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Effects of Cooperative Learning on the Academic Achievement and attitude towards cooperative learning: the case of Dilla College of Teacher Education First Year Mathematics Students

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Abstract

The purpose of this study was to investigate the effects of cooperative learning on academic achievement and attitudes towards cooperative learning of first-year mathematics students at Dilla College of Teacher Education in Ethiopia. In doing so, a quasi-experimental study design was employed. Simple random allocation was conducted, one class ($n_1 = 38$) being considered as the experimental group, and the other class ($n_2 = 39$) being considered as the control group. A pretest was administered for both groups before conducting intervention. After eight weeks of instruction, a post-test was administered for both experimental and control group participants. Data analysis was conducted through a paired t-test to determine performance by comparing the mean of both groups at a p 0.05 level of significance. The results confirmed that there was a significant difference in mean test scores between the two groups of participants, $t = 9.358$, p 0.05, with the experimental group scoring higher than the control group. This shows that cooperative learning has great power to improve their academic performance. The descriptive result on students' attitude towards cooperative learning revealed that the majority of the respondents have a positive attitude towards cooperative learning with an over-all mean score of 4.3, which tends to the value of "Agree". This confirms that students have positive outlooks, views, and a propensity towards cooperative learning. To conclude, the results indicated that the cooperative learning approach enhances conceptual understanding more than the regular teaching method. Thus, teachers have to incorporate cooperative learning methods into their teaching-learning process.

1 Introduction

1.1 Background of the Study

According to Gocer (2010), as cited in Odagboyi and Kreni (2017), learners are not isolated individuals but part of a larger society. Children's learning is affected by their homes, parents, peers, and the community as a whole. The goal structures of individuals are directed at the same communally held objectives, and there exists a high interdependence among the goal attainments of individuals (Odagboyi and Kreni, 2017). Odagboyi (2015) also noted that classroom groups with supportive friendship patterns enhance academic learning, while interpersonally tense classroom environments in which peer group rejection is strong and frequent get in the way of learning. Cooperative learning helps satisfy many psychological conditions of man. In a follow-up meta-analysis that examined the degree

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to which achievement is positively associated with motivation in positive (i.e. students are linked together to achieve goals), negative (i.e. students compete to achieve goals), or no interdependence (*i.e.*, students work individually) situations, Johnson, Johnson, Roseth, and Shin (2014) confirmed and found that situations characterized by positive interdependence resulted in greater motivation and achievement than negative or no interdependence situations.

A study by Slavin, Lake, Hanley, and Thurston (2014) ascertained and stated that science teaching methods focused on enhancing teachers' classroom instruction throughout the year, such as cooperative learning and science-reading integration, as well as approaches that give teachers technology tools to enhance instruction, have significant potential to improve science learning and academic performance.

According to Johnson and Johnson (2015), cooperative learning is more than just asking students to sit and work together. Research has identified some components that mediate the effectiveness of cooperative learning, such as: (a) positive interdependence, which allows students to perceive that they are linked with each other in such a way that one cannot succeed unless everyone succeeds; (b) interpersonal and small group skills, which means that students must be taught social skills for high quality cooperation; (c) individual accountability, which gives each member of the group a sense of personal responsibility toward goal achievement; and (d) group processing, which exists when group members discuss how well they are achieving their goals and maintaining their working relationships (Johnson and Johnson 2015). It is thought that the use of a learning plan prepared in line with cooperative learning provides students with more efficient thinking and problem-solving skills and develops students' cooperation skills, enables them to present more extensive studies by making use of their shared experiences, and supports long-lasting learning by supporting peer learning.

A quantitative study done by Zakaria et al. (2010) as quoted in Girma (2018) on the effects of cooperative learning compared to methods that are more traditional with students from a school in Miri, Sarawak indicated that the cooperative learning approach resulted in higher achievement than the traditional teaching approaches (Girma, 2018). According to Antil, Jerkins, Wayne, and Vadasy (1998), as cited in Kefale (2015), traditional instructions, such as lectures, explanations, answer-question routines, assigning reading, and guided practice, focus exclusively on individual academic goals. Traditional methods of teaching were teacher-centered and often created classroom atmospheres in which learners competed with each other. The traditional model fosters competition rather than cooperation, which is favored by the major students. Educators also believe that minority students might fall behind higher-achieving students in this kind of learning environment, *i.e.*, traditional models of competitive learning (Kefale, 2015).

Tesera and Desta (2006) pointed out that despite the strong criticisms of the conventional teacher-based approach in education, the teaching and learning process in most schools in Ethiopia has persisted as being teacher-dominated. Most classes are characterized by a situation where students are made to listen to their teachers and copy notes from the blackboard. Learning by doing, problem solving, cooperative learning, and group approaches are limited. Furthermore, Mekonnen (2011) also said that educators broadly agree that teacher-dominated pedagogy places students in a passive role, which is undesirable. Therefore, from the above research findings, it is possible to understand that in most schools in Ethiopia, cooperative learning is neglected, though ideally the strategy is contemplated. Likewise, Dilla College of Teacher Education is expecting to practice cooperative learning strategies so as to realize the national educational objectives and produce effective teachers. However, from experience and researchers' personal observations, most teachers use old methods of lesson delivery and almost all cooperative learning methods have been put aside by most teachers. In an attempt to contribute to bridging the above revealed gap, this study tried to evaluate the effects of cooperative learning on academic achievement. In addition, it also contributes some basic knowledge or insight about the impacts of cooperative learning and attitudes towards it on behalf of students and any concerned bodies.

Thus, this study addressed the following basic research questions:

1. What is the students' attitude towards cooperative learning?
2. Does the cooperative learning approach have statistically significant effects on the academic achievement of students?

1.2 Review of literature

Basic concepts of cooperative learning

The term cooperative learning has been defined by many scholars. However, most of these attempts to define cooperative learning reflect more or less the same ideas without any radical change. Cooperative learning (CL) is not a simply collaboration or group working as students help other students within groups of four or five persons in an effort to reach goals. Jacobs (1997) as cited inTina (2014) states that CL is more than just putting students in groups and giving them a task, but it is a tool which teachers use to encourage mutual helpfulness in the groups and the active participation of all members, and therefore each of them has his/her responsibility to help all the group mates.

In cooperative learning method the realization of individual objectives is dependent on the overall success of the group. Therefore, the ones who want to be successful are forced to help other group members (Wilkinson, 1994) as cited in Bolukbas (2011). In addition, he states that cooperative learning enables fast learners to help respectively slow learners in terms of improving their skills. In other words, every learner struggles to develop both themselves and other group members because they are aware of the fact that the success of the group depends on the performance of each individual.

According to Kagan & Kagan (1998) as cited in Berhanu (2016), cooperative learning is types of structured peer interaction emphasizing positive human relationships, collaboration between peers, active learning, academic achievement, equal participation & equal status of students in the classroom. It can be used to teach any subject matter, whether that can be foreign language, math, social studies, *etc*. Ogunleye (2011) as cited in Berhanu (2016), also states that cooperative learning refers to a method for organizing learning, in which students are working with their peers towards a shared academic goal rather than competing or working separately from their peers. Although people have attempted to define cooperative learning somehow in different ways, there are some similar concepts in their definitions. Their similarity is that the idea of working together and helping one another is emphasized.

Benefits of using Cooperative learning (CL) on academic performance

In addition to what has been said in the concepts of cooperative learning, many potential benefits arise when cooperative learning is used in the classroom instruction at different levels of grades. Researchers also have argued about the superiority & effectiveness of cooperative learning over competitive and individualistic learning on different grounds.

Some of the benefits of using CL that have been suggested by different scholars are presented as follows:

(A). Students can enhance their social skills: In real life, people need to collaborate with others. In their families, on their jobs, and in their social lives, they need to be able to work with others to everyone's mutual benefits. However, schools have not done enough to prepare students to this purpose. Often times, the students are conditioned to compete with others and view others as enemies who obstruct their own success. Other pupils' failure increases one's own chances of success.

In CL groups, the students can exercise their collective skills and practice working with others to achieve mutual benefits for everyone rather than thinking competitively and individualistically (Freeman, 2000) as cited in Kefale (2015). An essential element of cooperative learning is the appropriate use of interpersonal and small group skills. These social skills include staying with the group, using quiet voices, giving direction to the group's work, encouraging participation, relating present learning to past learning, criticizing ideas without criticizing people, asking probing questions and requesting further rationale (Johnson & Johnson 1990) as cited in Odagboyi & Kreni (2017).

(B). There can be more individualization of instruction: In cooperative learning groups, there is the potential for the students to receive individuals' assistance from teacher and their peers (Long & Porter, 1985) as cited in Kefale (2015). Help from peer's increases both for the students being helped as well as for those giving the help. In other words, for the students being helped, the assistance from their peers enables them to move away from dependence on teachers and gain more opportunities to enhance their academic performance. For the students giving help, the cooperative learning groups serve as opportunities to increase their own academic performance (Farivar & Webb, 1994) quoted in Kefale (2015). Moreover, Brumfit (1984) as quoted in Berhanu (2016) argues "Placing students in small groups assists individualization for each group, being limited by its own capacities, determines its own appropriate level of working more precisely than can a class working in lockstep, with its larger numbers".

(c). Anxiety can decrease: Students often feel anxious to speak in front of the whole class. In contrast, there is less anxiety connected with speaking in the smaller group. When a student represents the group and reports to the whole class, he/she feels more support because the answer is not just from one student alone, but from the whole group (Long & Porter, 1985) as quoted in Kefale (2015). Therefore, Brown (2001) as cited in Berhanu (2016) says, "In group activities, the security of the student will be improved and each individual is not entirely on public display".

(D). Motivation and positive attitude towards class can increase: As cooperative learning groups are interactive; the pace of communication becomes more student-centered than in traditional classroom. In a traditional classroom, a teacher is bound to proceed too slowly for some students and too fast for others. In contrast, students adjust the pace of their communications in cooperative learning groups to the understanding level of their peers. They know if they go too fast, the team will suffer. Over time there develops considerable attention among team members to the understanding level of others (McKernan, 1996), cited in Kefale (2015). Thus, in cooperative learning groups, the students can encourage and help one another. That is, the cooperative atmosphere of working in a small group may help them develop affective bonds among themselves. This, in turn, greatly increases motivation and positive attitude towards their class.

Students' attitude towards Cooperative Learning

As saying of Emina (1986) as cited in Odagboyi & Kreni(2017), attitude is the basis of motivation in learning in general and cooperative leaning in particular. One of the most critical issues for teaching and learning is for the teacher to capture the affection of the learner. This is the key to learning. It will be a catastrophic omission in the process of teaching if the formation of preferred attitude and its evaluation is not deliberatively planned for, and included in the curriculum and in their every day of activities (Odagboyi & Kreni, 2017).

Tina (2014) also corroborated and indicated that 75% students gave positive attitudes towards cooperative learning in enhancing their motivation to speak and engage in learning. Attitude plays an important role in teaching learning process. A learner's attitude to the learning will impact the learner outside the classroom. The study done by Burden (2004) cited in Hagose (2012), showed that a positive attitude would motivate learners to achieve their learning goals. Many research works have been conducted on students' views and classroom practice of cooperative learning. According to Fahad (2009), a study on students' attitude and perceptions towards the effectiveness of mobile learning confirmed that many students believe the importance of CL to improve their retention in the teaching and learning process. Also, in his class students were effective in implementing cooperative learning activities as requirements.

Theoretical model of the study

There are various models regarding cooperative learning approach in teaching-learning process. However, the current researchers followed STAD model for the purpose of current study.

STAD stands for student team achievement divisions; it is a collaborative learning strategy in which small groups of learners with different levels of

ability work together to accomplish a shared learning goal. It was devised by Robert Slavin and his associates at Johns Hopkins University (Innovative Learning, 2009) as cited in Monchai & Sanit (2013), students are assigned to four- or five-member learning teams that are mixed in performance level, gender, and ethnicity.

The teacher presents a lesson, and then students work together within their teams to make sure that all team members have mastered the lesson. Finally, all students take individual quizzes on the material, at which time they may not help one another. Students' quiz scores are compared to their own past averages, and points are awarded on the basis of the degree to which students meet or exceed their own earlier performance. In term of learning achievement using the STAD, a study of Keramati (2009) as cited in Monchai & Sanit (2013), entitled "The effect of cooperative learning on academic achievement of physics course", it is found and explained that experimental group students taught by cooperative learning (STAD technique) are more successful than control group students. At this point, it is found that cooperative learning increased academic achievement of students to a higher level when compared to conventional teaching method (Monchai & Sanit, 2013).

2 Objectives of the Study

2.1 General Objective of the Study

The general objective of this study was to investigate the effects of cooperative learning strategies on academic achievement and students' attitudes towards cooperative learning at Dilla College of Teacher Education first-year mathematics department students.

2.2 Specific Objectives of the Study

More specifically, the present study was proposed:

1. To evaluate students' attitude towards cooperative learning strategies
2. To analyze whether or not cooperative learning strategies significantly affect the academic achievement of students

3 Materials and Methods

In this particular study, a pre-test and post-quasi-experimental study design was employed for its quantitative approach. To that end, an experiment constituted two experiment groups. Accordingly, the students were randomly assigned to each of the teaching methods, namely, independent learner (IL) as the control group and the experimental groups (cooperative discussion group or CDG), in which one top-achieving student leads the other different academic performance levels of students based on the cooperative learning achievement division or student team achievement division (STAD). As revealed in the study by Mattingly and VanSickle (1991), as cited in Molla & Muche (2018), cooperative learning regarding achievement division (CLAD) was the most successful teaching method in which students are organized based on their academic performance into top achievers, middle achievers, and lower achievers discretely. Further, they stated that through CLAD, students must be held individually accountable, and to achieve group objectives, the students must pay for their roles autonomously. This is to mean that the experimental group took learning by the cooperative learning method while the control group thought by the traditional or usual method for eight weeks. The subject matter used and taught in this study was general biology and the central nervous system part or portion covered via a cooperative learning approach.

3.1 Population of the Study

The study was conducted during the period of March 2009 to May 2010 E.C. at Dilla College of Teacher Education Dilla, Ethiopia. The target population of the study was first year mathematics department students.

As data secured from registrar office of the college reveals, the total number of first year mathematics department students were 77, of which 66 were males and the remaining 11 were females.

3.2 Sample and Sampling Techniques

The researchers used a total of 77 students as participants in the study by using simple random assignment to categorize the research teams. One class

(n_1 = 38) is considered the experimental group, and the other class (n_2 = 39) is considered the control group. Both groups include high, middle, and low achievers, males and females, and an ethnically and linguistically diverse representation of the class due to their different backgrounds.

3.3 Data Collecting Methods

An achievement test containing 50 items was administered to measure a student's achievement in a general biology course to conduct a post-test after treatment. All questions were objective type items, including true or false items, multiple choice items, and matching items. The time allowed was 50 minutes, and each item was allocated 1 mark. The maximum score for the achievement test was out of 50. The questions were used to assess a student's achievement before treatment and to measure the student's achievement after treatment. The content validity of the test items was checked by the researcher before the examination. To test their validity and reliability, the items were cross-checked and reviewed by biology and measurement and evaluation expert instructors. Thus, the validity of the test item was confirmed as valid as it could measure what it was planned to measure. The questioners, which were adapted from Berhanu (2016) by the current researchers, were also used to evaluate the attitudes of students towards cooperative learning strategies. It contains 14 items, and the validity was measured using Cronbach's coefficient alpha. and the result of the test was.83.

3.4 Methods of Data Analysis

The data was analyzed using quantitative methods according to the nature of the data. Regarding quantitative data collected, the process of coding items was done, that is, converting responses to numbers for the data entry. In addition, organizing close-ended and structured information was done to analyze the contents. Then, data entry and analysis were done using computer-based software and the Statistical Package for Social Scientists (SPSS) version 21 data processing program. During data analysis, both descriptive and inferential statistics were used. Descriptive statistics such as frequency, percentage, mean, and standard deviation were used for the purpose of assessing and understanding the student's attitudes towards cooperative learning methods. Inferential statistics, specifically, paired sample t-test, were used to compare the mean score of pre-test and post-test results and to see the difference in mean between the experimental and control groups.

4 Results

The central purpose of this study was to investigate the investigative effects of cooperative learning strategies on academic achievement and attitudes towards cooperative learning of students at Dilla College of Teacher Education first-year mathematics department students. In doing so, findings secured via quantitative methodologies are presented as follows:

As shown in Table 1, in order to assess students' attitudes towards cooperative learning, 14 items were raised. To that end, the data in the table show that students had a positive attitude toward cooperative learning (74% strongly agreed and 22.1% agreed, with an agreed mean = 4.7). Most of the respondents thought that group members in cooperative learning should be heterogeneous in ability (50.6 and 35.1% of the respondents strongly agreed and agreed, respectively, and agreed mean = 4.3). A majority of respondents believed that cooperative learning improves students' self-esteem (45.5 and 39% of the respondents strongly agreed and agreed, respectively, and agreed mean = 4.2). Moreover, among the respondents, the majority believed that cooperative learning improves students' productivity (54.5 and 33.8% of the respondents strongly agreed and agreed, respectively, with an agreed mean = 4.4). On the other hand, the table shows that a little more than half of the respondents claimed that cooperative learning has positive effects on students' academic achievement (48.1 and 14.3% of the respondents strongly agreed and agreed, respectively, and the agreed mean = 3.8).

Table 1: Results on students' attitude towards cooperative learning

No	Items on Attitude towards CL	F &%	5	4	3	2	1	Total	Mean
1	I think cooperative learning is advantageous for students' learning.	F	57	17	2	0	1	77	4.7
		%	74	22.1	2.6	0	1.3	100	
2	I think group members in cooperative learning should be heterogeneous in ability	F	39	27	8	3	0	77	4.3
		%	50.6	35.1	10.4	3.9	0	100	
3	Cooperative learning improves students self esteem.	F	35	30	6	4	2	77	4.2
		%	45.5	39	7.8	5.2	2.6	100	
4	Cooperative learning increases students' productivity	F	42	26	6	3	0	77	4.4
		%	54.5	33.8	7.8	3.9	0	100	
5	Cooperative learning improves respect of others opinions among students.	F	28	41	7	0	1	77	4.2
		%	36.4	53.2	9.1	0	1.3	100	
6	Cooperative learning affects students' academic achievement positively	F	37	11	10	13	6	77	3.8
		%	48.1	14.3	13	16.9	7.8	100	
7	Cooperative learning facilitates students to use higher level thinking strategies.	F	41	25	9	0	2	77	4.3
		%	53.2	32.5	11.7	0	2.6	100	
8	Cooperative learning encourages students to create new ideas	F	35	33	6	2	1	77	4.4
		%	45.5	42.9	7.8	2.6	1.3	100	
9	In cooperative learning, group members should not be formed based on friendship.	F	34	28	4	6	5	77	4.1
		%	44.2	36.4	5.2	7.8	6.5	100	
10	Cooperative learning is important both for students and teachers.	F	37	26	5	6	3	77	4.1
		%	48.1	33.8	6.5	7.8	3.9	100	
11	I think students should know the essential elements of cooperative learning for successful learning.	F	34	33	7	2	1	77	4.3
		%	44.2	42.9	9.1	2.6	1.3	100	
12	Cooperative learning is a valuable instructional approach.	F	34	33	7	2	1	77	4.3
		%	44.2	42.9	9.1	2.6	1.3	100	
13	In cooperative learning positive interdependence among group members ensures effective learning.	F	32	29	9	5	2	77	4.1
		%	41.6	37.7	11.7	6.5	2.6	100	
14	I think cooperative learning makes students responsible for their learning	F	48	20	4	3	2	77	4.4
		%	62.3	26	5.2	3.9	2.6	100	
	Total Mean								4.3

In addition to this, 53.2 and 32.5% of the respondents strongly agreed and agreed, respectively, towards the idea that cooperative learning facilitates students to use higher-level thinking strategies (agreed mean = 4.3). From the same table, evidence has been obtained that the majority of the respondents articulated that cooperative learning is important both for students and teachers (48.1 and 33.8%), respectively, and agreed mean = 4.1).

On the other hand, the majority of the respondents thought that teachers should know the essential elements of cooperative learning for successful learning (44.2 and 42.9% of the respondents strongly agreed and agreed, respectively, and agreed mean = 4.3). Moreover, most of the participants believed that cooperative learning is a valuable instructional approach (44.2 and 42.9% of the respondents strongly agreed and agreed, respectively, and agreed mean = 4.3). Finally, the table reveals that a large number of participants thought that cooperative learning makes students responsible for their learning (62.3 and 26% of the respondents strongly agreed, agreed, and agreed, respectively, and agreed mean = 4.4). Generally, the overall response of the participants indicates that the majority of the respondents have a positive attitude towards cooperative learning.

The overall total mean (4.3) tends to the value of "Agree," confirming that students have positive outlooks, views, prospects, and a propensity towards cooperative learning.

Table 2: Paired t-test result on pre-test achievement means scores for the experimental and control group

Study Group	N	Mean	SD	Std. Error	t-value	df	p-value
Experimental	38	28.51	8.1	1.38	7.358	37.5	.31
Control	39	26.44	9.7	1.52			

Sig. level $p< 0.05$

The paired t test shows that there was no significant difference in general biology pre-test scores (p =.31) between the experimental group (Mean = 28.51, SD = 8.1) and the control group (Mean = 26.44, SD = 9.7). The magnitude of the difference in the means (mean difference = 2.07) This implied that the academic status of the learners in both groups was highly comparable before exposing them to different teaching methods.

Table 3: Paired t-test result on post-test achievement means scores of the experimental and control group

Study Group	N	Mean	SD	Std. Error	t-Value	df	p-value
Experimental	38	37.26	6.2	1.00474	9.358	37	.003
Control	39	26.13	4.1	0.64907			

Sig. level $p< 0.05$

A paired t-test was employed to compare the mean post-test scores of the control and experimental groups after eight weeks of treatments. There was a significant difference in mean test scores between the two groups of participants, i.e., the t statistic, t = 9.358 and p =.003 at the p 0.05 level of significance, two-tailed with the experimental group (Mean = 37.26, SD = 6.2) scoring higher than the control group (Mean = 26.13, SD = 4.1). The magnitude of the differences in the means (mean difference = 11.13) The results confirmed that the experimental group who had engaged in learning through cooperative learning produced a higher overall improvement in academic scores on the general biology post-test. This means that working cooperatively has significant effects on academic achievement scores in general and test scores in general biology courses in particular.

5 Discussions

In this study, the finding shows that respondents' attitudes towards cooperative learning are positive, i.e., the mean value of the total perception item was 4.3. As described in the data analysis section, this value (4.3) shows that the respondents have a higher score of responses. Hence, the high score of responses referred to the good attitude of respondents to the issue. Thus, the respondents' attitude towards cooperative learning is good and positive in this study. Therefore, the result is in agreement with the study of Mekonen (2011) and Hagose (2012); teachers' and students' attitudes and knowledge have a great impact on the implementation of new approaches. The findings from this study show that students who were taught through a cooperative learning approach achieved statistically significantly higher post-test achievement scores compared to those who were taught through the traditional lecture-based teaching method. This implies that the cooperative learning approach was more effective in enhancing students' achievement scores in biology than the traditional lecture-based teaching methods. For the students giving help, the cooperative learning groups serve as opportunities to increase their own academic performance (Farivar & Webb, 1994, quoted in Kefale (2015). Moreover, Brumfit (1984), as quoted in Berhanu (2016), argues, "Placing students in small groups assists individualization for each group, being limited by its own capacities, determines its own appropriate level of work more precisely than can a class working in lockstep, with its larger numbers. Also, the current study findings align with a study by Slavin, Lake, Hanley, and Thurston (2014) that ascertained and stated that science teaching methods focused on enhancing teachers' classroom instruction throughout the year, such as cooperative learning and science-reading integration, as well as approaches that give teachers technology tools to enhance instruction, have significant potential to improve science learning and academic performance. The findings from the current study showed a statistically significant difference at a significance level of p 0.05 in biology achievement scores with students who had no prior knowledge of the biology content when taught through the cooperative learning approach as compared to the traditional lecture-based teaching approach, and therefore the results are in agreement with the findings of previous research.

6 Conclusion

As the study confirms, most of the students have a positive and good attitude towards cooperative learning in their learning process. Furthermore, this study found that the cooperative learning approach promoted higher academic achievement scores in students' general biology courses as compared to the regular teaching methods. Therefore, the cooperative learning approach enhances conceptual understanding more than the regular teaching method. While using this method, there were significant differences in academic achievement in general biology courses between the two groups, and therefore the approach is appropriate to maximize students' performance in higher institutions.

7 Recommendation

Since cooperative learning improves the academic achievement of students, it is highly recommended as an alternative instructional pedagogy in the current wave of educational reform in Ethiopian higher education. To promote the implementation of cooperative learning effectively, both lecturers and students need to undergo a training course in this kind of learning. Teachers have to consider the usefulness of the cooperative learning approach and should incorporate this approach into their teaching-learning process. Although the present findings support the effectiveness of cooperative learning for students' achievement, the sample size of this study is restricted to only 77 participants. As a result, future research should include more participants in cooperative learning to provide more information on the impacts of cooperative learning in the chosen institution and its catchment area schools.

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Conflict of Interests

The authors declare that there is no conflict of interest.

Ethical approval

Consent was sought form the research participants. Confidentiality was maintained in reporting information.

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