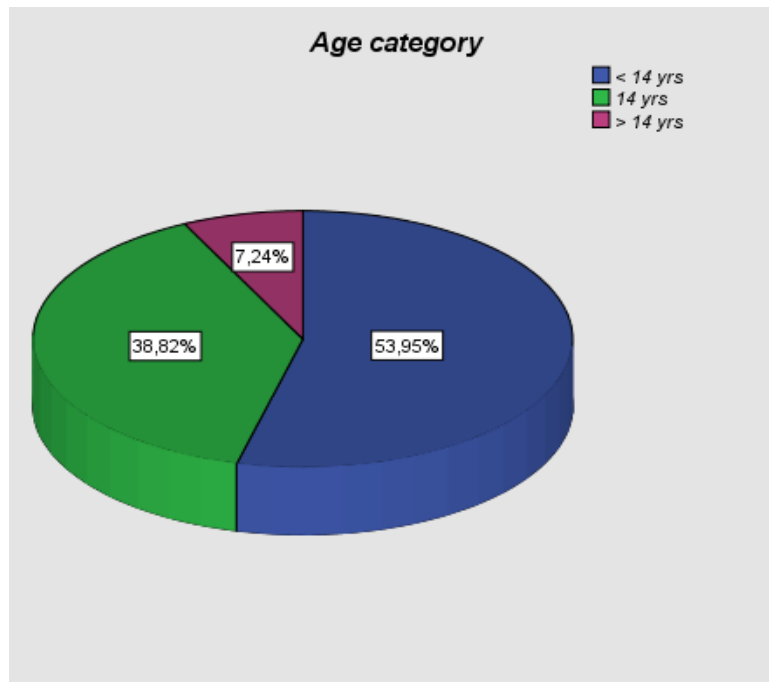


Figure 4.3: Diagram of the distribution of respondent according to age category

Table 4.4: Distribution of respondents according to age category by Groups

			Gender		Total
			Female	Male	
Age category	< 14 yrs	Count	46.00	36.00	82.00
		% of Total	30.26	23.68	53.95
	14 yrs	Count	31.00	28.00	59.00
		% of Total	20.39	18.42	38.82
	>14 yrs	Count	3.00	8.00	11.00
		% of Total	1.97	5.26	7.24
Total		Count	80.00	72.00	152.00
		% of Total	52.63	47.37	100.00

Table 4.4 above and figure 4.4 below, shows that the total number of female students who falls under the ages less than 14years constitute a percentage of 30.26% While male students under this category make up of 23.68%. In addition to that, from the figure above, it shows that female students with the age of 14 years make up 20.39% while the male constitute 18.42%. The population of the female students with ages greater than 14years has a percentage of 1.97% while the male students in this category have a percentage of 5.26%. These statistics show that the students who were categorized under the less than 14years made up the majority (53.95) of the population in the study.

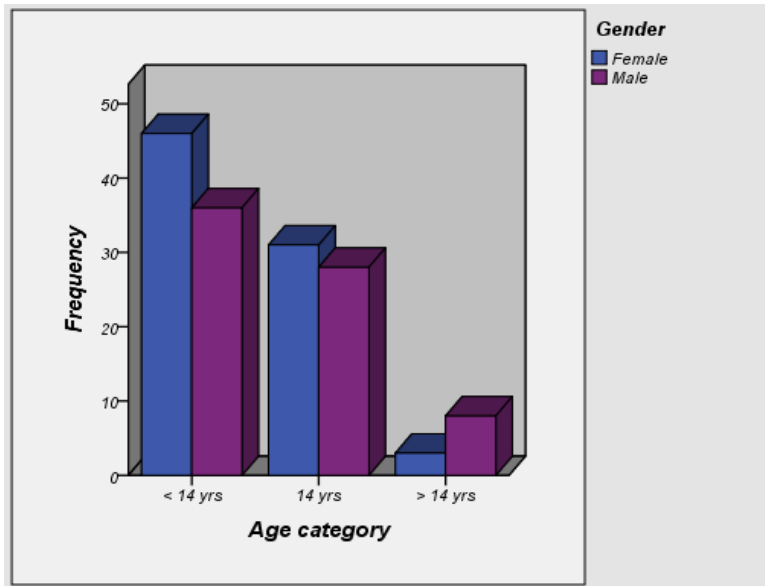


Figure 4.4: Distribution of respondents according to age category by Groups

#### 4.1.3. Distribution of respondents according to their gender

Table 4.5 and figure 4.5 below, shows that the total number of female students in the sampled population is greater than that of the male students. 80 female students participated in the tests making a percentage of 52.63% while 72% male students participated in the tests making up 47.37% of the sampled population. These statistics show that the female students were those that made up the majority of the population.

Table 4.5: Distribution of respondents according to Gender

	EGr	CGr	Frequency	Percentage	Cumulative Percentage
Female	41	39	80	52.63	52.63
Male	39	33	72	47.37	100.00
Total	80	72	152	100.00	

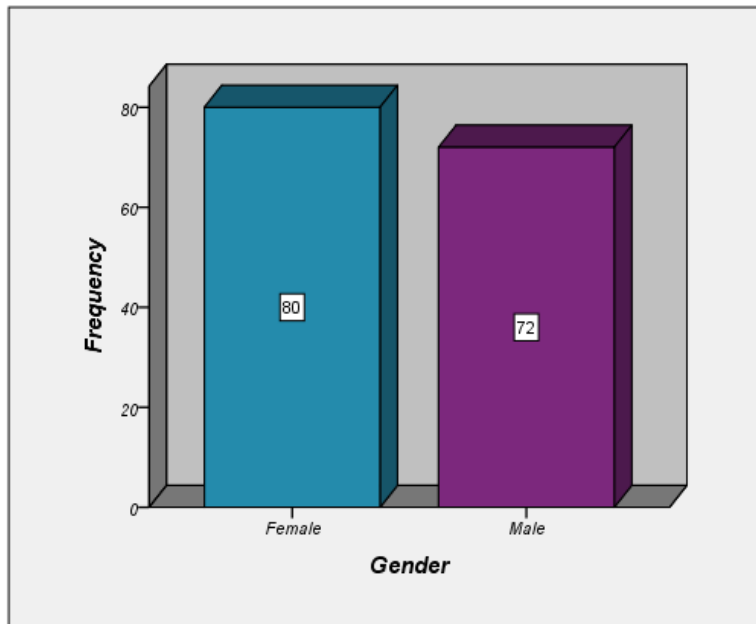


Figure 4.5: Diagram of the distribution of the respondent according to gender

#### 4.1.3.1. Distribution of participant according to their gender by group

Table 4.6: Distribution of respondents according to their gender by group

			Group		Total
			Comparison Group	Experimental Group	
Gender	Female	Count	39.00	41.00	80.00
		% of Total	25.66	26.97	52.63
	Male	Count	33.00	39.00	72.00
		% of Total	21.71	25.66	47.37
Total		Count	72.00	80.00	152.00
		% of Total	47.37	52.63	100.00

Table 4.6 above and figure 4.6 below, shows that the total number of female students in the experimental group is 41 making a percentage of 26.97% while the control group is made up of 39 female students making a percentage of 25.66% female. The male students in the experimental group was made up of 39 with a percentage of 25.66% while in the control group, male students had a total of 33 with a percentage of 21.71%. From Figure 4.6 below, it shows that the female and male in the experimental group are represented by green while the control group for both the male and female are represented by purple. From the Table above and Figure below, it shows that the majority of those who constituted the population of the study were females.

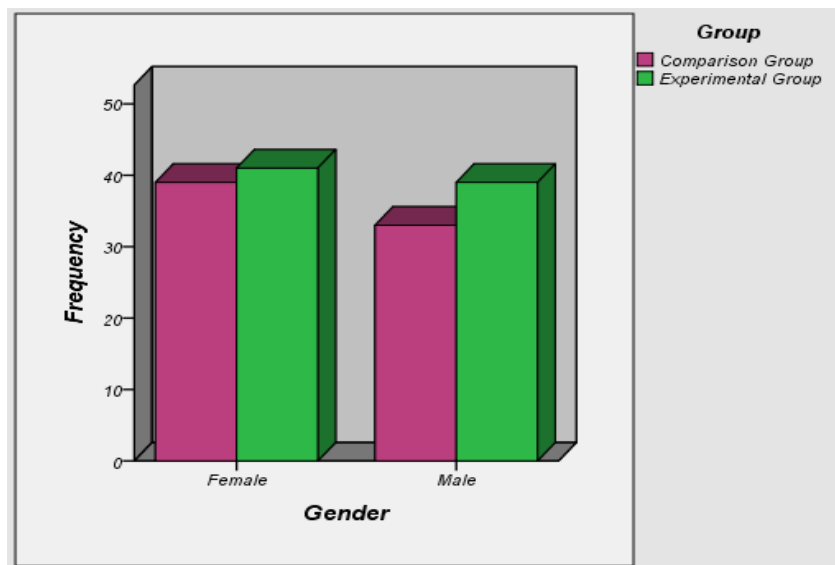


Figure 4.6: Diagram of distribution of respondents according to their gender by group

## 4.2. VARIABILITY OF THE PERFORMANCE BY PERSONAL CHARACTERISTICS

The usual goal in data analysis is to efficiently describe and measure the strength of relationships between variables (Muijs, 2004). In this regard, bivariate descriptive statistics describes such relationships. The intervention was conducted with sample population of secondary's student with special interest in their background characteristics. So, the t-test, the one way-Analysis of Variances (ANOVA) test and the Multivariate Analysis of Variances (MANOVA) test are used to determine the variability of the respondents' performances by background characteristics (gender, age, and group).

### 4.2.1. Variability of the pretest score by group

We want to test the difference of the pretest score between the comparison group and the experimental group. In other terms, does the pretest score differ between the comparison group and the experimental group? So, we will compare the pretest score of the two groups by using the t-test as shown in the table 4.10 below. The results show that on the average, the variability of pretest score in the study was not significantly different for the comparison group ( $M = 7.493$ ,  $SD = 2.280$ ) and for the experimental group ( $M = 7.506$ ,  $SD = 2.315$ ),  $t(150) = -0.035$ , ( $p > 0.05$ ).

*Table 4.7: Analysis of the variability of pretest score by group*

	Group	n	Mean	Variance	Std. Deviation	Std. Error Mean	t
Pretest score	Control Group	72	7.493	5.23	2.280	0.268	-
	Exp Group	80	7.506	5.87	2.315	0.258	
n =152 ; df = 150 ; ns = (p > 0,05)							

The results reveal a non-significant difference of pretest score for the comparison group and the experimental group in our study. The overall analysis as it is shown in table 4.10, displayed a significant difference in pretest score for the comparison group and the experimental group ( $p > 0$ ); meaning that, the pretest scores are not significantly different in the two groups. So, it can be concluded that the students in the two groups were relatively the same level in terms of their performance in history at the beginning of our intervention, thus motivating the arbitrary drawing of the comparison group and the experimental group.

#### **4.2.2. Variability of the posttest score by group**

The posttest score is made up of the score after the Jigsaw, peer tutoring and STAD intervention. We want to see if the posttest score varies by group. In other terms, does students' performance differ across the comparison group and the experimental group? So, we will compare the three posttest scores of the two groups by using the t-test as shown in table 4.8 below. From table 4.8 below we observe some differences in the Means and Standard Deviations in the groups involved in the study. However, the main issue at this level was to test whether the observed differences were significant between the different groups.

*Table 4.8: Analysis of the variability of posttest score by group*

	Group	n	Mean	Std. Deviation	Std. Error Mean	t
Posttest (Jigsaw)	Comp Group	72	6.194	2.720	0.320	-12.383***
	Exp Group	80	11.612	2.670	0.298	
Posttest (Peer tutoring)	Comp Group	72	6.056	2.637	0.310	-15.257***
	Exp Group	80	12,712	2.730	0.305	
Posttest (STAD)	Comp Group	72	6.069	2.580	0.304	-17.700***
	Exp Group	80	13.312	2.463	0.275	
n =152 ; df = 150 ; *** (p < 0,001)						

Table 4.8 displays the results for the t-test for the difference of means. For the posttest (Jigsaw), the results show that on the average, students experienced greater improvement in their performance (Jigsaw) in the the experimental group ( $M = 11.612$ ,  $SD = 2.670$ ) than for the comparison group ( $M = 6.194$ ,  $SD = 2.720$ ). This difference was significant,  $t(150) = -12.383$ , ( $p < 0.001$ ); and it did represent a large size effect  $r = .71$ . For the Post-test (Peer tutoring), the results show that on the average, students experienced better increase in their performance (Peer tutoring) in the the experimental group ( $M = 12.712$ ,  $SD = 2.730$ ) than for the comparison group ( $M = 6.056$ ,  $SD = 2.637$ ). This difference was significant,  $t(150) = -15.257$ , ( $p < 0.001$ ); and it did represent a large-size effect  $r = .78$ . For the posttest (STAD), the results show that on the average, students experienced greater improvement in their performance (STAD) in the the experimental group ( $M = 13.312$ ,  $SD = 2.463$ ) than for the comparison group ( $M = 6.069$ ,  $SD = 2.580$ ), revealing a significant difference,  $t(150) = -17.700$ , ( $p < 0.001$ ); and it did represent a large-size effect  $r = .82$ .

It appears from the above results that that experimental factor, cooperative learning techniques (jigsaw, peer tutoring and STAD) actually achieved the desire aim, making students' performance to improve significantly after the intervention.

#### **4.2.3. Variability of the gain score by group**

The effect size is an index that is obtained by dividing the difference between the means of the two groups (means of experimental group minus means of comparison group) being compared by the standard deviation of the comparison group. It is the change that occurs after an experimental intervention. The gain score is made up of the score after the Jigsaw, peer tutoring and STAD intervention. We want to see how the gain score varies by group. In other terms, does students' gain score differ across the comparison group and the experimental group? So, we will compare the three gain scores of the two groups by using the T-test as shown in Table 4.12 below. From Table 4.12 below we observe some differences in the Means and Standard Deviations in the groups involved in the study. However, the main issue at this level was to test whether the observed differences were significant between the different groups.

Table 4.9: Analysis of the variability of gain score by group

	Group	n	Mean	Std. Deviation	Std. Error Mean	t
Gain (Jigsaw)	Comp Group	72	-1.298	3.586	0.422	-10.657***
	Exp Group	80	4.106	2.636	0.294	
Gain (Peer tutoring)	Comp Group	72	-1.437	3.367	0.396	-13.352***
	Exp Group	80	5.206	2.762	0.308	
Gain (STAD)	Comp Group	72	-1.423	3.326	0.392	-14.904***
	Exp Group	80	5.806	2.642	0.295	
n=152 ; df = 150 ; *** (p < 0,001)						

Table 4.9 displays the results for the t-test for the difference of means. For the gain (Jigsaw), the results show that on the average, students experienced greater change in their performance (Jigsaw) in the experimental group (M = 4.106, SD = 2.636) than for the comparison group (M = -1.298, SD = 3.586). This difference was significant,  $t(150) = -10.657$ , ( $p < 0.001$ ); and it did represent a large-size effect  $r = 0.65$ . For the gain (Peer tutoring), the results show that on the average, students experienced better increase in their performance (Peer tutoring) in the the experimental group (M = 5.206, SD = 2.762) than for the comparison group (M = -1.437, SD = 3.367). This difference was significant,  $t(150) = -14.904$ , ( $p < 0.001$ ); and it did represent a large-size effect  $r = 0.73$ . For the gain (STAD), the results show that on the average, students experienced greater improvement in their performance (STAD) in the the experimental group (M = 5.806, SD = 2.642) than for the comparison group (M = -1.423, SD = 3.326), revealing a significant difference,  $t(150) = -17.700$ , ( $p < 0.001$ ); and it did represent a large-size effect  $r = 0.77$ .

It appears from the above results that that experimental factor, cooperative learning techniques (jigsaw, peer tutoring and STAD) actually achieved the desire aim, making students' performance to improve significantly after the intervention.

#### 4.2.4. Variability of the post-test score by gender

The posttest score is made up of the score after the Jigsaw, peer tutoring and STAD intervention. We want to see if the posttest score varies by gender. In other terms, does students' performance differ across the male students and the female students? So, we will compare the three posttest scores of the two groups by using the t-test as shown in Table 4.13 below. From Table 4.10 below we observe that there were some relative differences in the Means and Standard



Deviations in the gender involved in the study. However, the main issue at this level was to test whether the differences were significant between the different genders.

*Table 4.10: Analysis of the variability of posttest score by group*

	Gender	N	Mean	Std. Deviation	Std. Error Mean	t
Jigsaw posttest score	Female	80	8.937	3.657	0.408	-0.368ns
	Male	72	9.166	4.010	0.472	
Peer tutoring posttest score	Female	80	9.387	4.196	0.469	-0.521ns
	Male	72	9.750	4.385	0.516	
STAD posttest score	Female	80	9.600	4.175	0.466	-0.828ns
	Male	72	10.19	4.671	0.550	
n = 152 ; df = 150 ; ns = (p > 0,05)						

Table 4.10 displays the group descriptive statistics comparing the modalities of performance in history by the students' gender. The results show that on average, the difference between male and female students is not significant for Jigsaw posttest score, Peer tutoring posttest score and STAD posttest score ( $p > 0.05$ ).

#### **4.2.5. Variability of the gain score by gender**

The gain score is made up of the score after the Jigsaw, peer tutoring and STAD intervention. We want to see if the gain score varies by gender. In other terms, does students' performance differ across the male students and the female students? So we will compare the three gain scores of the two groups by using the t-test as shown in Table 4.11 below. From Table 4.11 below we observe that there were some relative differences in the Means and Standard Deviations in the gender involved in the study. However, the main issue at this level was to test whether the differences were significant between the different genders.

*Table 4.11: Analysis of the variability of gain score by group*

	Gender	n	Mean	Std. Deviation	Std. Error Mean	t
Gain (Jigsaw)	Female	80	1.562	4.170	.466	0.052ns
	Male	72	1.528	4.103	.483	
Gain (Peer tutoring)	Female	80	2.012	4.543	.508	-0.134ns
	Male	72	2.111	4.517	.532	
Gain (STAD)	Female	80	2.225	4.573	.511	-0.433ns
	Male	72	2.555	4.838	.570	
n= 152 ; df = 150 ; ns = (p > 0,05)						

Table 4.11 displays the group descriptive statistics comparing the modalities of performance in history by the students' gender. The results show that on average, the difference between male and female students is not significant for Jigsaw gain score, Peer tutoring gain score and STAD gain score ( $p > 0.05$ ).

#### 4.2.6. Variability of the posttest score by age

Literature shows that students' academic achievement is an important variable that varies according to age. We want to look at the variability of students' posttest score across the age category of the respondent. We will be addressing the question: does students' posttest score (Jigsaw, peer tutoring and STAD) differ across age category? Since this is a case of comparison of many means, we are going to use a univariate analysis of variance to assess the variability of students' posttest score across their age category as shown in the Table 4.15 below.

Table 4.12 under shows that there were some relative differences in the Means and Standard Deviations of the various age categories involved in the first intervention (Jigsaw): Under 14 years ( $M = 8.963$ ,  $SD = 3.546$ ), 14 years ( $M = 8.950$ ,  $SD = 4.078$ ); Above 14 years ( $M = 10.182$ ,  $SD = 4.490$ ). The test of the differences between these means shown in Table 4.12 below reveals that the age category, does not affect students' posttest (jigsaw) in a significant way as the results of this study show,  $F(2, 149) = 0.522$ ,  $p > 0.05$ .

*Table 4.12: Analysis of the variability of posttest score by age category*

		n	Mean	Std. Deviation	Std. Error	F
Posttest (Jigsaw)	< 14 yrs	82	8.963	3.546	0.391	0.522ns
	14 yrs	59	8.950	4.078	0.530	
	> 14 yrs	11	10.182	4.490	1.354	
	Total	152	9.046	3.817	0.309	
Posttest (Peer tutoring)	< 14 yrs	82	9.402	4.057	0.448	0.401ns
	14 yrs	59	9.576	4.457	0.580	
	> 14 yrs	11	10.636	5.104	1.539	
	Total	152	9.560	4.276	0.346	
Posttest (STAD)	< 14 yrs	82	9.670	4.145	0.458	0.208ns
	14 yrs	59	10.10	4.663	0.607	
	>14 yrs	11	10.27	5.274	1.590	
	Total	152	9.881	4.412	0.358	
n = 152 ; df = (2, 149) ; ns = ( $p > 0,05$ )						

Still in table 4.12 above shows that there were some relative differences in the Means and Standard Deviations of the various age categories involved in the second intervention (peer tutoring): Under 14 years ( $M = 9.402$ ,  $SD = 4.057$ ), 14 years ( $M = 9.576$ ,  $SD = 4.457$ ); Above 14 years ( $M = 10.636$ ,  $SD = 5.104$ ). The test of the differences between these means shown in table 4.15 above reveals that the age category, does not affect students' posttest (jigsaw) in a significant way as the results of this study show,  $F(2, 149) = 0.401$ ,  $p > 0.05$ .

Lastly, table 4.12 above displays the differences in the Means and Standard Deviations of the various age categories involved in the third intervention (STAD): Under 14 years ( $M = 9.670$ ,  $SD = 4.145$ ), 14 years ( $M = 10.10$ ,  $SD = 4.663$ ); Above 14 years ( $M = 10.27$ ,  $SD = 5.270$ ). The test of the differences between these means shown in table 4.12 above reveals that the age category, does not affect students' posttest (jigsaw) in a significant way as the results of this study show,  $F(2, 149) = 0.208$ ,  $p > 0.05$ .

The analysis as illustrated in table 4.12, revealed a non-significant difference in students' performance for the different age categories, meaning that, students' posttest (Jigsaw, peer tutoring and STAD) is not significantly affected by their age categories.

#### **4.2.7. Variability of the gain score by age**

We want to look at the change in students' posttest score across the age category of the respondent. We will be addressing the question: does students' gain score (Jigsaw, peer tutoring and STAD) differ across age category? Since this is a case of comparison of many means, we are going to use a univariate analysis of variance to assess the variability of students' gain score across their age category as shown in the table 4.13 below.

Table 4.13 under shows that there were some relative differences in the Means and Standard Deviations of the various age categories involved in the first intervention (Jigsaw): Under 14 years ( $M = 1.792$ ,  $SD = 3.840$ ), 14 years ( $M = 1.050$ ,  $SD = 4.618$ ); Above 14 years ( $M = 2.363$ ,  $SD = 3.324$ ). The test of the differences between these means shown in table 4.13 above reveals that the age category, does not affect students' posttest (jigsaw) in a significant way as the results of this study show,  $F(2, 149) = 0.522$ ,  $p > 0.05$ .

*Table 4.13: Analysis of the variability of gain score by age category*

		n	Mean	Std. Deviation	Std. Error	F
Gain (Jigsaw)	< 14 yrs	82	1.792	3.840	0.424	0.786ns
	14 yrs	59	1.050	4.618	0.601	
	> 14 yrs	11	2.363	3.324	1.003	
	Total	152	1.546	4.125	0.334	
Gain (Peer tutoring)	< 14 yrs	82	2.232	4.294	0.474	0.422ns
	14 yrs	59	1.678	4.971	0.647	
	> 14 yrs	11	2.818	3.683	1.112	
	Total	152	2.059	4.516	0.366	
Gain (STAD)	< 14 yrs	82	2.500	4.427	0.488	0.690ns
	14 yrs	59	2.203	5.191	0.675	
	> 14 yrs	11	2.454	4.058	1.223	
	Total	152	2.381	4.687	0.380	
n= 152 ; df = (2, 149) ; ns = (p > 0,05)						

Still in Table 4.13 above shows that there were some relative differences in the Means and Standard Deviations of the various age categories involved in the second intervention (peer tutoring): Under 14 years (M = 9.402, SD = 4.057), 14 years (M = 9.576, SD = 4.457); Above 14 years (M = 10.636, SD = 5.104). The test of the differences between these means shown in Table 4.13 above reveals that the age category, does not affect students' posttest (jigsaw) in a significant way as the results of this study show,  $F(2, 149) = 0.401, p > 0.05$ .

Lastly, Table 4.13 above displays the differences in the Means and Standard Deviations of the various age categories involved in the third intervention (STAD): Under 14 years (M = 9.670, SD = 4.145), 14 years (M = 10.10, SD = 4.663); Above 14 years (M = 10.27, SD = 5.270). The test of the differences between these means shown in Table 4.13 above reveals that the age category, does not affect students' posttest (jigsaw) in a significant way as the results of this study show,  $F(2, 149) = 0.208, p > 0.05$ .

The analysis as illustrated in Table 4.13, revealed a non-significant difference in students' performance for the different age categories, meaning that, students' posttest (Jigsaw, peer tutoring and STAD) is not significantly affected by their age categories.

#### 4.2.8. Variability of group on the posttest scores

A separate MANOVA was used to examine the association between group (comparison group and experimental group) as independent variable, and posttest scores (posttest-jigsaw, posttest-peer tutoring, posttest-stad) as dependent variables. The results of multivariate test (Wilks' Lambda) revealed that there was a statistically significant difference in performance (posttest scores) based on a student's belonging to a group,  $F(3, 148) = 106.981, p < 0.001$ ; Wilk's  $\Lambda = 0.316$ , partial  $\eta^2 = .684$ . It can be concluded that the posttest scores improvements' is significantly dependent on the experimental factor ( $p < 0.001$ ).

Table 4.14: Analysis of the effect of group on posttest scores

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F
Corrected Model	Posttest (Jigsaw)	1112.412	1	1112.412	153.328***
	Posttest (Peer tutoring)	1679.302	1	1679.302	232.770***
	Posttest (STAD)	1988.028	1	1988.028	313.292***
Intercept	Posttest (Jigsaw)	12015.939	1	12015.939	1656.205***
	Posttest (Peer tutoring)	13348.039	1	13348.039	1850.185***
	Posttest (STAD)	14235.528	1	14235.528	2243.369***
Group	Posttest (Jigsaw)	1112.412	1	1112.412	153.328***
	Posttest (Peer tutoring)	1679.302	1	1679.302	232.770***
	Posttest (STAD)	1988.028	1	1988.028	313.292***
Error	Posttest (Jigsaw)	1088.265	150	7.255	
	Posttest (Peer tutoring)	1082.165	150	7.214	
	Posttest (STAD)	951.840	150	6.346	
Total	Posttest (Jigsaw)	14639.000	152		
	Posttest (Peer tutoring)	16651.000	152		
	Posttest (STAD)	17782.000	152		
Corrected Total	Posttest (Jigsaw)	2200.678	151		
	Posttest (Peer tutoring)	2761.467	151		
	Posttest (STAD)	2939.868	151		
n = 152 ; df = (1, 150) ; *** (p < 0,001)					

From table 4.14, we can observe that group (comparison group and experimental group) has a statistically significant effect on posttest-jigsaw scores ( $F(1, 150) = 153.328; p < 0.001$ ; partial  $\eta^2 = 0.505$ ); posttest-peer tutoring scores ( $F(1, 150) = 232.770; p < 0.001$ ; partial  $\eta^2 = 0.608$ ) and posttest-STAD scores ( $F(1, 150) = 313.292; p < 0.001$ ; partial  $\eta^2 = 0.676$ ). The analysis of

correlation shows a significant relationship between posttest scores (posttest-jigsaw, posttest-peer tutoring, posttest-stad) in our study ( $p < 0.001$ ).

#### 4.2.9. Variability of group on the posttest scores

A separate MANOVA was used to examine the association between group (comparison group and experimental group) as independent variable, and gain scores (gain-jigsaw, gain-peer tutoring, gain-STAD) as dependent variables. The results of multivariate test (Wilks' Lambda) revealed that there was a statistically significant difference in performance (gain scores) based on a student's belonging to a group,  $F(3, 148) = 79.597$ ,  $p < 0.001$ ; Wilk's  $\Lambda = 0.383$ , partial  $\eta^2 = .617$ . It can be concluded that the change in scores is significantly dependent on the experimental factor ( $p < 0.001$ ).

*Table 4.15: Analysis of the effect of group on gain scores*

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F
Corrected Model	Gain (Jigsaw)	1107.001	1	1107.001	113.564***
	Gain (Peer tutoring)	1672.651	1	1672.651	178.281***
	Gain (STAD)	1980.792	1	1980.792	222.132***
Intercept	Gain (Jigsaw)	298.718	1	298.718	30.645***
	Gain (Peer tutoring)	538.237	1	538.237	57.368***
	Gain (STAD)	727.864	1	727.864	81.625***
Group	Gain (Jigsaw)	1107.001	1	1107.001	113.564***
	Gain (Peer tutoring)	1672.651	1	1672.651	178.281***
	Gain (STAD)	1980.792	1	1980.792	222.132***
Error	Gain (Jigsaw)	1462.177	150	9.748	
	Gain (Peer tutoring)	1407.316	150	9.382	
	Gain (STAD)	1337.577	150	8.917	
Total	Gain (Jigsaw)	2932.500	152		
	Gain (Peer tutoring)	3724.500	152		
	Gain (STAD)	4180.500	152		
Corrected Total	Gain (Jigsaw)	2569.178	151		
	Gain (Peer tutoring)	3079.967	151		
	Gain (STAD)	3318.368	151		
n = 152 ; df = (1, 150) ; *** (p < 0,001)					

From table 4.15, we can observe that group (comparison group and experimental group) has a

statistically significant effect on gain-jigsaw scores ( $F(1, 150) = 113.564$ ;  $p < 0.001$ ; partial  $\eta^2 = 0.431$ ); gain-peer tutoring scores ( $F(1, 150) = 178.281$ ;  $p < 0.001$ ; partial  $\eta^2 = 0.543$ ) and gain-STAD scores ( $F(1, 150) = 222.132$ ;  $p < 0.001$ ; partial  $\eta^2 = 0.597$ ). The analysis of correlation shows a significant relationship between gain scores (gain-jigsaw, gain-peer tutoring, gain-stad) in our study ( $p < 0.001$ ).

### **4.3. VERIFICATION OF RESEARCH HYPOTHESES**

In this section, we are going to verify our research hypotheses. As a statistical tool, the Mixed Analysis of Variances Design will be used to test our research hypotheses. It is a mixture of between group and repeated measures variables. A mixed ANOVA design contains at least one between-subjects variable and at least one within-subjects variable. The two-way mixed design allows us to track the performance of two or more independent groups over time on a dependent measure or to compare the performance of two or more independent groups on different measures. The statistical processing of the data was done through the SPSS software (SPSS 23.0 for Window) as shown in table 5.30 below.

#### **4.3.1. The jigsaw cooperative technique and students' performance (RH1)**

The jigsaw cooperative technique is a technique that encourages interaction among students in the classroom environment in the school milieu. That is why the first research hypothesis (RH1) claims that the use of jigsaw cooperative technique significantly improves students' performance. Table 4.16 displays the descriptive statistics of pretest, posttest, and gain in performance. From table 4.16, we observe that the comparison group consisted of 72 participants and (80) eighty participants comprised the experimental group. The mean values for the pretest and posttest measurements of the control group for jigsaw score were  $7.493 \pm 2.280$  and  $6.194 \pm 2.720$ , respectively. As for the mean values for the pretest and posttest measurements of the experimental group for jigsaw score were  $7.506 \pm 2.314$  and  $11.612 \pm 2.670$ , respectively. This result revealed an effect size coefficient (1.992) value calculated between posttest and pretest for Jigsaw.

Table 4.16: Descriptive Statistics of Pretest, Posttest, and Gain in performance

	Group				Effect Size (ES)
	Comparison Group (n = 72)		Experimental Group (n = 80)		
	Mean	SD	Mean	SD	
Pretest	7.493	2.280	7.506	2.314	1.992
Posttest (Jigsaw)	6.194	2.720	11.612	2.670	
Gain (Posttest-Pretest)	-1.298	3.586	4.106	2.636	1.507
n = 152 ; ES > 0,5 = Important effect					

The Table 4.16 presents the means for pretest and posttest measurements and gain scores for the comparison group (-1.298 ± 3.586) and experimental group (4.106 ± 2.636), with an effect size value of 1.507 which represents a large effect. Figure 4.7 illustrates the change that occurs after the use of jigsaw cooperative technique.

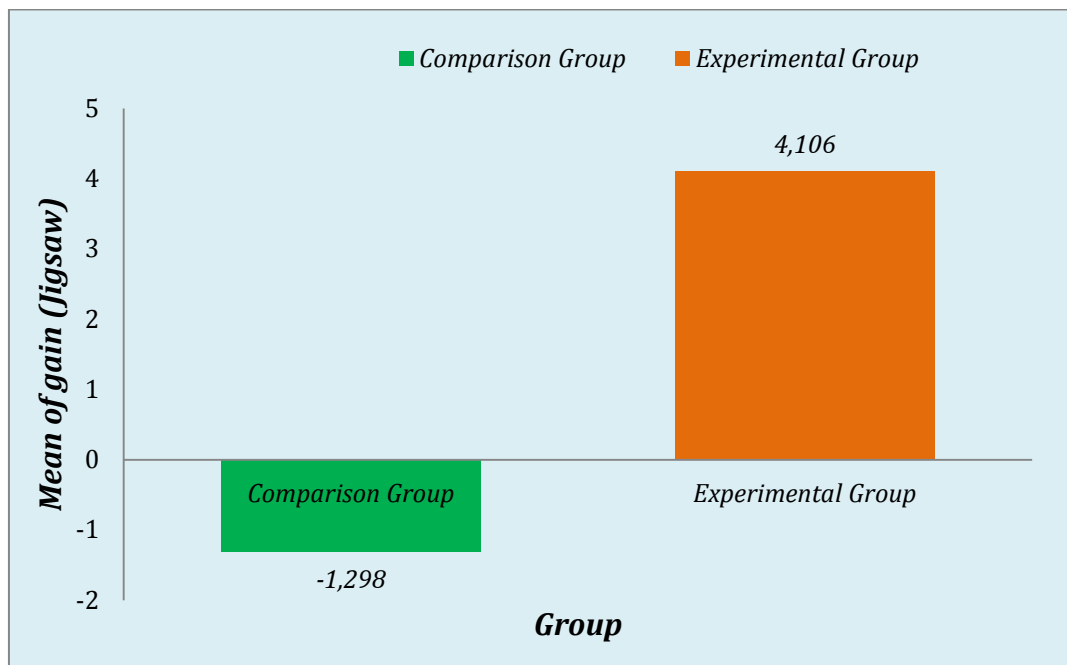


Figure 4.7: Mean change (difference between pretest and posttest) in Jigsaw scores

It can be observed that while the experimental group improves their performance, scores in the comparison group decrease. We calculated significant differences for measures,  $F(1.150) = 30.645$ ,  $p < 0.001$ , partial  $\eta^2 = 0.170$  and interaction (measures and group),  $F(1.150) = 113.564$ ,  $p < 0.001$ , partial  $\eta^2 = 0.431$ . This result revealed an important significant effect of the experimental factor.



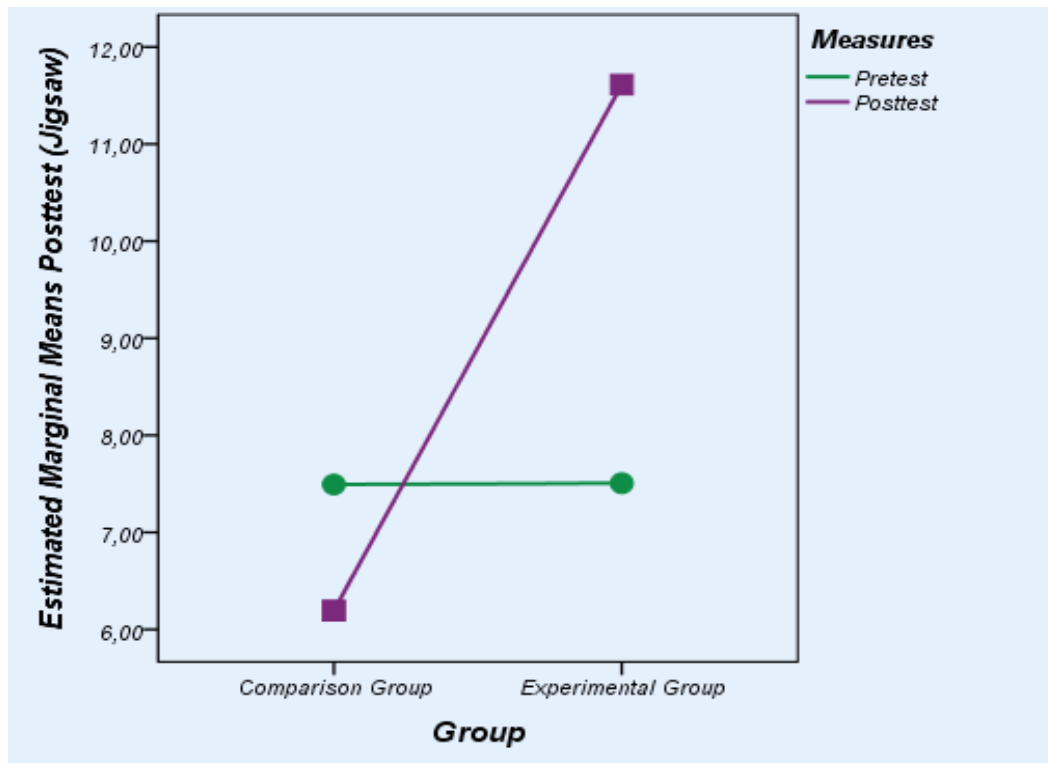


Figure 4.8: Diagram showing the interaction Pretest-Posttest in the two groups

The analysis of interaction as it is shown in figure 4.8, displayed a significant difference in academic achievement for comparison group and experimental group students ( $p < 0.001$ ); meaning that, students' performances are significantly different in the two groups. We can therefore conclude that the use jigsaw cooperative technique significantly improves students' performance in history.

#### 4.3.2. The peer-tutoring technique and students' performance (RH2)

The peer-tutoring cooperative technique is a technique that encourages interaction among students in the classroom environment in the school milieu. That is why the second research hypothesis (RH2) claims that the use peer tutoring cooperative technique significantly improves students' performance. Table 4.17 displays the descriptive statistics of pretest, posttest, and gain in performance.

From table 4.17, we observe that the comparison group consisted of seventy-two (72) participants and eighty (80) students comprised the experimental group. The mean values for the pretest and posttest measurements of the control group for peer tutoring score were  $7.493 \pm 2.280$  and  $6.055$

$\pm 2.637$ , respectively. As for the mean values for the pretest and posttest measurements of the experimental group for peer tutoring score were  $7.506 \pm 2.314$  and  $12.712 \pm 2.730$ , respectively. These results revealed an effect size coefficient (2.524) value calculated between posttest and pretest for peer tutoring.

Table 4.17: Descriptive Statistics of Pretest, Posttest, and Gain in performance

	Group				
	Comparison Group (n = 72)		Experimental Group (n = 80)		Effect Size (ES)
	Mean	SD	Mean	SD	
Pretest	7.493	2.280	7.506	2.314	2.524
Posttest (Peer Tutoring)	6.055	2.637	12.712	2.730	
Gain (Posttest-Pretest)	-1.437	3.367	5.206	2.761	1.973
n = 152 ; ES >0,5 = Important effect					

The Table 4.17 presents the means for pretest and posttest measurements and gain scores for the comparison group ( $-1.437 \pm 3.367$ ) and experimental group ( $5.206 \pm 2.761$ ), with an effect size value of 1.973 which represents a large effect. Figure 4.9 illustrates the change that occurs after the use of peer tutoring cooperative technique.

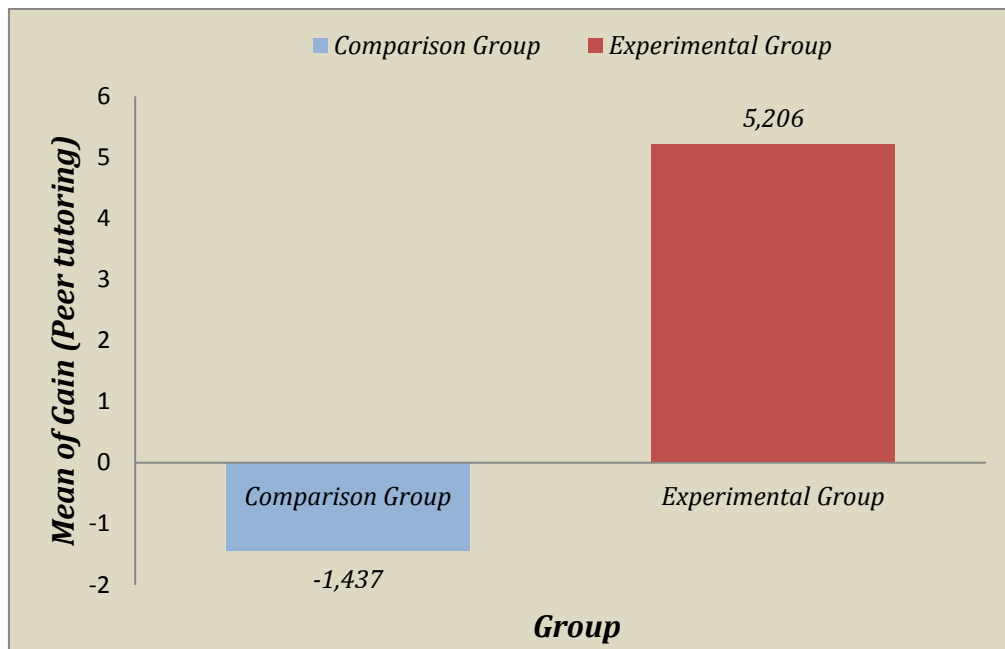


Figure 4.9: Mean change (difference between pretest and posttest) in Peer tutoring scores

It can be observed that while the experimental group improves their performance, scores in the comparison group decrease. We calculated significant differences for measures,  $F(1, 150) =$

57.368,  $p < 0.001$ , partial  $\eta^2 = 0.277$  and interaction (measures and group),  $F(1, 150) = 178.281$ ,  $p < 0.001$ , partial  $\eta^2 = 0.543$ . This result revealed an important significant effect of the experimental factor.

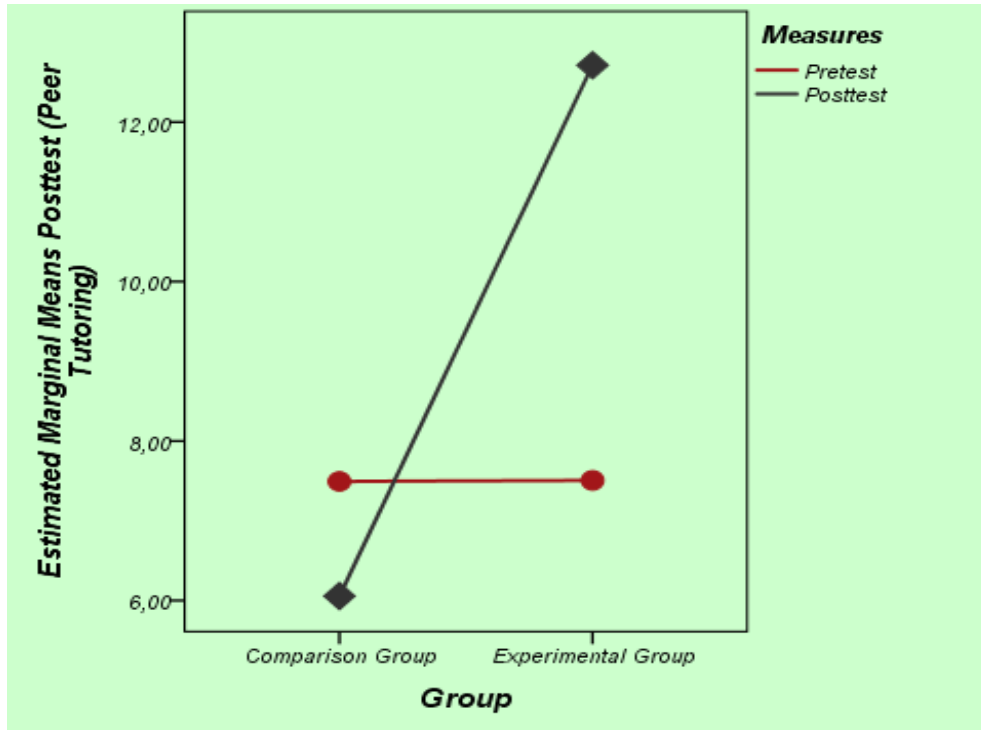


Figure 4.10: Diagram showing the interaction pretest-posttest in the two groups

The analysis of interaction as it is shown in figure 4.10, displayed a significant difference in pretest and posttest (peer-tutoring) scores for comparison group students and experimental group students ( $p < 0.001$ ); meaning that, changes in performances are significantly different in the two groups. It means that the use of peer-tutoring technique significantly improves students' performance.

#### 4.3.3. The Student Team Achievement Division technique and students' performance (RH3)

The STAD technique is a technique that encourages interaction among students in the classroom environment in the school milieu. That is why the third research hypothesis (RH3) affirms that the use of STAD technique significantly improves students' performance. Table 4.18 displays the descriptive statistics of pretest, posttest, and gain in performance.

From table 4.18, we observe that the comparison group consisted of seventy two (72) participants and eighty (80) students comprised the experimental group. The mean values for the pretest and

posttest measurements of the control group for STAD score were  $7.493 \pm 2.280$  and  $6.070 \pm 2.280$ , respectively. As for the mean values for the pretest and posttest measurements of the experimental group for STAD score were  $7.506 \pm 2.314$  and  $13.312 \pm 2.643$ , respectively. These results revealed an effect size coefficient (2.807) value calculated between posttest and pretest for STAD.

Table 4.18: Descriptive Statistics of Pretest, Posttest (STAD), and Gain in performance

	Group				Effect Size (ES)
	Comparison Group (n = 72)		Experimental Group (n = 80)		
	Mean	SD	Mean	SD	
Pretest	7.493	2.280	7.506	2.314	2.807
Posttest (STAD)	6.070	2.580	13.312	2.463	
Gain (Posttest-Pretest)	-1.424	3.326	5.806	2.643	2.173
n = 152 ; ES > 0,5 = Important effect					

The Table 4.18 presents the means for pretest and posttest measurements and gain scores for the comparison group ( $-1.424 \pm 3.326$ ) and experimental group ( $5.806 \pm 2.643$ ), with an effect size value of 2.173 which represents a large effect. Figure 4.11 illustrates the change that occurs after the use of STAD technique.

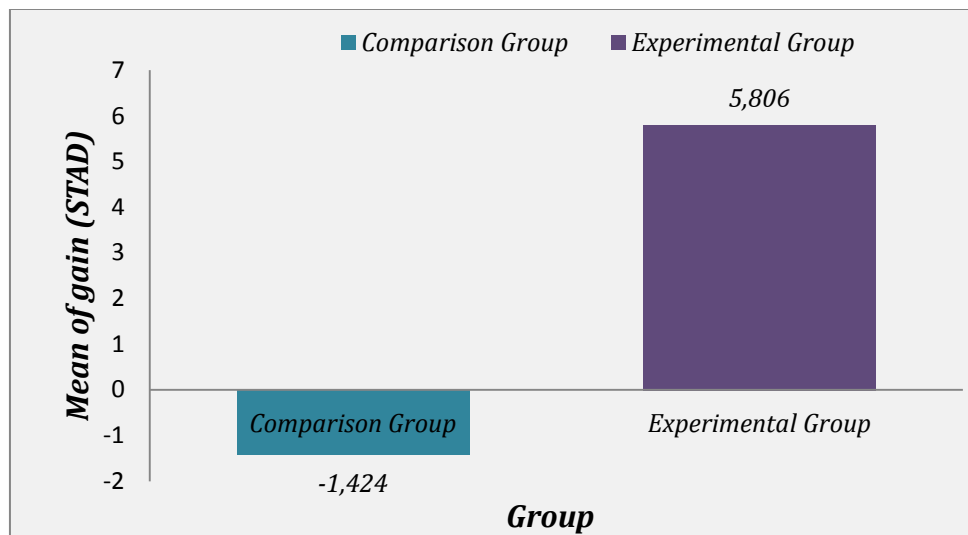


Figure 4.11: Mean change (difference between pretest and posttest) in STAD scores

It can be observed that while the experimental group improves their performance, scores in the comparison group decrease. We calculated significant differences for measures,  $F(1.150) =$

81.625,  $p < 0.001$ , partial  $\eta^2 = 0.352$  and interaction (measures and group),  $F(1.150) = 222.132$ ,  $p < 0.001$ , partial  $\eta^2 = 0.597$ . This result revealed an important significant effect of the experimental factor.

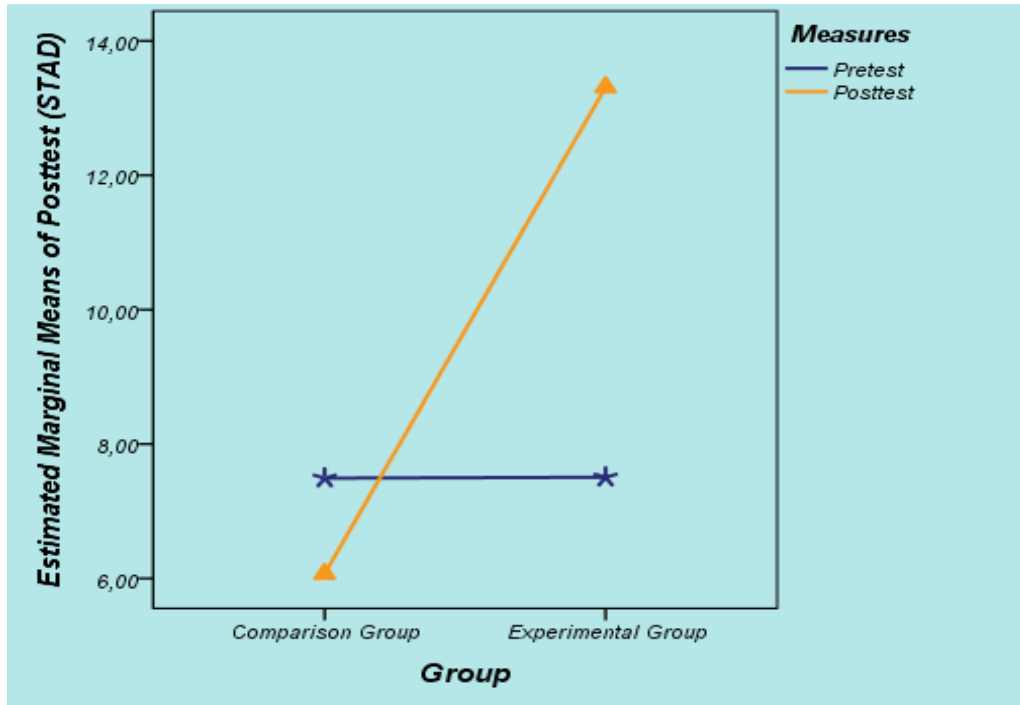


Figure 4.12: Diagram showing the interaction pretest-posttest in the two groups

The analysis of interaction as it is shown in figure 4.12, displayed a significant difference in pretest and posttest (STAD) for comparison group and experimental group students ( $p < 0.001$ ); meaning that, students' performances are significantly different in the two groups. Therefore, we have enough evidence to affirm that the use STAD technique significantly improves students' performance.

## **CHAPTER FIVE**

### **DISCUSSION OF FINDINGS, RECOMMENDATIONS AND CONCLUSIONS**

The objective of this study was to investigate the use of cooperative learning techniques on students' academic performance of secondary school students in the Government Bilingual High school Etoug-ebe in the Yaounde VI subdivision, Mfoundi division of the Centre Region of Cameroon. The main research instruments used for this investigation were test. Three research hypotheses were formulated alongside research questions to guide the investigations. The data collected were analysed using the T-test, Multivariate Analysis of Variance (MANOVA), one-way Analysis of Variance (ANOVA), Mixed ANOVA. After the verification of hypotheses, all our research hypotheses were confirmed. In this chapter, we shall discuss and analyse the findings in relation to the hypotheses, objectives and the views or findings of some authors. From this interpretation and discussion of findings, the researcher shall make her conclusion and provide some recommendations as well as suggestion for future research on the studied phenomenon. The chapter shall equally elaborate the limitations of the study.

#### **5.1. SUMMARY OF FINDINGS**

From the presentation and analysis of data in the preceding chapter, the following findings were obtained at:

Looking at the personal characteristics of the participants, a significant variation was found to exist in students' academic performance between the participants in the school. The results showed that groups have significant effects on the academic performance of students.

The results show that the variability of the posttest by groups on students' academic performance in the study was significantly different after intervention for experimental groups than for control groups in history and this difference is significant. Jigsaw (experimental group  $M = 11.612$ ,  $SD = 2.670$ , control group  $M = 6.194$ ,  $SD = 2.720$ ), peer tutoring (experimental group  $M = 6.055$ ,  $SD = 2.637$ , control group  $M = 6.070$ ,  $SD = 2.580$ ) and STAD (experimental group  $M = 13.312$ ,  $SD = 2.637$ , control group  $M = 6.070$ ,  $SD = 2.580$ ) and STAD (experimental group  $M = 13.312$ ,  $SD = 2.637$ , control group  $M = 6.070$ ,  $SD = 2.580$ )

=2.463, control group M =-1.423, SD =3.326). So it can be concluded that the use of cooperative learning techniques (Jigsaw, peer tutoring and STAD) does affect students' academic performance.

Looking at table 4.9, it shows that there were some relative differences in the Mean and Standard Deviations in the various gain scores by groups involved in the study: jigsaw (experimental group M =4.106, SD =2.636, control group M =-1.298, SD =3.586), peer tutoring (experimental group M =5.206, SD =2.762, control group M =-1.437, SD =3.367) and STAD (experimental group M =5.806, SD =2.642, control group M =-1.423, SD =3.326). The analysis of variances shown above reveals that being a student of the experimental group influences students' academic performance in a significant way as shown in the results of this study. Meaning that, students' academic achievement is significantly affected by their gain scores by groups.

Considering the pretest of the different groups, which were involved in the study, there were significantly no differences in the means and standard deviations in both groups involved in the study. The overall analysis revealed that pretest scores are not significantly different in the two groups on students' academic achievement. Meaning that, pretest scores does not significantly affect students' academic performance.

Looking at the different research hypotheses, with respect to the independent variable and the dependent variable, the results show major strong correlations between our study variables, namely between the independent variables (cooperative learning techniques) and the dependent variable (students' academic performances). The results obtained were as follows:

- The use of jigsaw cooperative technique significantly improves students' academic performance in history. The mean values for the pretest and posttest measurements of the control group for jigsaw score were  $7.493 \pm 2.280$  and  $6.194 \pm 2.720$ , respectively. As for the mean values for the pretest and posttest measurements of the experimental group for jigsaw score were  $7.506 \pm 2.314$  and  $11.612 \pm 2.670$ , respectively. This result revealed an effect size coefficient (1.992) value calculated between posttest and pretest for Jigsaw. As for the change, the mean for pretest and posttest measurements and gain scores for the comparison group ( $-1.298 \pm 3.586$ ) and experimental group ( $4.106 \pm 2.636$ ), with an effect size value of 1.507 which represents a large effect. It can be observed that while the experimental group improves their performance, scores

in the comparison group decrease. We calculated significant differences for measures,  $F(1, 150) = 30.645$ ,  $p < 0.001$ , partial  $\eta^2 = 0.170$  and interaction (measures and group),  $F(1, 150) = 113.564$ ,  $p < 0.001$ , partial  $\eta^2 = 0.431$ . This result revealed an important significant effect of the experimental factor.

- The use of peer tutoring cooperative technique significantly improves students' academic performance in history. The mean values for the pretest and posttest measurements of the control group for peer tutoring score were  $7.493 \pm 2.280$  and  $6.055 \pm 2.637$ , respectively. As for the mean values for the pretest and posttest measurements of the experimental group for peer tutoring score were  $7.506 \pm 2.314$  and  $12.712 \pm 2.730$ , respectively. These results revealed an effect size coefficient (2.524) value calculated between posttest and pretest for peer tutoring. As for the change, the mean for pretest and posttest measurements and gain scores for the comparison group ( $-1.437 \pm 3.367$ ) and experimental group ( $5.206 \pm 2.761$ ), with an effect size value of 1.973 which represents a large effect. It can be observed that while the experimental group improves their performance, scores in the comparison group decrease. We calculated significant differences for measures,  $F(1, 150) = 57.368$ ,  $p < 0.001$ , partial  $\eta^2 = 0.277$  and interaction (measures and group),  $F(1, 150) = 178.281$ ,  $p < 0.001$ , partial  $\eta^2 = 0.543$ . This result revealed an important significant effect of the experimental factor.

- The use of students' team achievement division (STAD) technique significantly improves students' academic performance. The mean values for the pretest and posttest measurements of the control group for STAD score were  $7.493 \pm 2.280$  and  $6.070 \pm 2.280$ , respectively. As for the mean values for the pretest and posttest measurements of the experimental group for STAD score were  $7.506 \pm 2.314$  and  $13.312 \pm 2.643$ , respectively. These results revealed an effect size coefficient (2.807) value calculated between posttest and pretest for STAD. As far as change was concerned, the means for pretest and posttest measurements and gain scores for the comparison group ( $-1.424 \pm 3.326$ ) and experimental group ( $5.806 \pm 2.643$ ), with an effect size value of 2.173 which represents a large effect. It can be observed that while the experimental group improves their performance, scores in the comparison group decrease. We calculated significant differences for measures,  $F(1, 150) = 81.625$ ,  $p < 0.001$ , partial  $\eta^2 = 0.352$  and interaction (measures and group),  $F(1, 150) = 222.132$ ,  $p < 0.001$ , partial  $\eta^2 = 0.597$ . This result revealed an important significant effect of the experimental factor.



## **5.2. DISCUSSION OF FINDINGS**

The discussion of the findings will be based on the hypotheses stated above. These discussions are as follows.

### **5.2.1. The use of jigsaw technique and the academic performance of secondary school students**

The findings show that jigsaw cooperative learning technique significantly has an impact on students' performance in history in secondary schools. The mean score of the experimental group that is exposed to jigsaw cooperative technique stood to a difference of 4,106 against the control group who had a value of -1,298. The value of the t-statistic obtained is  $F(1, 150) = 30.645$ , and interaction (measures and group),  $F(1, 150) = 113.564$ , with a  $p\text{-value} < 0.001$ , (less than 0.05). This result shows that the use of jigsaw technique promotes good performance and active student participation, and this shows jigsaw technique has a great impact on students' academic performance.

Also, the mean of the experimental group which was exposed to jigsaw technique is higher than that of the control group. Implying that student academic performance significantly increased. The null hypothesis was rejected, and the alternative hypothesis was accepted. This explains why Vygotsky (1972) further explains that the upper limit in the Zone of Proximal Development can only be fruitful through social interactive support from peers and teachers. This means that as learners interact together, their students' performance is positively influenced. In addition to that, Vygotsky (1972) in his Zone of Proximal Development points out that when learners work in team or small groups; the weaker students benefit from the more knowledgeable ones. That is to say through collaboration or interaction, learner's cognitive skills that is in the process of maturing can be honed.

As earlier mentioned, the jigsaw process in the treatment group required students to read and learn the assigned material, to move from home groups to jigsaw groups to help each other to learn their assigned learning materials and back to teach other members what they have learned from their experience in the jigsaw groups. Consequently, skills were enhanced by the exchanging and sharing of information and the cooperative discussion held by students in the group. Since every student in the treatment group was responsible for a small part of the tasks

and had to teach it other member, this feeling of having a specific responsible role enhanced central position in the construction of knowledge. The jigsaw cooperative technique involved higher participation in the process of learning and had a greater performance in their posttest than the comparison group. This is because they were equipped with skills in terms of teaching others and elaborating ideas on the concept taught in the learning process. Also, Students taught by the Jigsaw cooperative technique made use of groups and less frequent use of element of lecture during instructions than those taught by the conventional method. This finding validates the results of some earlier studies done by authors for instance Naomi (2013) which indicates that jigsaw technique promotes students' academic performance.

### **5.2.2. The use of peer tutoring technique and students' academic performance of secondary school students**

The findings confirm that peer tutoring has an impact on students' academic performance. Judging from the collected and analysed data, it was realized that peer tutoring technique impacts students' academic achievements. The mean score of the experimental group that is expose to peer tutoring cooperative technique stood to a difference of 5.206 against the comparison group whose score was -1.437. The value of the t-statistic obtained with a p-value < 0.001, (less than 0.05). Students taught by the peer tutoring cooperative technique perceived made use of groups and less frequent use of element of lecture during instructions than those taught by the conventional method. Furthermore, the mean of the experimental group which was exposed to peer tutoring technique is higher than that of the control group. Implying that student academic performance significantly increased. The null hypothesis was rejected, and the alternative hypothesis was accepted. Furthermore, peer tutoring improves not only the tutees performance but also the tutors.

Is in the same light that Vygotsky says that, unless persons work cooperatively, they will not grow intellectually and the time person's work alone should therefore be minimized. In addition to that, a central concept is the zone of proximal development, which is the zone between what a person can do on his or her own and what the person can achieve while working in cooperation with older individuals or more capable peers.

Also, Davis (1993) says learners perform better and are able to retain knowledge longer and course materials when they learn in peer. To him, establishing the appropriate conditions for

learning in a group setting is a critical component for success. This is because, one of the conditions requires that the teacher should see in to it that, individual members in a group are actually working on the material given rather than, simply taking credits for other group members. If the group members properly managed, it's going to influence their students' performance. Gillies (2007), also stresses that students working together are more motivated to achieve than they would be when working individually.

### **5.2.3. The use of student team achievement division technique (STAD) and academic performance of secondary school students**

Judging from the collected and analysed data, it was realized that Student Team Achievement Division technique impacts students' academic achievements. The mean score of the experimental group that is expose to students team achievement division technique stood to a difference of 5.806 against the comparison group whose score was-1.424. The value of the t-statistic obtained with a p-value < 0.001, (less than 0.05). Also, the mean of the experimental group taught with STAD technique indicated that students performed better than students taught using the lectured method. In this light, the null hypothesis was rejected, and the alternative hypothesis was accepted. The mean of the posttest for students taught with the STAD technique indicated that experimental group performed better than the control group taught with using the lecture method.

It is in the same view, Johnson and Johnson (1989) says when group members have high commitment towards attaining group goals they tend to perform better and will influence student's performance. Without an objective (goal), groups will eventually splinter in to separate individuals working towards their own personal agenda or better still members become less committed to group's task; and not for the common good of the group which will have an influence on student performance. Members know what is expected of them and know that they will be held accountable by other group members will stay committed to the objectives of the group which will equally students' performance.

The Student Team Achievement Division cooperative technique involved active learning in the process of learning and had a greater performance in their posttest than the comparison group. This is because they were equipped with skills in terms of teaching others and elaborating ideas on the concept taught in the learning process. This finding validates the results of some earlier

studies done by authors for instance Huang (2011) which indicates that STAD technique promotes students' academic performance.

### **5.3. PRACTICAL IMPLICATION OF THE STUDY**

Jigsaw cooperative learning techniques bring about division of labour as some members may opt to take up particular tasks which will in turn influence performances be it in their expert groups or even in a company. From this cooperative learning technique, learners will be aware that collective effort is necessary for success in life. Nobody has a monopoly of knowledge so the more we interact, the better the ideas the better the output of the school or company. Through this technique, social skills like communication are inculcated in the learners which will be used back in the society since the school is a subset of the society.

Peer tutoring cooperative learning will make the learners to understand as well as the society the outcome if group members are not well tutored; they will be a problem on learner's performance because the learners will work the way they are pleased and at their own convenient, which will influence performance. Be it in a company, tutors must direct or guide the activities of employees; they should be able to tutor a team.

A study like this will enlightened the teachers on how to manage the learners when they work in group through defining the different activities they have to do during the teaching and learning process to ensure that learners have learnt what is expected of them and as such improve classroom performance.

### **RECOMMENDATIONS**

After a study of this nature, the researcher came out with some recommendations. The aspect of poor academic performance and low rate of academic achievement of secondary school students have become a great problem nowadays. Thus, the recommendations will be important to the school administrator, teachers and to students.

#### **To the school administrators**

They should organize seminars for the teachers in order to equip them with skills and techniques that will enhance the use of cooperative learning. They should also provide teachers with the

necessary facilities needed for the implementation of cooperative learning techniques. This is because if cooperative learning is effectively managed, it increases students' performance. The results of this research indicate that co-operative learning techniques can be an effective instructional method for attaining secondary students' achievement in History. Thus, co-operative learning techniques can be used to supplement other teaching methods used in teaching history.

#### **To Teachers:**

Cooperative learning techniques influences students' performance so the teachers should be trained more on the use of cooperative learning techniques since one of the goals of teaching is to see the learners succeed. Moreover, tests further illustrate that cooperative learning techniques builds other skills in the learners that does not only end at making the learners perform well but to equally help him or her integrate in the society. Thus, teachers should be trained on the skills and techniques that will enhance better use and management of cooperative learning so as to enhance learner's performance. They should see in to that learners are given the opportunities to work in group to enable them to develop other social skills.

#### **To Learner:**

Let them to be exposed to cooperative learning techniques right from the beginning of the academic year. This is to enable them become use to so as they grow older; because from what the researcher noticed was that some learners were not too comfortable working as team from the first day and they were only struggling to project their own self-interest, which had an effect on some performances of the students. Students should work hand in globes with teachers in order to enhance effectiveness in the teaching and learning process when cooperative learning is concerned.

#### **Limitations of the Study:**

The researcher faced some difficulties in the course of carrying out the study such as:

Addition of new students in the classes after the pre-test had taken place and students have been split in Groups due to the crisis in the South west and North-West region. This stressed up the researcher because she had to plead with the administration to put the students in the other class since the activity had already began.

Time allocated for History (50minutes) was small for effective interaction to take place in the classroom environment. The researcher had to make use of the time to ensure that objectives is been attained.

### **Suggestions for Further Research**

This study investigated the impacts of cooperative learning on students' performance in Government Bilingual High School, Etoug-ebe. For further research; studies can be carried out in the following light:

- The study can be carry out in primary school (the use of cooperative learning techniques and its impacts on Pupils in primary school in the center region).
- Future research should include other school types like denominational and lay privates, for its findings to be generalized at its utmost.

## GENERAL CONCLUSION

Academic achievement is a subject which has attracted academic, professional as well as public attention, due to its multifaceted nature and its importance in the society. Since success is a result of how students have to be flexible and creative so as to think critically, solve daily life problems, interact, communicate, and use social skills appropriately in order to contribute to the growth and development of the society. From the proverbs that goes thus 'two heads are better than one' and the school being a subset of the society in which we belong and live, young people (students) have to come to the understanding that they cannot succeed all by themselves for they need to work with others (cooperate) to succeed. Thus, working with peers today in little group is orientating them for the larger society of tomorrow.

The principal objective of the study was to investigate whether the use of cooperative learning techniques (jigsaw, peer tutoring, and student team achievement division) improves students' academic performance of secondary schools. Three specific hypotheses were derived from the general hypothesis. 152 students were chosen from three History students (3B &3C) in a selected secondary school (Government Bilingual High School Etoug ebe) in the Yaoundé VI sub division were used as the sample population. Based on the confirmation of the research hypotheses, it was therefore concluded that there is a significant relationship between cooperative learning techniques and students' academic performance.

However, note should be taken that cooperative learning does not only influence academic performance but equally enhance the development of appropriate social skills. Let teachers and learners be educated more on the techniques of cooperative learning to enhance efficient use of cooperative learning in the classroom so as to keep on improving on classroom output.

In conclusion, the chapter equally provided some difficulties encountered by the researcher and also provided recommendation to the school administrator, teachers and learners of our educational system to which can bring about an improvement in students' performance. In addition to that, the researcher also provided some suggestion for future study on the problem. The study was to measure the extent to which the use of jigsaw technique, peer tutoring and Student Team Achievement Division has an impact on students' academic performance in history in secondary school. The results showed that all the null hypotheses were rejected, and the alternative retained. Thus, the use of cooperative learning techniques significantly influences students' academic performance in History.

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## APPENDIX

### QUESTIONS

#### Jigsaw Cooperative Learning Technique

##### Posttest First Test

**Instructions: read the questions and answer the following questions by listing out the answer short notes. Time (30 minutes).**

- a) List out reasons why Britain, France and Germany scrambled for Cameroon? (10marks)
- b) List out the Roles played by the chiefs during the scramble for Cameroon? (10marks)

#### Peer Tutoring cooperative learning technique

##### Second Test

**Instructions: read the questions and answer the following questions by writing down short notes. Time (30 minutes).**

- a) How did Germany, Britain and France contribute to the Scramble of Cameroon?  
(10marks)
- b) How the Natives rulers contributed to the scrambled for Cameroon? (10marks)

#### Student Team Achievement Division cooperative learning technique

##### Third Test

**Instructions: read the questions and answer the following questions by ticking the right answers. Time (30 minutes).**

- 1) The various powers that contributed to the scramble except one?
  - a) Germany
  - b) France
  - c) Portugal

- d) Britain
- 2) The various chiefs that signed the treaty during the scramble except one?
- a) King Akwa
  - b) King Big batanga
  - c) King locko priso
  - d) King Bell
- 3) France opened trading station on the southern coast of Cameroon except?
- a) Victoria
  - b) Malimba
  - c) Grand Batanga
  - d) Campo
- 4) Various kings that requested for British annexation except one?
- a) King Bell
  - b) King Lock Priso
  - c) King Akwa
  - d) King big batanga
- 5) Main reasons why Hewett came late for annexation?
- a) Because he wasn't interested in Cameroon.
  - b) They didn't want trade conflict among the Natives.
  - c) They did not know of Nachitgal plans.
  - d) They did not know of the potentials Cameroon had.
- 6) Tick two reasons why the British did not worry about their falling trade?
- a) Because they signed treaties with the chiefs
  - b) They gave bribes to the natives.
  - c) They were more interested in East Africa than Cameroon
- 7) One word to describe the "scramble" can be



a) Mad rush

b) Fighting

c) Pressure

d) Desperate

8) Year which Cameroon was finally annexed

a) 12<sup>th</sup> July 1884

b) 12<sup>th</sup> June 1884

c) 12<sup>th</sup> July 1848

9) One political reason why Britain scrambled for Cameroon

a) 12<sup>th</sup> July 1884

b) 12<sup>th</sup> June 1884

C) 14<sup>th</sup> of July 1884

10) One social reason why Britain scrambled for Cameroon

a) 12<sup>th</sup> July 1884

b) 12<sup>th</sup> June 1884

C) 14<sup>th</sup> of July 1884

***Title: experimental procedure***

<b>Phase</b>	<b>Objectives</b>	<b>Experimenters (researcher) activity</b>	<b>Groups</b>	<b>Duration</b>
First phase : pretest	Verify the similarity of the groups at the beginning	Give a pretest	CGr & EGr	50 minutes
Second phase : experimentation	Introduction of cooperative learning techniques	Jigsaw Peer tutoring Student Team Achievement Division	EGr	50 minutes
Third phase : post test.	To verify the effects of the treatment	Give a Posttest	CGr & EGr	50 minutes

## LESSON PLAN

<b>Stages</b>	<b>Resources</b>	<b>Teachers activity</b>	<b>Student activity</b>	<b>Didactics materials</b>	<b>Teaching technique</b>	<b>Evaluation</b>
Revision of previous knowledge (2minutes)	What do you understand by the phrase “going after something”? What do you understand by the term scramble? List the various powers involved in the scramble?	Ask students to think and come out with the definition. Ask them to list the different powers involved in the scramble?	Student listens to question? Answer questions by gesticulating (hands up).	Questions from notes		Diagnostic evaluation
Presentation of the lesson objectives (20 minutes)	List out what the learners should be able to do at the end of the lesson. (Explaining using the different techniques).  Why Britain, France and Germany scrambled for Cameroon (political, economic and social reasons)	List out the objectives of the lesson  Present the lesson.  Give the instructions to the lesson.  Listen to their point of view in regard to the lesson	Listen to the objectives (pay attention). listening  Follow instructions given from the teacher  Give their points of view	Chalk board Exercise books Pictures	Lecture method	
Formulation of heterogeneous groups with their group roles that is meeting their group mates and sitting in a circular manner (5 minutes)	Students groups of different abilities were formed. They were given different roles to play during the work (activity).	Formulate the different groups. Assign different roles to the students in the various groups.	Sit in class according to their groups. Take responsibility of their role	Chalk board	Cooperative learning techniques	

Task proper (20 minutes)	Why did Germany succeed to annex Cameroon? Why Britain, France, Germany scrambled for Cameroon?	Assign tasks to students in their various groups Monitors and intervenes when necessary	Work in groups to accomplish tasks. Ask questions to teachers were there is doubt or a need?	Chalk board	Cooperative learning techniques (jigsaw, peer tutoring, Student Team Achievement Division)	
Evaluation (3 minutes)	Why did Germany succeed to annex Cameroon?	Ask students questions Clarifies students on what not understood. (Summarizing the lesson).	Answer questions Take down corrections Ask questions	Chalk board		Formative evaluation

***Title: Lesson plan for a lesson using cooperative learning techniques.***

**Source: Dimu Tongmo Winnie (2017).**

**STUDENTS WORKING IN THEIR VARIOUS COOPERATIVE GROUPS  
USING THE DIFFERENT TECHNIQUES OF COOPERATIVE LEARNING IN  
CLASS**

**A) STUDENTS WORKING IN THEIR EXPERT GROUP USING THE JIGSAW COOPERATIVE LEARNING  
TECHNIQUE**



**B) STUDENTS WORKING IN THEIR VARIOUS GROUPS USING THE PEER TUTORING COOPERATIVE LEARNING TECHNIQUE**



**C) STUDENTS WORKING IN THEIR VARIOUS GROUP USING THE STUDENT TEAM ACHIEVEMENT  
DIVISION COOPERATIVE LEARNING TECHNIQUE**



**Title: Marks obtained from the Pretest and post test in the Experimental and Control Group.**

<b>NAMES</b>	<b>GROUPS</b>	<b>Age</b>	<b>GENDER</b>	<b>PRETT</b>	<b>JIGSAW</b>	<b>PEERT</b>	<b>STAD</b>
Abuacho precious	Egr	13	Female	8	15	15	14
Afana takam steve	EGr	14	Male	7	17	18	17
akawung Nathalie	EGr	14	Female	6	15	13	16
Akukulong Enock	EGr	13	Male	9	16	18	17
Akum faith enih	EGr	14	Female	10	13	14	14
Albright bobeyega Gwangw	EGr	13	Male	5	9	10	10
Amougou minoue	EGr	15	Male	10	15	16	15
Anoba ngoke welly	EGr	13	Female	6	10	12	11
Asah mbom diland	EGr	14	Male	4	9	12	13
asah precious foyam	EGr	14	Female	9	13	12	14
Ashu nsemeyong Daniel	EGr	14	Male	8	12	10	14
Ashu obi joy fbai	EGr	12	Female	8	10	12	11
Efuetlancha Glenn Tanze	EGr	13	Female	8	17	18	18
Fanka sandra Nyanyoh	EGr	14	Female	10	14	17	16
Favour Ranibel Shimenyi	EGr	12	Female	8	10	14	13
Fon Anyim Benila	EGr	15	Female	10	12	14	13
Fotio yimlong junior	EGr	12	Male	6	10	12	12
Fotso Megaptche Carolin	EGr	14	Female	2	8	9	9
Gueban Sana Olsen Dian	EGr	13	Female	8	10	9	12
Guevara Tsapo Manuella	EGr	13	Male	8	12	10	13
Jaibe Clavel Binnyuy	EGr	14	Male	7	10	11	11
Jatsa Chirole	EGr	13	Male	9	10	11	12
Jiogo Divine Ngemoh	EGr	12	Male	10	16	16	17
Kernyuy Larissa Yufernyu	EGr	13	Female	11	16	18	17
Kouba Djoumessi Joel	EGr	14	Male	8	10	8	12
Kufe Wally Kongnyuy	EGr	14	Male	12	13	12	14
Kwasse Yvette	EGr	14	Female	10	9	12	12
Kwenyi Brandon.N	EGr	14	Male	8	10	8	12
Maga Meutchadje	EGr	12	Female	7.5	10	11	14
Magatsing Ruth	EGr	12	Female	7	8	9	9
Mangola Moinas Bake	EGr	13	Female	4	12	12	13
Marie Noela Ngikwoh	EGr	14	Female	10	8	10	12
Massing Nicanor	EGr	13	Male	10	14	12	11
Mawamba Feze Colette	EGr	13	Female	5	9	12	12
Metiaze Djatsa Viani	EGr	14	Male	6	10	14	16
Mokeni Pembe Masango.	EGr	14	Female	6	10	11	13
Manga Sinclair	EGr	13	Female	5	10	14	13
Nayah Peaceful Ayeah	EGr	13	Female	7	9	10	10



Nchafac Lindsey Chopjun	EGr	14	Female	4	11	12	13
Ndemassong Nkengafac	EGr	13	Male	8	9	11	10
ndifon Clinton	EGr	14	Male	9.5	14	16	16
Neba Junior Shuche	EGr	13	Male	2	5	6	6
Nennbe Nehemie	EGr	14	Female	9	10	10	10
Ngangue Ashley Lucile	EGr	14	Female	10	14	15	15
Nega Boris Kwa	EGr	12	Female	6	7	10	9
Ngeafack Fabrice	EGr	15	Male	8	16	16	18
Ngo Anette Neychang	EGr	13	Female	4	9	12	12
Ngo Batoumbi Ndjock	EGr	14	Male	10	14	14	15
Ngochiabo Wirba Romaric	EGr	13	Male	7	12	14	16
Njinkeu Mbakop Fortune	EGr	14	Female	7	14	15	14
Nkengafack Medrit	EGr	13	Female	10	12	14	15
Nkongo Orook	EGr	12	Male	9	12	12	11
Noudou Paul	EGr	13	Female	5	8	7	9
Noubiwo Ngameni	EGr	14	Male	12	16	18	18
Ntamag Emile Jr	EGr	14	Male	8	10	10	12
Nwey Adje Simoni	EGr	12	Female	4	6	6	8
Nzikou Serena Vanelle	EGr	14	Female	8	12	14	14
Nzobou Temgoua Cefora	EGr	14	Female	7	9	10	14
Onya Martha Ofuibttifuh	EGr	15	Female	9	15	16	14
Peulewang Meula Yvanna	EGr	13	Female	7.5	14	14	15
Ringanyu Percy Kongnyu	EGr	13	Female	9	10	14	14
Tchakounte NOUNGWA	EGr	13	Female	9	13	14	15
Tchanga Tienjo Stivine	EGr	14	Male	7	10	14	14
Tchamtouo Chimi Dilane	EGr	14	Male	7	14	15	15
Tedjong Didjeu Pharel	EGr	17	Male	11	11	12	12
Tejou Danchi Asaph	EGr	14	Male	4	8	12	14
Tekodjo Adrien	EGr	13	Male	6	14	14	16
Tessop Tiokeng Valdes	EGr	13	Male	7	12	11	10
Tiku Quinta Tabe	EGr	13	Female	6	12	11	11
Tsombo Ghotsa emmanuek	EGr	13	Male	2	10	13	15
Verla Jevis Ndzedeyuy	EGr	12	Female	8	12	15	14
Yenessi Felix .N	EGr	13	Male	8	10	12	12
Asongu Blessing	EGr	14	Female	7	10	12	14
Lie Nou Loic	EGr	13	Male	9	12	14	15
Mbifu Juleve	EGr	13	Male	10	14	15	17
Suiyo Nadia	EGr	14	Female	2	16	15	14
Ndoh Michael	EGr	12	Male	7	14	13	15
Delle Aime Patrice	EGr	13	Male	6	13	13	14
Asonguh Olinus	EGr	14	Male	8	12	15	14

Asonguh Olinus	EGr	14	Male	11	12	15	14
Keja Mbuvi bam	CGr	12	Male	8	4	7	8
Kutwa Larrisa	CGr	15	Male	7	9	12	12
Payoong keng	CGr	13	Male	6	7	8	8
Mbella peugeot	CGr	14	Male	9	1	4	5
Gayoung ornella	CGr	14	Female	10	6	5	5
Ngenkeng glorious	CGr	12	Female	5	7	6	6
Gahbam blessing	CGr	14	Female	10	3	4	4
Ngongang kezeter	CGr	13	Male	6	10	12	12
Ngenjane Fabiola	CGr	14	Female	4	5	5	4
Nguemele djoufack	CGr	13	Female	9	3	3	3
Mbataka anne chloe	CGr	14	Female	8	5	4	5
Ngwi victory	CGr	14	Male	8	6	5	5
Orneilla favour	CGr	14	Female	8	8	8	8
Kenfou tatou	CGr	14	Female	10	4	5	4
Moveh sandra	CGr	13	Female	8	4	5	5
Ndongla keren	CGr	14	Female	10	6	6	6
Kuh lesley langi	CGr	15	Male	6	8	8	8
Aben belsha amban	CGr	13	Female	2	8	7	7
Nchang edjua	CGr	14	Female	8	10	10	10
Bih Benita	CGr	12	Female	8	8	10	10
Chelsea ngwangunu	CGr	13	Female	7	8	8	8
Akasa egoh	CGr	13	Male	9	5	7	7
Nzeuko Christ	CGr	12	Male	10	5	6	4
Kongnyuy ulrich	CGr	13	Male	2	8	7	7
Njuh falon sih	CGr	13	Female	7	9	9	9
Tanwani samole	CGr	13	Male	6	9	8	8
Nanfack tchoumo	CGr	14	Male	8	8	7	6
Youmbi brel	CGr	14	Male	11	4	6	6
Kadline muma koyo	CGr	15	Female	8	13	12	12
Fang kah asah	CGr	12	Male	12	11	11	11
Nkongho kelly	CGr	14	Male	10	10	10	11
Dongmo tsappe	CGr	13	Female	8	8	9	9
Tegha abah noela	CGr	12	Female	7.5	4	3	4
Bama seraphine	CGr	13	Female	7	2	2	2
Tandongfor Claris	CGr	13	Female	4	8	5	5
Katirmey nono	CGr	13	Female	10	3	3	4
Mapiefou chuchap	CGr	14	Female	10	1	3	2
Enyegue nsoa ulrich	CGr	13	Male	5	10	8	8
Njuakom joseph	CGr	15	Male	6	5	4	2
Njie brianno	CGr	14	Male	6	4	4	5

Tekuh Elton	CGr	14	Male	5	1	2	2
Ntin praise	CGr	14	Male	7	3	2	2
Che tem emmanuella	CGr	17	Male	4	4	2	3
Dein afuhveze mua	CGr	14	Male	8	5	5	5
Mafayo mpuesoh	CGr	14	Female	9.5	9	3	4
Rimkame nwade	CGr	14	Female	2	3	3	3
Minkem kengeni	CGr	13	Female	9	8	8	8
Ngassa shelsa	CGr	14	Female	10	5	6	4
Kelly bright mbong	CGr	12	Female	6	10	9	8
Ngenue alvine	CGr	12	Female	8	8	5	6
Isabelle antoine	CGr	13	Female	4	4	3	4
Ngoune ariel	CGr	14	Male	10	4	5	6
Nke assomo	CGr	12	Female	7	10	9	9
Nana leticia	CGr	13	Female	7	5	6	6
Mulu tasi glory	CGr	13	Female	10	13	10	11
Ngolla sabrina njuh	CGr	14	Female	9	5	5	6
Fosso steve	CGr	13	Male	5	6	4	4
Akum bahnah	CGr	13	Male	12	7	4	4
Chidera loveline	CGr	14	Female	8	10	10	8
Nkemengue brain	CGr	13	Male	4	6	6	6
Tsamo zatsa junior	CGr	14	Male	8	7	6	7
Fonang diane	CGr	13	Female	7	6	5	6
Gueban tiayo oliver	CGr	13	Male	9	6	6	6
Bongwa joel	CGr	13	Male	7.5	4	6	5
Moffo Josias	CGr	13	Male	9	3	6	4
Fube larry	CGr	13	Male	9	4	1	3
Talla wafo	CGr	13	Male	7	5	5	5
Nkenfack ngou ines	CGr	12	Female	7	5	6	4
Ngala blessing	CGr	13	Female	11	6	5	6
Ngah marion	CGr	13	Female	4	5	3	5
Asandale stephanie	CGr	14	Female	6	8	9	8
Yemata bryan	CGr	15	Male	7	4	5	4

<b>Presentation of summary of pretest results</b>		
<b>Groups</b>	<b>Experimental group</b>	<b>Control group</b>
Mean	7.506	7.493
Variance	5.23	5.87
Standard deviation	2.280	2.315

<b>Presentation of summary of posttest results</b>			
	<b>Mean</b>	<b>Variance</b>	<b>Standard deviation</b>
<b>Experimental group</b>	12.54	5.47	2.33
<b>Control group</b>	6.106	5.34	2.31
n =152			