Student Teams Achievement Division and its Effect on Junior Secondary School Students' Map Reading Skills

Kidanemariam Paulos*

Received: 10 April 2018; Accepted 23 March 2021

Abstract: The main purpose of this study was to assess the effect of the Student Team Achievement Division (STAD) learning technique on students' academic achievement. The pretest-posttest experimental and control quasi-experimental design was used for the study. The participants of the study were 91 students from the junior secondary school who were supposed to sit for Ethiopian General Secondary Education Certificate Examination. Results showed that both the experimental and control groups were almost equal in map reading skills at the commencement of the treatment. In addition, the findings of the study indicated that the experimental group significantly outscored the control group in the post-test. Results further pointed out that the comparison of mean post-test scores of high and low achievers showed a significant difference between the two groups. It was also found out that STAD was the best cooperative learning method that promoted a positive change in students' learning and perception. These findings call for, among others, reevaluation of the current geography syllabus and the teaching practices at high schools and teacher training programs to improve students' knowledge about map reading in great detail.

Keywords: *Student Team Achievement Division, Cooperative Learning, Experimental Group, Control Group, Pre-test, Post-test*

*Associate Professor, Department of Social Science and Language Education, College of Education and Behavioral Studies, Addis Ababa University. E-mail: kidane.paulos@yahoo.com

Introduction

Student Team Achievement Division (STAD), one of the most straightforward approaches to cooperative learning, was developed by Robert Slavin and his colleagues at Johns Hopkins University (Slavin, 1978). According to Slavin (1994), in STAD, students are assigned to four or five member-learning teams that are mixed in achievement level, capability, talents, gender, and ethnic background. They may work on problems one at a time in pairs, take turns quizzing each other, discuss problems as a group, or use whatever means they wish to master the material. It stimulates group responsibility to foster individual learning (Ocampo and Bascos-ocampo, 2015). In addition, Johnson and Johnson (1998) argued that STAD is used when learning goals or mastery and retention of material are essential, a task is complicated, problem-solving or high-level reasoning strategies are required. The authors further argued that a task requires, or high-quality performance. Students in each group work through the assignment until all group members successfully understand and complete the task. Some of the evaluations in STAD that can be used are group recognition, individual improving scores, quizzes, group study, or lecture presentation (Stevens and Slavin, 1995). Alongside this, Slavin (1987) adds that STAD works on a basic idea that students work collectively to learn and are responsible for their teammates' learning as well as their own, and stresses having a team objective that is reliant on the learning of all group members. During sessions, instructors merely facilitating and coaching learners with suggestions and bits of advice for further study or inquiry but do not assign predetermined learning activities. More fully, STAD can be specified as:

> … class presentations, teams, quizzes, individual improvement scores, and team recognition. By its very nature, learners first listen to the teacher's explanation of material, following which they work in mixed groups based on their ability to complete activities or worksheets, take individual quizzes, and finally recognize their team achievements (Slavin 1990: 32).

Several studies (Vaughan 2002; Jacobs; Gawe and Vakalisa. 2003; van Wyk 2010; Slavin 1994; Slavin, 1990; Slavin, 1983; Kagan, 1994; Johnson and Johnson 1998; Johnson; Johnson and Taylor. 1999; Balfakih 2003; Bernaus and Gardner 2008; Becker and Watts 1998) revealed that STAD has been practiced successfully in an array of subjects, from natural science and mathematics to social sciences, and has been used from primary through tertiary levels. Furthermore, they argued that it is one of the simplest and most extensively researched forms of all cooperative learning techniques and it could be an effective instrument, to begin with for educators who are fresh to the cooperative learning-teaching approach. In addition, Adams and Hamm (1996) state that STAD as a teaching strategy has been a success story in the transformation of education over the past decade. Similarly, studies conducted by Balfakih (2003) and Slavin (1994) revealed that STAD as an alternative cooperative learning method improves attitude, self-esteem, and interpersonal relationships that contribute to a positive attitude towards collaborative learning.

However, results of studies on reading comprehension achievement have presented contradicting evidence regarding the efficacy of STAD learning techniques. For example, Bejarano (1987); Miritz (1989), and Tan, Sharan, and Lee (2007) revealed that STAD had no positive effect on the achievement of reading comprehension skills. In addition, Susan (as cited in Slavin, 1987) argued that STAD as an instructional strategy is imperfect for gifted children by concluding that making ability grouping appear disastrous for the achievement of all students. These conflicting pieces of evidence shed doubt over the nature of earlier studies and motivate further research in this area.

More likely, though, there are ample reasons for the continual downward trend in academic performance of junior secondary school students in Ethiopia, which was evidenced in the Ethiopian General Secondary Education Certificate examination, unfortunately, it was derived largely by teachers' teaching style. For example, World Bank (2018) in its study reported that teachers are available in classrooms, but their poor

teaching skills coupled with the lack of learning materials needed to teach effectively in Sub-Saharan schools, resulted in unacceptably low learning achievement. Unfortunately, this is also true to Ethiopian secondary schools and has become a source of concern for this study. Therefore, educators need to find the appropriate methods to teach to minimize achievement loss, using the resources available to them. Thus, being aware of learning techniques and their roles in academic achievement is of vital importance for junior secondary school teachers. This is because, as stated by Mosha (2006), teaching staff and teaching methods are the foundation of quality education at all levels of education.

Map reading is considered as an aspect of physical geography that develops a learner's critical thinking ability in understanding the spatial relationship among various features of the earth's surface (Emmanuel, 2020). However, Emmanuel (2020) argued that in most cases high school students are believed to have difficulty in learning this aspect of physical Geography. The same author further argued that "A lot of students perform poorly in it as they are always scared of this aspect of Geography (Emmanuel, 2020, p. 405). In a similar vein, a study on Geography literacy among undergraduate university students in Ethiopia revealed that "students' geographic literacy in all the tests was found to be low" (Mekonnen, 2020, p. 1). However, little is known about high school student's knowledge of geography particularly map reading (Mekonnen, 2020).

Based on the researcher's sufficient familiarity with the STAD learning method, the inconclusiveness of the existing studies on the degree of efficiency of this technique in various subjects, and the existing teaching-learning practice which is dominated by chalk and talk, memorizing, and individual pupils' work on observed map reading topics in a selected school for study; this study, therefore, was designed to assess the effectiveness of STAD learning method at Dejach Belay Zeleke junior secondary school Students’ map reading skill.

Statement of the Problem

The Ethiopian government, in partnership with donors, has invested heavily in improving the quality of education. The General Education Quality Improvement (GEQIP) Package is a reform program that has been designed to scale up government efforts to improve the quality of general education (MoE, 2007). The remarkable achievements in access are of little meaning if they are not accompanied by improved students' learning (World Bank, 2018). If students do not acquire significant knowledge and skills, Ethiopia will not be able to compete within an international economy (MoE, 2010). Quality is also a crucial challenge at the secondary education level due to the rapid expansion of secondary level institutions, which need colossal attention on the quality enhancement concerning teachers' competence and material resources (MoE, 2010). Educators have denounced teacher training and concerned organization for extreme quantitative growth and meager quality (Dilshad, 2010).

Moreover, the quality of teacher education and educators' competency has been cross-examined and criticized frequently by the concerned stakeholders (Ibid). Though the evidence at hand is limited, especially concerning secondary school map reading competency, the available ones on mathematics competency indicate two types of problems: (1) content and pedagogical knowledge of teachers is low; and (2) there are inequalities in the state of learning resulting from differences in location of residence (urban-rural), sex, income level, parental education, and related factors (Tilaye & Bediru, 2006). Moreover, poor student performance and teaching methods, declining numbers of teachers, inadequate facilities, and scarce teaching materials (World Bank, 2018 and HDRC, 2011) characterize the secondary education system in Ethiopia. Furthermore, it is rather ill-fated that in education a great deal of time and effort is devoted to the attainment of knowledge still, very little is known about how long this comprehension is retained. Educators and researchers have frequently argued that teaching with a direct lecture method makes students passive in the classroom that

encourages a drop in attendance and decreases their retention of knowledge (Vaughan 2002). However, lecturing remains one of the popular methods for passing information and ideas by teachers in Ethiopia that leads to low academic achievement, loss of information, and poor retention (Biadgelign, 2010). Therefore, the choice of a suitable learning method and teaching strategy is essential to the success of the teaching and learning process.

Even though, research evidence regarding the best method of teaching revealed that there is no single, reliable, multi-purpose method that can be considered as the best, the researcher thought the most suitable strategies for teaching a practical oriented subject like map reading is STAD because it can be very effective for illustrating concepts in class. Therefore, this study attempts to address this problem by comparing the effectiveness of the lecture method and STAD cooperative learning method in enhancing students' academic achievement in map reading skills.

Research Questions

This study sought to provide answers to the following leading research questions.

- Is there a statistically significant mean difference between the STAD learning approach and the direct instruction approach on students' map reading achievement scores?
- Is there a statistically significant difference between high and low achievers of control and experimental groups on the post-test map reading achievement scores?
- Is there a significant difference between the mean score of high and low achievers of the control and experimental groups on the retention test?
- What are the perceptions of students about the cooperative learning method?

Based on the above questions, the following null and alternative hypotheses were generated: There are no statistically significant mean differences in students' gain among those who are taught map reading skills using STAD at *P<0.05*. There are statistically significant mean differences in students' gain among those who are taught map reading skills using STAD at P<0.05.

Objectives of the Study

The main objective of this study is to assess the effect of the Student Team Achievement Division learning technique on students' map reading achievement in the teaching of some units of geography in grade 10. Specifically, the study is conducted to:

- Determine whether cooperative learning is more effective than the traditional method of teaching regarding the academic achievements of students in map reading.
- Identify the effects of cooperative learning on the high and low achievers of control and experimental groups on the post-test in map reading.
- Examine the effects of cooperative learning on the retention of students in map reading.
- Explore the perception of students about the cooperative learning method.

The Scope and Limitations of the Study

The study was delimited to only the Students Teams Achievement Division (STAD) method of cooperative learning. The study may lack external validity since the sample size was small concerning the total population of the junior secondary school students across the city. Besides, the study lacks a random assignment of subjects. In addition, not all variables employed in previously conducted international studies were included. Furthermore, there was a paucity of published research

outputs in the country that focused and discussed the related study problem.

Operational Definition of Terms

*Cooperative Learning***:** group work to accomplish mutual learning goals.

*Team***:** students who share a common team purpose and several challenging goals.

*Achievement***:** the extent to which a student has attained his/her short or long-term educational goals.

*Low-achieving Students***:** Students placed in the lowest academic track based on tested ability level.

*Heterogeneous Mixture***:** grouping students with varying performance levels and gender to provide equal and quality instruction to all.

Research Design and Methodology

Research Design

For this study, a quasi-experimental method that employs a pretest-posttest nonequivalent group design was employed. The key difference in this empirical approach is the lack of random assignment (Gray, 2004). Representatively the design corresponds to the pre-test for the experimental and control group respectively (X_1 and X_3) and represents post-test for the experimental and control group respectively (X_2 and X_4). Here the cooperative learning method was applied to the experimental group students while the traditional teaching method to the comparison group students. The independent variables of the research consist of the STAD method and traditional teaching method and these teaching methods were applied to students on the same topics for the same duration of one month (12 sessions). The academic achievement pre-

test, post-test, retention test, questionnaires that were distributed to the students concerning the treatment effect as well as observations are all the dependent variables of the study.

Subjects and Sampling Technique

The target population of this study was students of grade 10 in Dejach Belay Zeleke junior secondary school found in Addis Ababa City. The researcher chose the school purposely because it is convenient to execute the research by giving treatment in a school, which is not far from the researcher-working place. A random sampling technique was used to select the two sections from the total of 9 sections that took part as the experimental and control group in the study.

Instruments

To answer the research questions and to collect data, map reading achievement tests were used. The calculated value for the item difficulty level and item discrimination index is found to be greater than 0.73 and 0.8 respectively by discarding one item, which does not meet the criteria of a good item from the post-test exam without reducing the content validity. Using the Kuder Richardson (KR-21) reliability coefficient formula, the calculated coefficient reliability was equivalent to 0.73 for pre-test, 0.876 for the post-test, and 0.881 for long–term retention test respectively. The validity of questionnaires was insured through the expert opinion of two geography professors of Addis Ababa University and two geography teachers of the targeted group as panels of experts. The attitude inventory consists of 20 questions rated on a Likert-type of scale that ranges from strongly agree to strongly disagree with measuring the perceptions of experimental and comparison groups towards the STAD and direct teaching methods were employed. The items were worded both positively and negatively to reduce the risk of obtaining false responses. A neutral score occurred if students answered primarily in the mid-range of 3.0 thus, a score of 60 (3 X 20) had taken as a neutral position. The collected data were analyzed using inferential

statistics like independent sample t-test and descriptive statistics such as percentages, frequency distributions, mean scores, and standard deviations.

Procedure

Following the assignment of treatment and control groups randomly, the students in both classes were pre-tested on their prior knowledge of lesson content. The selected map reading topics for conducting the study were: Direction on maps; Position on maps; Map enlargement and reduction, and Relief on maps.

The experimental group was taught with the STAD method of cooperative learning for the duration of treatment, and the other group that was used as the comparison group was taught with the traditional learning technique.

Pre-test scores were used to provide an information base that serves to compare post-test scores to determine if the STAD method was effective in improving academic attainment. Following the pre-test, the 45 students in the experimental group were divided into nine groups of five members. The students were assigned to groups in such a manner as to reflect a heterogeneous mixture of academic ability and gender. Thus, in an experimental class five-person team that includes three boys and two girls; one high performer, one low performer, and three average performers. Of course, "high" and "low" are relative terms, relating to high and low for the class rather than to national levels. These experimental groups were trained in cooperative learning skills such as problem-solving skills, planning, agreeing on roles, decision making, creating a group environment, etc.… earlier to the treatment sessions. In addition, a volunteer teacher who implements this experiment was selected among geography teachers. After that, guidance such as that was given to the teacher on the implementation of the STAD method of cooperative learning in the classroom. Following the experiment group, according to Slavin (1994), students were alienated into nine

heterogeneous groups of five students, in which each lesson conducts using the regular cycle of instructional activities of STAD as follows:

- Teaching: The teacher presented the lesson using the lecture method providing sufficient guided exercise according to the lesson plan (first day).
- Team Study: On the second day, discussion topics and problems covering the contents of the lesson taught on the previous day were provided to each cooperative group. The students worked on their teams to master the topics (exercise).
- Test: On the third day, students continue working in their teams for 20 minutes by summarizing the important points of the lesson. In the next 20 minutes, students took an individual test (quizzes).
- Team Recognition: Team scores are computed based on team members' improvement scores and certificates recognize high-scoring teams. The treatment in the 3-days cycle continued until the end of the study.

Meanwhile, the control group was taught the same lesson contents by the same teacher by using traditional teaching techniques under the supervision of the researcher. After the treatment was over, the researcher made a post-test for both the experimental and comparison groups at the end of each of the units treated. The purpose of the post-test is to find out whether there were any achievement differences between the marks of the post-test scores of both groups of students. These tests, the pre-test, and the post-test were constructed by the researcher after a thorough review of the techniques of test construction and related units of geography topics. Alongside, both groups received the same textbook, learning materials, quizzes, assignments, and tests. The attitude of students towards cooperative learning was examined through the attitude scale inventory and teamwork satisfaction scale questionnaires after the completion of treatment.

Results and Discussion

This study aimed at identifying whether there was any significant difference between the means of the pre-and post-tests of the students of the STAD and control group achievement and attitude. As shown in Table 1, the difference between the mean scores of the experimental and control group on the pre-test was found to be insignificant (t calculated < t critical, p. 0.05). Consequently, both groups portray a low difference mean at the commencement of the survey.

Table 1. An Independent Samples T-Test Analyses of Experimental & Control Groups on the Pre-Test

Groups	*N*	*M*	*SD*	*SE*	*t*
Control group	46	35.13	13.54	2.76	-0.267*
Experimental group	45	35.91	12.58		

***Significant at p<0.05*

This finding is consistent with the research findings previously reported by Kagan (1994); Slavin (1983, 1990); Johnson and Johnson (1998); Johnson et al. (1999); Balfakih (2003); Bernaus and Gardner (2008); Becker and Watts (1998) who reported on insignificant difference between experimental and control groups on Pre-test. Vaughan (2002); Jacobs et al. (2003); van Wyk (2010) reported similar observations while studying the effectiveness of STAD cooperative learning. This result is also similar to the finding of Admas (1995) who came up with a result that revealed the low mean difference of both groups on the pre-test.

Table 2. An independent samples t-test analyses of high achievers of experimental & control groups on pre-test

Groups	*N*	*M*	*SD*	*SE*	*t*
Control group	18	45.23	4.15	1.24	-0.417*
Experimental group	21	45.76	4.11		

***Significant at p<0.05*

An analysis of the significant difference between the means of high achievers of the experimental and comparison groups on pre-test was not a principal center of this study. As shown in Table 2, no significant difference was found between mean scores of high achievers of the experimental group (M=45.76, SD=4.15) and high achievers of the comparison group (M=45.25, SD= 4.15) on pre-test; SE=1.24 t at 0.005 level. Hence, both groups were almost the same concerning the map reading skill at the commencement of the investigation and the probable reason for this result may be an unvarying traditional form of instruction.

Table 3. An independent samples t-test analyses of low achievers of experimental and control groups on the pre-test.

Groups	*N*	*M*	*SD*	*SE*	*t*
Control group	28	24.99	9.47	2.76	-0.712*
Experimental group	24	23.11	9.24		

***Significant at p<0.05*

Concerning the means scores of low achievers of the experimental group and comparison group on pre-test, the computed data (Table 3) depict the insignificant mean difference between the two groups. Therefore, both groups were equal concerning the map reading skill at the beginning of the investigation and this might be because direct teaching methods were applied to students on the same topics for the same duration.

After the implementation of teaching and exercise on the lesson plans covering four map-reading units of grade 10, the academic achievement of the control group and experimental group was evaluated through the post-test set by a researcher and schoolteacher. Table 4 illustrates that after the task, the difference between the mean scores of the experimental group (M=78.36, SD=13.81, $\alpha = 0.05$) and the comparison group (M=32.67, SD=19.87, $\alpha = 0.05$) was significant on post-test.

Table 4. An independent samples t-test analyses of experimental and control groups on post-test.

Groups	*N*	*M*	*SD*	*SE*	*t*
Control group	46	32.67	19.87	3.58	-12.87*
Experimental group	45	78.36	13.81		

***Significant at p<0.05*

The experimental group, which was exposed to STAD, had a statistically significant increase in map reading skill compared to the control group. Thus, when cooperative learning techniques are used appropriately, achievement benefits emerge to be one of the results that can be expected. This is consistent with similar achievement gains previously reported (Johnson and Johnson (1998); Nichols and Miller (1994); Slavin (1990); Balfakih (2003); van Wyk 2010). The findings of this investigation are also in agreement with the efficacy of STAD as a teaching technique for better performances in the schools (Bejarano, (1987); Miritz, (1989); Adams and Hamm, (1996) Tan et al., (2007). Nevertheless, these findings contradict the conclusions of Susan (as cited in Slavin, 1987) who reported that STAD as an instructional technique, is awful for gifted students. Conversely, many studies revealed that STAD is the most successful cooperative learning technique for increasing student academic achievement (Zenginobuz and Meral, 2008). Furthermore, research studies conducted in STAD as a teaching technique were also applied with great success in various research projects (Slavin 1994; Mills 2001). Thus, it could be said that STAD as an instructional technique constantly has positive effects on map reading skills of all thoughtful students learning. The probable reason for this result is the positive mutually understanding that encourages learners to help each other and put forth more attempts to achieve group success. Here, more likely, the students in STAD teaching technique groups receive peer encouragement and personalized support from their more competent partners. Hence, emanating from the findings of this study, it can be suggested that the STAD approach is more effective than direct instruction.

Analysis of the significance of the difference between mean scores of high achievers of the experimental group and comparison group on post-test at the end of the application found that there was a statistically significant difference at 0.005 level. Table 5 depicts that experimental students scored considerably higher (M=89.53, SD=5.27, p< 0.05) than comparison group (M=49.6, SD=15.91, p= 0.05) on Post-test.

Table 5. An independent samples t-test analyses of high achievers of experimental & control groups on post-test.

Groups	*N*	*M*	*SD*	*SE*	*t*
Control group	18	49.67	15.91	3.74	11.19*
Experimental group	21	89.53	5.27		

***Significant at p<0.05*

This significant mean difference between the two groups might be because the selected map reading topics are more or less better treated in the STAD teaching method than the conventional approach.

Similarly, the comparison of mean scores of low achievers of both the experimental and comparison groups on post-test table, 6 shows a significant difference at 0.05 level in favor of the experimental group.

Table 6. An independent samples t-test analyses of low achievers of experimental and control groups on post-test

Groups	*N*	*M*	*SD*	*SE*	*t*
Control group	28	48.96	16.81	3.74	11.19*
Experimental group	24	65.98	5.23		

***Significant at p<0.05*

To measure long-term knowledge retention, the mean scores of the experimental group and comparison group were analyzed on a retention test after four weeks.

Table 7. An independent samples t-test analyses of experimental & control groups on retention of knowledge test.

Groups	*N*	*M*	*SD*	*SE*	*t*
Control group	46	32.78	19.27	3.52	-13.47*
Experimental group	45	77.96	13.51		

***Significant at p<0.05*

The results presented in Table 5 show that students who were taught through the STAD had significantly higher mean scores (77.96) in the map reading long-term knowledge retention test than the retention mean scores (32.78) of those taught with the oratory lecture method. This result implied that the STAD method of teaching was more effective in enhancing students' retention of knowledge by internalizing the concept than the lecture method, which tends to be concept memorization. This may be because when the students observed the teacher demonstrating a given concept or model and were not fortunate to do it frequently due to non-availability or inadequacy of school cartography and map reading laboratory, the students may tend to forget. However, when they are involved in a practice session of what they already know and are doing it at home, they may care to remember it more. This finding is in agreement with Veselinovska (2011) who reported that the retention level of students taught using the cooperative teaching method is higher as opposed to the lecture method. He also established that student comprehension is enhanced with a lesson started with an experiment because laboratory activities increase students' interest in the topic. Similarly, results of a study done by Esra, Ijlal, and Ocak (2009), focusing on the effects of cooperative learning on retention in Biology, showed higher retention level in lessons beginning with experiment or slide demonstration as opposed to the lecture method. Their findings agreed with the results of previous researches that laboratory work offer students hands-on experience thus enhancing their remembrance to 90%. Furthermore, this view is strongly supported by O'Day (2009), who observed that on retention, animated slide demonstration rival and at times surpasses the pedagogical value of lab work. In addition, Esra et

al. (2009) also reported that an analysis of the scores on the 35 items delayed post-test (retention test) revealed that cooperative teaching specifically the problem-oriented group earned higher than the lecture-study question group. The use of STAD is thus encouraged since it also has a positive effect on the transfer and retention of long-term knowledge in geography.

Table 8. An independent samples t-test analyses of high achievers of experimental and control groups on retention of knowledge test

Groups	*N*	*M*	*SD*	*SE*	*t*
Control group	18	47.13	16.35	3.46	12.12*
Experimental group	21	89.87	5.13		

***Significant at p<0.05*

The data pertaining to students' mean scores of high achievers of the experimental group and control group on long-term retention of knowledge test are presented in Table 8. The results of the study revealed that at the end of the application, the difference between the mean scores of high achievers of experimental and comparison groups was substantially significant (t calculated > t critical, $p < 0.05$) on the retention test which was conducted after four weeks.

Table 9. An independent samples t-test analyses of low achievers of experimental & control groups on retention of knowledge test.

Groups	*N*	*M*	*SD*	*SE*	*t*
Control group	28	17.65	7.35	1.81	29.5*
Experimental group	24	66.95	3.87		

***Significant at p<0.05*

The mean scores of low achievers of the experimental group and control group on long-term retention of knowledge test are presented in Table 9. The data of the present study reported that at the end of the application, the mean difference was significant at 0.05 level on the

retention test in favor of the experimental group. This finding is supported by the finding of Hompton and. Grudnitski (1996) that asserted low achievers benefited from cooperative learning than high achievers.

To evaluate students' attitudes towards the traditional form of instruction and STAD as a cooperative learning method, 20 inventory items were conducted. According to the attitude test score of the students (Table 10), the mean pre-test score for both groups is statistically insignificant (t= 0.021*, p<0.05).

Table 10. Independent samples t-test attitude scale results of pre-test and post-test scores.

Tests	*Groups*	*N*	*M*	*SD*	*t*	*p*
Pre-test	*Experimental group*	45	78.13	14.56		0.265
	Control group	46	78.98	17.98	1.09	
Post-test	*Experimental group*	45	87.38	12.69	-0.021*	0.021*
	Control group	46	77.19	23.76		

***Significant at p<0.05*

The analysis of the results of the post-test on the attitude test indicates that the mean of post-test scores for the experimental group that taught through the STAD cooperative method performed better (M=87.38) compared to the control group (M=77.19). It is reasonable to claim that STAD as a cooperative learning technique, which was implemented in the experimental group has a positive attitude effect towards map reading skill than the traditional form of instruction. One can hence conclude that the findings of this study offer support for this type of instruction in promoting students' attitude and academic achievement in geography.

Conclusion and Implications

The findings of the study showed that the difference between the mean scores of the two groups on pre-test was insignificant at 0.005 level, suggesting that both groups possess almost equivalent knowledge in map reading skills until treatment. In addition, the difference between mean scores of high achievers of both groups was also insignificant at 0.05 level on the pretest. Therefore, high achievers of both groups were more or less equal in comprehension level at the commencement of the experiment in map reading units. Similarly, the independent t-test reveals an insignificant difference between the performances of low achievers of the two groups indicating that low achievers of both groups had an almost equal map reading background at the beginning of the treatment.

After the intervention, the results of the study showed that there was a statistically significant difference at the level of 0.05 between the means of the achievement of the experimental and comparison groups on the performance test in favor of the experimental group. Hence, one can conclude that STAD has positive effects on the pupils' map reading skills. Furthermore, the results of this study also revealed that there was also a statistically significant difference in map reading achievement for high and low achievers who were taught through STAD in post-test attained scores. Therefore, the STAD proved to be more effective in enhancing map reading achievements for both high and low achievers than the conventional teaching methods.

Moreover, unexpectedly the calculated result of Cohen's effect size shows that the strength of treatment effect size for low achievers is greater than high achievers students. One can hence understand, the STAD learning method appears to enhance the competence of low achiever students better than high achiever students do. The probable reason for this result is individual accountability among all group mates. Additionally, the findings of this survey suggest that STAD as a cooperative learning method is one opportunity that efficiently promotes

a positive change in students' attitudes. Moreover, from the outcome of this study and similar international studies' findings, one can hence, view the consistency of results across time and across different settings, which confirm the reliability of the study. The findings offer Ethiopian teachers more empirical provision for promoting productive changes in teaching methods to improve student learning and their attitudes toward learning. Therefore, STAD is highly recommended as an alternative instructional pedagogy in the current wave of educational quality reform in Ethiopia, especially concerning the aim of making the learning environment more thought-provoking for students. For that reason, further training and continuous professional development need for instructors.

In general, these findings can have implications not only for teachers and learners but also for syllabus designers and textbook developers. It is expected that the study will be helpful to geography teachers to comprehend better how STAD be used successfully in map reading learning classes. It is recommended that since this study focused only on the assessment of students' academic achievement exposed to the STAD learning technique in certain map-reading units thus, further studies are needed to see the effectiveness of this method on other topics of grade 10 geography. These principal outcomes call for a further comprehensive study to inspect the syllabus, curriculum, and teaching practices at high schools and teacher education programs in the Ethiopian context. Thus, a series of further studies on cooperative learning at the primary, secondary, and tertiary levels of Ethiopian education should be conducted.

Competing Interests: The author has declared that no competing interests exist.

References

Adams, D. and Hamm, M (1996). **Cooperative Learning: Critical Thinking and Collaboration Across the Curriculum**. Springfield, Illinois: Charles C Thomas Publishers.

Balfakih, N. (2003). The Effectiveness of Student Team-Achievement Division (STAD) for Teaching High School Chemistry in the United Arab Emirates. ***International Journal of Science Education*** 5(5): 605 – 624. Retrieved from <http://www. informaworld.com/ smpp/content~db=all~ content= a713864989>

Becker, W. and Watts, M. (1998). **Teaching Economics to Undergraduates: Alternatives to Chalk and Talk**. Cheltenham: Edward Elgar Publishing Inc.

Bejarano, Y., (1987). A Cooperative Small Group Methodology in the Language Classroom. **TESOL Quarterly** 21 (3), 483–501.

Bernaus, M. and Gardner, R. (2008). Teacher motivation strategies, student perceptions, student motivation, and English achievement. **The Modern Language Journal**, 92 (9): 387-401.

Biadgelign Ademe (2010). **General Learning-Teaching Methods and Techniques.** Addis Ababa University Press, Ethiopia

Dilshad, M. (2010): Assessing Quality of Teacher Education: A Student Perspective. **Pakistan Journal of Social Sciences (PJSS**). Vol. 30 (1):.85-97.

Emmanuel, B. (2020). Influence of Students Attitude on Academic Achievement in Geography Map Reading Among Senior Secondary School III Students In Oyo Metropolis, Oyo State, Nigeria. **International Journal of Scientific Research in Education**, 13(3).

Esra, O., Ijlal, O., and Ocak, G. (2009). **Sequential Teaching methods in Biology and their effects in Academic Achievement**. Kuramsal. Ataturk University press.

HDRC (2011) Helpdesk Report: Approaches to Improving the Quality of Education in Ethiopia. UK aid from the Department for International Development press.

Hompton, D. and. Grudnitski, G. (1996). Does cooperative learning mean equal learning*?* **Journal of Education for Business**. 7(5): 123-135

Gray D. (2004). **Doing Research in the Real World.** SAGE Publications: London.

Jacobs, M. Gawe, N. and Vakalisa, N. (2003). **Teaching-Learning Dynamics: A Participative Approach for OBE**. Cape Town: Heinemann Publishers.

Johnson, D.; Johnson, R. and Taylor, B. (1999). Making cooperative learning work. **Theory into Practice***,* 38(2): 67-73.

Johnson, D. and Johnson, R. (1998). **Cooperative Learning, Values and Culturally Plural Classrooms***.* Boston: Interaction Book.

Mekonnen, F. (2020). What is the level of geographic literacy among undergraduate students of Bahir Dar University**? Eastern Africa Social Science Research Review**, 36(1), 97-114.

Mills, J. (2001). Cooperative Learning: It's Here to Stay. **Essays on Teaching Excellence**, 12(8): Retrieved from <file://C:my Documents\ cooperative learning it's here to stay.htm> pdf

Miritz, M. (1989). *A **Study of Cooperative Learning Strategies for Improving Reading Achievement*.** Winscons-Madisonin University publishers.

MoE (2010). *General Education Quality Improvement Program (GEQIP):* Second Annual Performance Report.

MoE (2007). *General Education Quality Improvement Package*. Addis Ababa, Ethiopia.

Mosha, H. (2006). **Planning Education Systems for Excellence.** Dar es Salaam: E&D Limited

Nichols, J. and Miller, R. (1994). Cooperative learning and student motivation**. Contemporary Educational Psychology**, 19(2): 167–178.

Ocampo, R. and Bascos-Ocampo, R. (2015). *Effectiveness of Students' Team Achievement Division on Students' Attitude Towards Physics*. **Asia Pacific Journal of Multidisciplinary Research,** *3*(4), 112–117.

O'Day, D. (2009). FAMIS Animations as Teaching Tools and Laboratory Exercises: Their Value and How to Make in Tested Studies for Laboratory Teaching, 3 (12): 67-72.

Slavin, R. (1994). Student Teams – Achievement Divisions: STAD. Using Student Team Learning. **Journal of Psychology**, *2*(1) 43-57

Slavin, R. (1990). *Cooperative Learning: Theory, Research, and Practice.* Massachusetts: Allen and Bacon Kagan S 1994. *Cooperative Learning*. San Juan Capistrano, CA: Kagan Cooperative Learning.

Slavin, RE (1983). When Does Cooperative Learning Increase Achievement? **Psychological Bulletin**, 94: 429-445

Slavin, R. (1978). Student Teams and Comparison among Equals: Effects on Academic Performance and Student Attitudes. ***Journal of Educational Psychology***.

Stevens, R., and Slavin. R. (1995). The Cooperative Elementary School: Effects on Students Achievement, Attitudes and Social Relation. **The American Educational Research Journal**, 32 (11) 321–351.

Tan, I.; Sharan, S. and Lee, C. (2007). Group Investigation. Effects on Achievement, Motivation, and Perceptions of Students in Singapore. **Journal of Educational Research**, 100 (3) 86-96.

Tilaye Kassahun and Bedru Kedir (2006). Girls' Performance in Mathematics in Upper Primary Schools of Addis Ababa. **Indian Journal of Gender Studies**, 22 (2):94-105.

Van Wyk MM (2010). Do Student Teams Achievement Divisions Enhance Economic Literacy? A Quasi-Experimental Design. **Journal of Social Science**, 23(2): 83-89.

Vaughan, W. (2002). Effects of Cooperative Learning on Achievement and Attitude Among Students of Color. **The Journal of Educational Research**, 95(6): 359-364.

Veselinovska, S. (2011). The Effect of Teaching Methods on Cognitive Achievement, Retention, and Attitude in Biology Studying. **Cypriot Journal of Educational Sciences**. 4 (1): 75-185.

World Bank (2018). *World Development Report 2018:* Learning to Realize Education's Promise. Washington, DC