

**RESEARCH PAPER****Enhancing Secondary Student Achievement through Cooperative Learning Strategies****¹Dr. Romena Ali* and ² Dr. Shahid Raza**

1. Assistant Professor, Department of Education, Emerson University, Multan, Punjab, Pakistan
2. Assistant Professor, Department of Education, University of Education Lahore, Multan Campus, Punjab, Pakistan

Corresponding Author rominaali0900@gmail.com**ABSTRACT**

This study aimed to explore the effects of cooperative learning on General Science achievement among 9th-class students. Based upon previous research literature it was hypothesized that a significant difference existed between the mean posttest scores of General Science achievement of the experimental group and the control group. The pretest-posttest control group design was chosen for the experiment. The study sample consisted of 36 students of the 9th class who were equally distributed among the experimental group and control group, matched based on their annual examination at general science scores. The dependent variable of General Science achievement was measured through a self-constructed 30-item achievement test used as a pretest as well as a posttest. The experiment group was taught through cooperative learning while the control group was taught through traditional teaching. The material was used such as lesson plans, worksheets, and quizzes, designed to implement a cooperative learning methodology. The data were analyzed through mean, standard deviation, and t-test and .05 was the selected level of significance. The main result of the study was that the cooperative learning method is superior to the traditional method in general science achievement of 9th-grade students.

Keywords: Academic Achievement, Cooperative Learning, General Science**Introduction**

Teaching is not a mechanical process, it is an intricate, exciting, and challenging job. Teaching is an art and a truly fine teacher is an artist. Teaching requires a high degree of flexibility, adaptability, and nimbleness of mind that goes far beyond the mechanical application of step-by-step procedures. Marcos *et al.*, (2020) stated that group work means several students working together, and working together does not necessarily involve cooperation. Cooperative learning is an arrangement in which students work in mixed-ability groups and are awarded based on the success of the group. Michaelson *et al.*, (2024) explained that cooperative learning is an instructional strategy in which students engage in activities that promote collaboration and teamwork. Individual achievement is sometimes overlooked in favor of group accomplishment (Ghavifekr, 2020).

Moreover, many students who have worked in a team in a laboratory- or project-based course do not have fond memories of the experience. Some recall one or two team members doing all the work and others simply going along for the ride but getting the same grade (Pudjiarti *et al.*, 2023). Others remember dominant students, whose intense desire for a good grade led them to stifle their teammates' efforts to contribute (Mahmudah *et al.*, 2022). Still others recall arrangements in which the work was divided up and the completed parts were stapled together and turned in, with each team member knowing little or nothing about what any of the others did. Whatever else these students learned from their team experiences, they learned to avoid team projects whenever possible (Bores-Garcia *et al.*, 2021). Cooperative learning is an approach to group work that minimizes the occurrence

of unpleasant situations and maximizes the learning and satisfaction that result from working on a high-performance team (Siregar *et al.*,2021).

Furthermore, a large and rapidly growing body of research confirms the effectiveness of cooperative learning in higher education. Relative to students taught traditionally i.e., with instructor-centered lectures, individual assignments, and competitive grading cooperatively taught students tend to exhibit higher academic achievement, greater persistence through graduation, better high-level reasoning and critical thinking skills (Millis,2023), deeper understanding of learned material, greater time on task and less disruptive behavior in class (Munoz-Martinez *et al.*,2020), lower levels of anxiety and stress, greater intrinsic motivation to learn and achieve, greater ability to view situations from others' perspectives, more positive and supportive relationships with peers, more positive attitudes toward subject areas, and higher self-esteem (Keramati *et al.*2023).

Cooperative learning has been well-documented in educational research as a successful pedagogy to improve students' academic achievement (Wu *et al.*,2022). It is a fundamental principle of cooperative learning that group members are linked together in such a way that they cannot succeed unless everyone succeeds, they will actively assist each other to make sure that the assignment is done and the purpose of the group is achieved (Yang *et al.*,2022). They acquire this by providing help and cooperation to each other, sharing resources, and encouraging each other's efforts. As a result, group members who work in cooperative groups outperform students who work by themselves or in competition with each other (as seen in competitive conventional classrooms). Tran, (2019) stated that cooperative learning is one of the two ways of organizing the learning environment of a classroom, the other being competitive. In a cooperative learning environment, the goals of separate individuals become so linked that there is a positive correlation between them; on the contrary, in a competitive conventional environment, the goals of the students are so linked that there is a negative correlation between their goal attainments.

Literature Review

Effective cooperative learning

Mukuka *et al.*,(2019) stated that Effective cooperative learning is dependent on the sort of talk, which takes place in the group between students. Talking about a question helps create meaning and understanding; humans make meaning about things through talk. Studies have shown that by having to explain answers to problems to a peer the act of having to clarify and communicate enhances the students understanding. In these conversations, it is the process of discussion that is important not whether the answers are right or wrong. Klang *et al.*,(2021) explained that during cooperative learning activities, each member of a team is responsible not only for learning what is taught but also for helping teammates learn, thus creating an atmosphere of achievement.

Cooperative learning Meanings

Teaching that provides opportunities for students to learn together in small groups is known as **Cooperative Learning**. Cooperative Learning is children learning together in groups, which are structured so that group members have to cooperate to succeed. Students work together to learn and are responsible for their teammates' learning as well as their own (Abramczyk *et al.*,2020) Today, many teachers in Cambodia are reconsidering traditional practices that emphasize competition over cooperation in the classroom. Teachers are rethinking whether it makes sense to encourage students to work by themselves, often hiding what they know from other students to prevent cheating. They are discovering that cooperative learning allows more students to be actively engaged in learning (Mahmudah *et al.*,2022). Classrooms are very social places but often when teachers think about learning the focus is on individual learning and the social aspects are often

viewed as a distraction and/or a nuisance. If, however, teachers can make positive use of this social aspect and the social arrangement of the classroom then more learning will take place. Cooperative Learning improves students' communication skills and enhances their ability to be successful in the world of work and to live in society (Erdogan,2019).

Types of Cooperative Learning Groups

There are three commonly recognized types of cooperative learning groups. Each type of group has its purpose and application.

Informal Cooperative Learning Groups

These *ad-hoc* groups may be organized "on the fly" as an aid in direct teaching. Informal groups are particularly useful in breaking up a lecture into shorter segments interspersed with group activity. While this method leads to less time for lectures, it will increase the amount of material retained by students as well as their comfort in working with each other (Johnson *et al.*,2024).

Formal Cooperative Learning Groups

This type of group forms the basis for most routine uses of cooperative learning. Groups are assembled for at least one class period and may stay together for several weeks working on extended projects. These groups are where students learn and become comfortable applying the different techniques of working together cooperatively (Harahap *et al.*,2021).

Cooperative Base Groups

Cooperative base groups are long-term, stable groups that last for at least a year made up of individuals with different aptitudes and perspectives. They provide a context in which students can support each other in academics as well as in other aspects of their lives. The group members make sure everyone is completing their work and hold each other accountable for their contributions. Implementing cooperative base groups in such a way that students meet regularly for the duration of a course completing cooperative learning tasks can provide the permanent support and caring that students need "to make academic progress and develop cognitively and socially in healthy ways (Johnson *et al.*,2024).

The purpose of cooperative learning

More children actively learning

Co-operative Learning helps to actively engage more children in learning than do teacher-centered or lecture-oriented methodologies. In using the latter, it is usually only possible to actively engage at most one or two students in active learning at the same time. By using more cooperative methodologies in which students work together in groups, all students are actively engaged in a learning task. Students become more active participants in their learning, as opposed to passive recipients of knowledge who only listen, observe, and take notes (Vartiainen *et al.*,2020)

Children learn to help one another

Co-operative Learning encourages students to support their classmates in a group rather than to compete against one another. In this way, students can combine their talents and help one another (Vartiainen,2020).

Child-to-child learning support

Co-operative Learning provides the opportunity for higher-achieving students to help students who are slower learners. These higher-achieving students can probably communicate more easily with their peers than can the teacher. The help of these students also increases the amount of explanation that occurs in the classroom overall (Eryilmaz *et al.*,2022).

Improved motivation through success

Co-operative Learning helps to improve the motivation of many students by offering the opportunity to more students to experience the joy of winning (in the case of cooperative activities that require games) and academic success. In classrooms where students are only allowed to compete individually, only a few high-achieving students will likely have this experience. In classrooms where the students are divided into cooperative teams, each with its high- and low-achieving students, the opportunity to succeed is more evenly distributed (Bietenbeck,2020).

Cooperative Learning activities in the classroom

The following pointers should help the teacher organize Cooperative Learning activities in the classroom in a way that will contribute to the overall learning environment. (Harahap *et al.*,2021)

Organizing Groups

- Be sure that the objectives and methods of working together in a group are clear.
- Do not simply put students together in a group and tell them to "work together."
- Be clear about what is expected from students and how they should organize themselves.
- Be sure that there is a clear division of labor in each group. Each student should know clearly what it is that they have to do.
- Try to mix students of different abilities into one group.
- Keep group sizes under eight children. Five to six students in a group is best.
- Move back and forth between large group presentations and small group work several times during the lesson. Teaching in this way will help to maximize the number of students on task at the same time.
- Try to create a feeling of group pride in each student. Such feelings will help to strengthen cooperation in the group and help students to work together better.
- Make sure that students are held accountable for their learning. *Cooperative Learning does not mean that your friends do your work for you.* Students must understand that they will still be tested and graded on their performance at the end of the lesson, or the month (Dyson,2016).

The Teacher's Role in Co-operative Learning

The teacher plays a crucial role in orchestrating and overseeing that group activities occur as planned. In most cases, the teacher must be sure to establish him or herself as a

firm figure in the classroom but not so firm as to dominate the students. There are also some key duties that the teacher must be responsible for. Consider some of the important responsibilities outlined below:

Co-operative Learning strategies greatly enhance the motivation of low and middle-achieving students

During the last 10 years, many studies have been done to assess the effectiveness of Co-operative Learning Methodologies. Almost all of these studies have validated the belief that such methodologies are much more effective in bringing about higher achievement among students than traditional competitive strategies. Perhaps even more importantly, these studies have found that cooperative learning strategies greatly enhance the motivation of low and middle-achieving students. It is also commonly understood that Cooperative Learning strategies not only improve learning achievement but are also very effective in fostering social development and instilling values of cooperation and helping behavior (Dyson *et al.*,2012).

Thus, this methodology is not only a helpful tool for **cognitive development** but also for **affective competencies** as well. Many teachers in Cambodia tend to prefer classroom activities, which stress competition among individual students as the chief means through which to motivate them. While these methods may be effective with a small handful of bright students, they often have a devastating effect on the majority of students who are not fast learners. The public nature of competitive rewards and incentives leads to embarrassment and anxiety for children who fail to succeed. When the anxiety and embarrassment are too great, children who know that they are not likely to win no matter how hard they try, eventually drop out of active learning (Hortiguela Alcala *et al.*,2019). If teachers are trying to help all the students in a classroom learn sufficient literacy and numeracy skills, this observation should be of great concern to them. The competition between groups, which is stressed by Cooperative Learning has motivational advantages for low and middle-achieving students that individual competition does not. By grouping students of different abilities into one team as is recommended in Cooperative Learning, the joy of success can be more evenly distributed to a greater number of students in the classroom (Dyson *et al.*,2021).

Cooperative Learning in the 21st Century

Today's classrooms are focusing more on cooperative and collaborative learning. The characteristics of the 21st-century classroom will be very different from those in the past and the focus is on producing students who are excellent communicators, highly productive, creative thinkers, and wizards of technology. The mixed classroom is a great challenge for the 21st century educators and a solution to cater to learners with diverse learning abilities is by creating a cooperative learning environment. Students who work collaboratively in groups on a structured activity experience both interpersonal as well as academic growth (Pena-Ayala,2021).

Cooperative learning and student achievement

Alhamuddin *et al.*, (2022) found that Cooperative learning is a great tool that can be used to improve student achievement in any classroom. It also fosters tolerance and acceptance in the community, which improves the quality of everybody's life. Multiple researches have shown that cooperative learning strategies can be utilized to promote deeper understanding. Educators can use various strategies of cooperative learning along with their instructional techniques to enhance learning in a classroom. This will result in higher student achievement.

Hypothesis

1. There is a significant mean score difference between the achievement scores of control and experimental groups after intervention.
2. There is no significant mean score difference between the achievement scores of the control and experimental groups after intervention.

Material and Methods

Research Design

The study was chiefly Experimental in design. This design is often used in social sciences to assess the effectiveness of any factors or phenomena. In this design, the experimental and control groups were selected as intact classes that may be very similar. The purpose of the study was to know the impacts of cooperative learning on students' achievements in Islamiyat and science subjects at the secondary level. The cooperative learning method is based on the students' actual participation in learning and it finds the best solutions to the problem by discussing with the teacher and their peers.

Population

Students of 9th class section (A) and section (B) of Government Girls High School Nawabpur, Multan were treated as samples of the study. The study was conducted on the students of grade 9 on the subjects of Islamiyat and General Science at Government Girls High School Nawabpur, Multan. So, all the students of grade 9th are the population of the study.

Sample and sampling technique

The sample is a little representation of the entirety. The sample for this study was taken from the selected institution i.e. The Government Boys Muslim High School Multan. The Sample frame consisted of 40 students of the 9th class in subjects of Mathematics. Whereas the size of the sample consisted of 40 students of the 9th class in the subject of Islamiyat and General Science, who participated in the Experiment and Control Groups. The study was conducted in The Government Girls High School Nawabpur, Multan So it was not possible to disturb the school schedule and timetable. The total number of students in the 9th class in the selected school was 40. They all were selected for the formation of Experimental and Control Groups. From the list of these 40 students, all the students were divided into two groups bifurcating Even and Odd serial. All students with Odd serial numbers were taken in the Experimental Group and all students with Even serial numbers were comprised Control Group through systematic sampling

In the experimental group, the first step is grouping the students. To ensure homogeneity, students were assigned to groups randomly by counting a set of numbers (1-2-3-4-5). Then all the numbers "1" sit on the table-one to work as a group, all the numbers "2" sit on the table-two to work as a group, and so forth. All Students moved to their desks to the area that matched their numbers and then arranged themselves so that they could seat facing one another. So, seven groups of students were made. One group consisted of five students

Table 1
Sample of Teachers

Students	Control group	Experimental group	Total
	20	20	40

Research instrument

One objective type test of Islamic (MCQs+ short answers) based questionnaire having 20 MCQs and 5 short answer questions items was developed, containing the statements regarding the impacts of cooperative learning on Islamic students' achievements at the secondary level. Similarly, One objective type test of General Science (MCQs+ short answers) based questionnaire having 20 MCQs and 5 short answer questions items was developed, containing the statements regarding the impacts of cooperative learning on General Science students' achievements at the secondary level. Multiple choice and short-answer question-based questionnaires were used as the tool of data collection for this research. In this study, two tests as pre-test and a post-test were used. Pre-test was used to assess the status of learning and equality level of the two groups before the commencement of the experiment. It consisted of 20 multiple-choice items and 5 short answer questions. The time allocated for this test was 30 minutes

A test was used to assess the level of effectiveness in teaching education subjects at an intermediate level. The pretest and Posttest were comprised of 20 MCQ-type and 5 short answer questions.

Pretests were constructed for the following purpose:

a) To determine the current level of student's knowledge in the selected content area of Mathematics subject

(b) To prepare experimental and control groups based on performance. Whereas, the purpose of preparing posttests was to measure the effectiveness of the performance of the two groups. First Pilot Test of Instrument During the instrument development phase, a pilot test was held with 20 students other than the sample from Government Girls High School Nawab pur, Multan.

The test aimed to evaluate the content and format of the instruments. Respondents involved in the pilot test provided feedback on the ease or difficulty of completing the items and their understanding of the instructions. From the pilot test, the researcher got an idea about some of the items, which appeared to be difficult. The items were reviewed with the help of the supervisor and experts, on the pilot test to find out how well the respondents understood the questions being asked, problems experienced providing the answer, and suggestions for improvement. The results of the pilot test identified items that were unclear to respondents. It resulted in the change/removal of several difficult/ambiguous items from the tests. The ambiguities of the test items, too easy or too difficult test items were eliminated from final versions of the tests.

Instructions to Experimental and Control Groups

After the preparation of the test, the next task was to conduct the activities with both groups. The task was made possible with the full cooperation of the school colleagues with the researcher. Two versions of lesson plans were used, one based on the lecture method and the other based on the cooperative learning method. The control group was taught by the class teacher using the lecture method. The experimental group was taught through the cooperative learning method.

The researcher teaches the students with cooperative learning methods. The duration of teaching the both group was one month. In the same way, the students were given the following guidelines:

a) Be patient and tolerant with other classmates.

- b) Should cooperate with teachers and take care of the discipline of the class.

In the discussion, the following pattern was adopted by the researcher:

Before the Activity

1. Introduce the purpose of the class activity to students
2. Describe the key feature of the lesson.
3. Show the type of learning material to students.

During Discussion Activity

1. Encourage students to be fully involved in the activity by asking questions occasionally and to test their comprehension of what is going on.
2. Elaborate the activity, when appropriate to help students understand concepts inherent in the lesson.
3. Encourage students to ask questions if they do not understand the questions.

After Class Activity

1. Help students to relate relevant questions with easy examples to arrive at the conclusions
2. Feedback of students
3. Evaluate opinions and facts.
4. Encourage students to be prepared for the next activity

This experiment was carried out over 4 weeks. The period was forty minutes. It was conducted in Government Girls High School Nawab pur, Multan.

The total strength of the class which was comprised of 50 students was divided into two groups of ODD and EVEN serials. Each group comprised of 25 students: One Experimental Group and the other Control Group. The Experimental Group was taught through the cooperative learning Method by the researcher and the Control Group was taught through the traditional lecture method. The posttest was administered after one month of treatment. In this case, the first step was to measure both the groups. The treatment was then administered to both groups experimental and control groups. The two groups were measured again by posttest. The addition of the pretest measurement allowed the researcher to address the problem of assignment bias that exists in all nonequivalent group research.

Results and Discussion

Table 2
Percentage of the results of class 9th (Section A) in Pre-test.

Sample name	Islamiat	General Science	Total	Percentage
9 A1	13/30	13.5/30	26.5/60	44.16%
9 A2	13/30	13.5/30	26.5/60	44.16%
9 A3	13/30	13.5/30	26.5/60	44.16%
9 A4	13/30	12.5/30	25.5/60	42.5%
9 A5	12.5/30	12.5/30	25/60	41.66%

9 A6	12.5/30	12.5/30	25/60	41.66%
9 A7	12/30	12.5/30	24.5/60	40.83%
9 A8	12/30	12/30	24/60	40%
9 A9	12/30	12/30	24/60	40%
9A10	12/30	12/30	24/60	40%
9 A11	12/30	10/30	22/60	36.66%
9 A12	12/30	10/30	22/60	36.66%
9 A13	10.5/30	10/30	20.5/60	34.16%
9 A14	10.5/30	9/30	19.5/60	32.5%
9 A15	10.5/30	9/30	19.5/60	32.5%
9 A16	10/30	9/30	19/60	31.6%
9 A17	10/30	8/30	18/60	30%
9 A18	10/30	8/30	18/60	30%
9 A19	10/30	8/30	18/60	30%
9 A20	9/30 229.5 38.25%	8/30 215.5/600 35.9%	17/60 445/1200 37.08%	

Table 2 Describes the percentage of the results of the 9th class in the Pre-Test of Islamiat and general science subjects. Students of the 9th class got 38.25% marks in Islamiat and 35.9% in General science. Overall students of the 9th class in the Pre-Test of Islamiat and general science subjects got 37.08 marks in general science and Islamiat subjects.

Table 3
Percentage of the results of class 9th (Section B) in Pre-test.

Sample name	Islamiat	General Science	Total	Percentage
9 B1	9/30	8/30	17/60	28.33%
9 B2	7.5/30	7/30	14.5/60	24.16%
9 B3	7.5/30	7/30	14.5/60	24.16%
9 B4	7.5/30	7/30	14.5/60	24.16%
9 B5	7/30	7/30	14/60	23.33%
9 B6	7/30	7/30	14/60	23.33%
9 B7	7/30	7/30	14/60	23.33%
9 B8	7/30	7/30	14/60	23.33%
9 B9	7/30	7/30	14/60	23.33%
9B10	7/30	7/30	14/60	23.33%
9 B11	7/30	6/30	13/60	21.66%
9 B12	7/30	6/30	13/60	21.66%
9 B13	6.5/30	6/30	12.5/60	20.83%
9 B14	6.5/30	5/30	11.5/60	19.16%
9 B15	6.5/30	5/30	11.5/60	19.16%
9 B16	6.5/30	5/30	11.5/60	19.16%
9 B17	6/30	5/30	11/60	18.33%
9 B18	6/30	5/30	11/60	18.33%
9 B19	6/30	4/30	10/60	16.66%
9 B20	6/30 22.91%	4/30 20.33%	10/60 229.5/1200 21.62%	16.66%

Table 3: Describes the percentage of the results of the 9th class in the Test of Islamiat and general science subjects. Students of the 9th class got 22.91% marks in Islamiat and 20.33% in General science. Overall students of the 9th class in the Test of Islamiat and general science subjects got 21.62% marks in general science and Islamiat subjects

Table 4
Percentage of the results of class 9th Control group (Section A) in Post-test.

Sample name	Islamiat	General Science	Total	Percentage
9 A1	12.5/30	12.5/30	25/60	41.66%
9 A2	12.5/30	12.5/30	25/60	41.66%
9 A3	12.5/30	12/30	24.5/60	40.83%
9 A4	12.5/30	12/30	24.5/60	40.83%
9 A5	12.5/30	12/30	24.5/60	40.83%
9 A6	12.5/30	12/30	24.5/60	40.83%
9 A7	12.5/30	11.5/30	24/60	40%
9 A8	12/30	11.5/30	23.5/60	39.16%
9 A9	12/30	11.5/30	23.5/60	39.16%
9A10	11.5/30	10.5/30	22/60	36.66%
9 A11	11.5/30	10.5/30	22/60	36.66%
9 A12	11.5/30	9/30	20.5/60	34.16%
9 A13	11.5/30	9/30	20.5/60	34.16%
9 A14	11/30	9/30	20/60	33.33%
9 A15	11/30	9/30	20/60	33.33%
9 A16	11/30	8.5/30	19.5/60	32.5%
9 A17	11/30	8.5/30	19.5/60	32.5%
9 A18	11/30	8.5/30	19.5/60	32.5%
9 A19	10.5/30	8.5/30	19/60	31.66%
9 A20	10.5/30 38.83%	8.5/30 34.5%	19/60 440.5/1200 36.70%	31.66%

Table 4 describes the percentage of the results of the 9th class in the Post Test of Islamiat and general science subjects. Students of the 9th class got 38.83% marks in Islamiat and 34.5% in General science. Overall students of the 9th class in the Post Test of Islamiat and general science subjects got 36.7 marks in general science and Islamiat subjects.

Table 5
Percentage of the results of class 9th Experimental group (Section B) in Post-test.

Sample name	Islamiat	General Science	Total	Percentage
9 B1	25/30	24.5/30	49/60	81.66%
9 B2	25/30	24.5/30	49/60	81.66%
9 B3	25/30	23.5/30	48.5/60	80.83%
9 B4	25/30	23.5/30	48.5/60	80.83%
9 B5	23/30	23.5/30	46.5/60	77.5%
9 B6	23/30	23.5/30	46.5/60	77.5%
9 B7	23/30	21.5/30	44.5/60	74.16%
9 B8	23/30	21.5/30	44.5/60	74.16%
9 B9	22/30	18.5/30	40.5/60	67.5%
9B10	22/30	18.5/30	40.5/60	67.5%
9 B11	22/30	18.5/30	40.5/60	67.5%
9 B12	21/30	18/30	39/60	65%
9 B13	21/30	18/30	39/60	65%
9 B14	21/30	18/30	39/60	65%
9 B15	18/30	18/30	36/60	60%
9 B16	18/30	17/30	35/60	58.33%
9 B17	18/30	17/30	35/60	58.33%
9 B18	18/30	16.5/30	34.5/60	57.5%
9 B19	18/30	16.5/30	34.5/60	57.5%
9 B20	18/30 71.33%	16/30 64.41%	34/60 822.5/1200	57.5%

71.37%

Table 5 describes the percentage of the results of the 9th class in the Post Test of Islamiat and general science subjects. Students of the 9th class got 71.33% marks in Islamiat and 64.41% in General science. Overall students of the 9th class in the Post Test of Islamiat and general science subjects got 71.37 marks in general science and Islamiat subjects.

Table 6
Subject-wise comparison of Percentages and Mean of 9th class (section A) in pre-test and post-test

Sr#	Subjects	Study Groups	Percentages	Mean
1.	Islamiat	Pre Test	38.25	6.87
		Post Test	38.9	11.67
2.	General Science	Pre Test	35.9	10.75
		Post Test	34.5	10.25

Table 6 shows the overall percentages and mean of the 9th class in pre-test and post-test all subjects. In the subject of Islamiat percentage and mean of the 9th class in the pre-test are 38.25% and 38.9% while in the post-test are 35.9% and 34.5% respectively. The mean of the Islamiat subject in the pre-test and post-test is 6.87 and 11.67 respectively while the mean of the general science subject in the pre-test and post-test is 10.75 and 10.25 respectively.

Table 7
Subject-wise comparison of Percentages and Mean of 9th class (section B) in pre-test and post-test

Sr#	Subjects	Study Groups	Percentages	Mean
1.	Islamiat	Pre Test	22.91	6.87
		Post Test	71.5	21.45
2.	General Science	Pre Test	20.33	6.1
		Post Test	66.08	19.8

Table 7 shows the overall percentages and mean of the 9th class in pre-test and post-test all subjects. In the subject of Islamiat percentage and mean of the 9th class in the pre-test are 22.91% and 71.5% while in the post-test are 20.33% and 66.08% respectively. The mean of the Islamiat subject in the pre-test and post-test is 6.87 and 21.45 respectively while the mean of the general science subject in the pre-test and post-test is 6.1 and 19.8 respectively.

Table 8
Overall comparison Percentages and Mean of 9th class (Section A) in pre-test and post-test

Sr#	Study Groups	Percentages	Mean
1.	Pre Test	37.08	22.25
	Post Test	36.70	22

Table 8 shows the overall percentages and mean of the 9th class (Section A) in the pre-test and post-test of all subjects. The percentage and mean of the 9th class in the pre-test are 37.08% and 22.25 while in the post-test are 36.70% and 22 respectively.

Table 9
Overall comparison Percentages and Mean of 9th class (Section B) in pre-test and post-test

Sr#	Study Groups	Percentages	Mean
1.	Pre Test	21.62	11.47
	Post Test	71.37	41.12

Table 9 shows the overall percentages and mean of the 9th class (Section B) in the pre-test and post-test of all subjects. The percentage and mean of the 9th class in the pre-test are 21.62% and 11.47 while in the post-test are 71.37% and 41.12 respectively.

Table 10
Pre-Test And Post-Test Comparison Of control and experimental Independent Sample z-Test

Group	Test	N	Mean	S.D	Df	Level of significance
Control group	Pre-test	20	22.25	1.59099	19	
	Post-test	20	22	1.414214	19	
Experimental group	Pre-test	20	11.47	6.031621	19	
	Post-test	20	41.12	14.9341	19	

Table 10 depicts the calculated value of t (0.09) which is greater than the table value (.05) at the level of significance. It means that the difference between the means is significant. It also shows that female school teachers have a greater attitude towards pedagogical innovations than of male school teachers.

Discussion

Applications of social learning to the classroom first began in the early 1970s. Since that time, what we now know as 'Cooperative Learning' has been one of the most researched kinds of instructional methodology used in the classroom. Much of this research has concluded that cooperative learning strategies in the classroom have been highly successful, both in terms of learning achievement as well as the development of morals and values. International research (Loh *et al.*, 2020) has found that Cooperative Learning improves not only learning but also social development skills and communication. (Yang, 2023) found some of the advantages that researchers have when studying Cooperative Learning.

Fadzil *et al.*, (2020) embarked on a study to determine the effects of cooperative learning over the conventional teaching method in matriculation-level mathematics. He found cooperative learning improved students' achievement in mathematics and attitudes toward mathematics. He concluded that the utilization of the cooperative learning method is a preferable alternative to the traditional instructional method. Novelti, (2020.) investigated the effects of cooperative learning on students' achievement and attitudes in a secondary mathematics classroom. They found that students in cooperative learning had higher test scores than students in the comparison group.

Erdogan, (2019) examined the effects of cooperative learning on the achievement and attitudes toward mathematics of a group of fifth graders. The students participated for twelve - weeks in cooperative learning in mathematics. The analysis of pre-and post-test scores revealed positive changes in attitudes and achievement. Other studies had similar findings showing that cooperative learning produces a positive effect on mathematics achievement and improves students' attitudes toward mathematics. Warsah *et al.*, (2021) hence, this study aimed at identifying the effects of cooperative learning on students' mathematics achievement and attitudes towards mathematics in selected Boys' and Girls' schools in Natore, Bangladesh.

Based on the results of pre-tests and post-tests, the students of class 9 showed noticeable improvement in all the subjects. Based on the results of pre-tests and post-tests, the students of class 9 showed noticeable improvement in all the subjects. In an overall comparison between pre-test and post-test scores of class 9, students showed tangible progress in academic achievement. The null hypothesis No.1 was accepted that There is a

significant mean score difference between the achievement scores of control and experimental groups after intervention. It was, therefore concluded that the academic performance of the students taught through routine method differed in their academic performance from the group of students taught through cooperative learning group was better than the group taught without cooperative learning. The Cooperative learning method was better than the lecture method in the enhancement of academic achievement of the students. The Cooperative learning method was better than the lecture method in the development of the academic self-concepts of the students.

Recommendations

- Government and non-governmental organizations should provide administrative control to ensure the widespread implementation of cooperative learning and generalize its effectiveness to different populations.
- In addition to academic performance, future studies should investigate the impact of cooperative learning on students' self-esteem, social skills, and academic motivation.³
- The cooperative learning model was applied to General Science in this study. Future research should explore its effectiveness in other school subjects at different levels and with various student types, such as slow learners and special students.⁴
- General science and Islamiat teachers should receive practical training in cooperative learning techniques to improve their teaching methods.

References

- Abramczyk, A., & Jurkowski, S. (2020). Cooperative learning as an evidence-based teaching strategy: What teachers know, believe, and how they use it. *Journal of Education for Teaching, 46*(3), 296-308.
- Alhamuddin, A., Inten, D. N., Mulyani, D., & Erlangga, R. D. (2022, April). 21st century learning. In *4th Social and Humanities Research Symposium (SoRes 2021)* (pp. 332-337). Atlantis Press.
- Bietenbeck, J. (2020). *Own motivation, peer motivation, and educational success*. Lund University, CESifo, DIW Berlin and IZA
- Bores-García, D., Hortigüela-Alcalá, D., Fernandez-Rio, F. J., González-Calvo, G., & Barba-Martín, R. (2021). Research on cooperative learning in physical education: Systematic review of the last five years. *Research quarterly for exercise and sport, 92*(1), 146-155.
- Dyson, B., & Casey, A. (2016). *Cooperative learning in physical education and physical activity: A practical introduction*. Routledge.
- Dyson, B., & Casey, A. (Eds.). (2012). *Cooperative learning in physical education*. New York, NY: Taylor & Francis.
- Dyson, B., Howley, D., & Shen, Y. (2021). 'Being a team, working together, and being kind': Primary students' perspectives of cooperative learning's contribution to their social and emotional learning. *Physical education and sport pedagogy, 26*(2), 137-154.
- Erdogan, F. (2019). Effect of cooperative learning supported by reflective thinking activities on students' critical thinking skills. *Eurasian journal of educational research, 19*(80), 89-112.
- Eryilmaz, Ö., & Deveci, H. (2022). The Effect of Child-to-Child Teaching Approach on Students' Level of Social Responsibility in Social Studies. *International Online Journal of Primary Education, 11*(1), 90-108.
- Fadzil, F. A., & Mahmud, S. N. D. (2020). The Effect of the Cellular Respiration Project-Based Learning Module on Matriculation Students' Achievement. *International Journal Of Academic Research In Business And Social Sciences, 10*(1).
- Ghavifekr, S. (2020). Collaborative Learning: A Key To Enhance Students' social Interaction Skills. *Mojes: Malaysian Online Journal of Educational Sciences, 8*(4), 9-21.
- Harahap, R. R., Makhroji, M., Zulida, E., Fadlia, F., & Chairuddin, C. (2021). A Study Of Effectiveness Cooperative Learning Models In Efl Classroom. *Journal of Education, Linguistics, Literature and Language Teaching, 4*(02), 6-24.
- Hortigüela Alcalá, D., Hernando Garijo, A., Pérez-Pueyo, Á., & Fernández-Río, J. (2019). Cooperative learning and students' motivation, social interactions and attitudes: Perspectives from two different educational stages. *Sustainability, 11*(24), 7005.
- Johnson, D. W., Johnson, R. T., & Smith, K. A. (2024). Cooperative learning: Improving university instruction by basing practice on validated theory.
- Keramati, M. R., & Gillies, R. M. (2023). Perceptions of nursing students on the effect of cooperative learning on academic achievement and learning environment. *Interactive Learning Environments, 31*(10), 6724-6734.

- Klang, N., Karlsson, N., Kilborn, W., Eriksson, P., & Karlberg, M. (2021, August). Mathematical problem-solving through cooperative learning—the importance of peer acceptance and friendships. In *Frontiers in Education* (Vol. 6, p. 710296). Frontiers Media SA.
- Loh, R. C. Y., & Ang, C. S. (2020). Unravelling cooperative learning in higher education. *Research in Social Sciences and Technology*, 5(2), 22-39.
- Mahmudah, H., & Rasyid, F. (2022). Engaging Students in Cooperative Learning Model of Reading Course Through Numbered Head Together. *ETERNAL (English Teaching Journal)*, 13(1), 53-67.
- Marcos, R. I. S., Fernández, V. L., González, M. T. D., & Phillips-Silver, J. (2020). Promoting children's creative thinking through reading and writing in a cooperative learning classroom. *Thinking Skills and Creativity*, 36, 100663.
- Michaelsen, L. K., Davidson, N., & Major, C. H. (2024). Team-based learning practices and principles in comparison with cooperative learning and problem-based learning.
- Millis, B. (Ed.). (2023). *Cooperative learning in higher education: Across the disciplines, across the academy*. Taylor & Francis.
- Mukuka, A., Mutarutinya, V., & Balimuttajjo, S. (2019). Exploring the barriers to effective cooperative learning implementation in school mathematics classrooms. *Problems of Education in the 21st Century*, 77(6), 745.
- Muñoz-Martínez, Y., Monge-López, C., & Torrego Seijo, J. C. (2020). Teacher education in cooperative learning and its influence on inclusive education. *Improving Schools*, 23(3), 277-290.
- Novelti, N. (2020). The Implementation of Think Pair Share Type Cooperative Model on Writing Exposition Text (Korespondensi).
- Peña-Ayala, A. (2021). A learning design cooperative framework to instill 21st century education. *Telematics and Informatics*, 62, 101632.
- Pudjiarti, E. S., Werdiningsih, R., & Wae, D. (2023). Cooperative Learning: An Effective Approach for Improving Student Engagement and Achievement. *Educational Administration: Theory and Practice*, 29(2).
- Siregar, N., Siregar, H., & Hutahaean, H. (2021). Application of the Picture and Picture Type of Cooperative Learning Model in Improving Student Learning Creativity. *Jurnal Teknologi Pendidikan*, 23(1), 23-36.
- Tran, V. D. (2019). Does Cooperative Learning Increase Students' Motivation in Learning?. *International Journal of Higher Education*, 8(5), 12-20.
- Vartiainen, H., Tedre, M., & Valtonen, T. (2020). Learning machine learning with very young children: Who is teaching whom?. *International journal of child-computer interaction*, 25, 100182.
- Warsah, I., Morganna, R., Uyun, M., Afandi, M., & Hamengkubuwono, H. (2021). The impact of collaborative learning on learners' critical thinking skills. *International Journal of Instruction*, 14(2), 443-460.

- Wu, X., & Tao, M. (2022). The Impact of cooperative learning on EFL achievers' and underachievers' motivation based on marginal utility. *Journal of Language Teaching and Research*, 13(2), 417-424.
- Yang, X. (2023). A historical review of collaborative learning and cooperative learning. *TechTrends*, 67(4), 718-728.
- Yang, X., Zhou, X., & Hu, J. (2022). Students' preferences for seating arrangements and their engagement in cooperative learning activities in college English blended learning classrooms in higher education. *Higher Education Research & Development*, 41(4), 1356-1371.