

Effect Of Cooperative Learning On Students' Learning Attitudes Towards Science At Elementary Level In Pakistan

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Abstract

The current research investigated the causal effect of cooperative learning on students' learning attitudes toward science. Through random sampling 34, 7th graders were selected from a public girls' schools situated in Wahdat Colony, Lahore. Research ethics were taken into consideration regarding prior permission for use of research tool (Attitude toward Science learning: AtSL), parents, participants and school administration consent. This adapted tool has 24 items that were used in this experimental research (pre-test and post-test design). For 8 weeks experimental group was treated with cooperative learning whereas traditional instructions were for the control group. Both sets of students were equated regarding time span, and had the same material, same age group, same teacher and same institution along with same locale, even more both the groups were provided with same attitude scale. The results of pretest and posttest were compared via T-test and paired sample T-test. The findings demonstrated that cooperative learning instructions improved positive attitudes for science in experimental group, moreover, they were thinking critically about the subject matter, and they were sharing their views with classmates. For wide implication of recent research, it should be conducted in qualitative mode of research within the same age group, even across grades.

Keywords: Cooperative Learning, Students' Learning Attitudes, Science.

Introduction

Cooperative learning is an instructional method in which learners collaborate to attain a shared objective (Mehmood, Anwer, & Tatlah, 2019). They are working together in small groups to attain these objectives, knowing that the benefits will be shared. Under some situations, cooperative learning is expected to be more effective than competition among learners with various learning styles. Cooperative learning environments enable students to help one another, develop collective partnerships, and achieve shared targets by focusing on the task that has been allocated to them. (Slavin, 2015).

The development of a positive attitude or mindset towards science ought to be the main focus of the educational curriculum (Aiken et al., 2010). Promoting a positive attitude towards science in learners is a significant goal of science instruction (TIMMS, 1999). A positive or good attitude towards science is certainly not an inherited trait. The attitudes of students towards science change throughout time. Students' attitudes towards science and the resulting knowledge are impacted by how the material is presented and seen in the classroom, as well as when teachers believe they are providing it in the most practical and situational manner possible (Ahmed, 2007).

The teacher's position in a cooperative learning setting differs from that of a common, traditional classroom. The teacher serves as the leader or a guide, and the class operates independently as groups of learners. This strategy is the most effective way to impart science (Turget, 2015). Many aspects of school culture have been found to be enhanced when science is taught through cooperative learning methodologies, particularly learners' attitudes towards science, teamwork, involvement in class, and willingness to study on a personal level. According to Humphreys's (2015), Students who engaged in cooperative educational activities achieved better and had a better outlook towards learning compared to those who engaged in solo instruction.

Pakistan is an ethnically diverse, multicultural nation with a diverse population based on cultural heritage, ethnicity, and the nation" (Najmonnisa et al., 2015). Diversity is a unique element of each classroom since education is a mirror of society. According to various studies, innovative teaching methodologies in Pakistan are never understood nor acknowledged by teachers. (Najmonnisa, 2015). Conventional teaching approaches are utilized in all nation institutes, particularly science; as a result, students' ability to recall knowledge improves. (Ahmad et al., 2014; Halai, & Khan, 2011).

Johnson & Johnson (1989) who worked together to undertake a significant research synthesis in, looked at and examined 539 papers. There was a total of 93 years of research from 1898 and 1990. All 367 of the articles that were examined were released in the last 29 years. There was a total of 458 experimental studies that included participants of various ages, socioeconomic history, and educational levels. In the Americas, a total of 528 studies were carried out, with only 27 research on adults and 178 on elementary level school children, 113 on secondary level school learners, and 216 on students in college. With mean impact sizes varying from .52 to .89 and an average of .73, cooperative learning has been demonstrated to be more successful than traditional teaching techniques. The vote total favored cooperative learning, with 323 studies demonstrating beneficial outcomes, 173 displaying no impact, and 44 demonstrating adverse impact.

Qinn et al., (1996) examined 46 studies to realize how collaborative strategies impacted learners' attitudes through different grades. Collaborating pupils in both groups outperformed competing students significantly. The cooperative team mean was 71% more successful than individual achievement. Bayraktar (2001) investigated the effect of a method of cooperative learning on elementary school students' attitude and achievements in science classes. Based on measurements of academic success, cognitive attitude, as well as personal skill practises, the

research discovered that the participants in the treatment grouping achieved much improved than the untreated grouping throughout the tasks sessions.

The objective of Parveen et al.'s (2001) research evaluated success of a cooperative instructions compared to that of traditional methods by analyzing the outcomes of learner the tests taken by learner in elementary school social studies. They reported to have found no evidence connecting conventional classroom formats to cooperative learning. AlBadavi (2008) conducted research to examine the usefulness of the cooperative learning method Jigsaw II on comprehension of texts, test results, and learners' overall desire to acquire English language. The participants received Jigsaw II therapy for two months. He found no evidence tying the "Jigsaw II" cooperative technique to the typical lecture style.

Arbab (2003) performed an empirical study that compared the effectiveness of working together in groups with the standard method of educating secondary school students in the domain of general science. Students were divided into treatment and control groups based on pretest outcomes. A cooperative learning strategy was used to treat the experimental group for 15 days. Her research found that the therapy grouping had considerably better mean value than the other group.

Kosar, (2021) examined cooperative learning to conventional instruction to determine which strategy best prepared elementary school students for achievement on standardized social science assessments. According to their achievement on past social science yearly tests, the 40-student sample was divided into two groups. Participants of the experimental group took part in team-based instructional tasks for a period of 15 days. The test was designed to measure the academic outcomes of both groups after treatment was provided. The findings demonstrated that learners who took part in group activities performed better on examinations likened to those in the other group.

Rational of the Study

Age of digitalization has changed the conventional system of instruction, which focuses largely on textbook material, is perceived by learners as a manipulative and passive entity. Learners view the teacher to be the most important individual in education. However, this system is unable to thrive in the present instructing and educational setting. Therefore, it is necessary to address this pressing issue and explore alternative methods to enhance the effectiveness of educational procedures. This study aimed to conduct an experimental study to investigate the effect of cooperative learning on attitude or mindset of learners towards science.

Problem Statement

In Pakistani context, the majority of public-school teachers are tasked with instructing 70–80 students at once. In a large class, it is difficult for the teacher to offer each student the individualized attention they need using the traditional teaching methods. Pakistan's prevailing educational approach has become outdated, depriving students of the analytical ability and learning skills they need. Therefore, more effective substitutes must be discovered. The use of cooperative learning as a teaching technique may improve students' capacity for critical

thought. Investigative cooperative learning effect on elementary school learners' mindset or attitudes towards studying science was the primary objective of the current research.

Objectives

The study focused on the following objectives

- To find the effect of cooperative learning on elementary grade students 'attitude towards science in control group.
- To find the effect of cooperative learning on elementary grade students 'attitude towards science in experimental group.
- To investigate the effect of cooperative learning on elementary grade students' attitudes towards science.

Hypotheses

- i. There is no difference in scores of control group of cooperative learning on elementary grade students' attitude towards science.
- ii. There is no difference in scores of experimental group of cooperative learning on elementary grade students' attitude towards science.
- iii. There is no difference in of cooperative learning on elementary grade students' attitude towards science.

Research Questions

- What is the effect of cooperative learning on elementary grade students 'attitude towards science in control group?
- What is the effect of cooperative learning on elementary grade students 'attitude towards science in experimental group?
- What is the effect of cooperative learning on elementary grade students' attitudes towards science?

Delimitation of the Study

Due to the time and available resources, this study was delimited to students of 7th grade of Govt. Junior Model High School in Lahore district.

Methodology

Population

The population of this experimental study consist of 7th grade students of one Government Junior model high school in Lahore district.

Sample

Using a practical method of sampling, one junior public sector school in Lahore district was chosen for the experimental study. Students from a certain seventh grade class were selected for both groups. Based on their school scores, sixty (34) group members were chosen at random

assigned to the experimental and control groups using the matching example technique. Each group had seventeen (17) students.

Procedure

The research was pre-experimental. Students' attitudes regarding science were utilized as a dependent factor while cooperative learning was employed as an independent factor in this causal-comparative research. The experimental group was taught utilizing cooperative learning strategies, while the control group was taught using standard teaching methods (chalk and talk). Each group contained one learner of high skills, two students of medium skills, and one learner of poor skills. Following the pre-test, the researcher began the process of mediation (Cooperative learning methodologies and approaches) with an experimental group. During the six-week treatment period of time, the researcher took a single lesson every day. After the initial seven days of introductory class, both groups received a pre-test to see how engaged learners were in the course. Cooperative learning strategies were utilized to correspond with the topic matters requirements. The lecture was delivered to the experimental group according to with the lesson plan. A pre-test was conducted prior to the treatment to determine the attitude to science, and a post-test was conducted following the action. Each group received lessons from the PTCB Science book for the seventh grade. Although the course of study was the same, the experimental group used cooperative learning strategies while the control group used standard teaching methods. Each group's course of action was created. Assignments related to the exercises produced by the researcher were used in the experimental group.

Instrumentation

The information related to this research study were collected used the same questionnaire for the both tests. The Attitude towards Science Learning (AtSL) instrument was employed for this study with the consent of that author. This instrument was developed by Zubair & Nasir (2011). It was comprised of twenty-four questions which was a 5-point Likert-scale and based on students' attitudes towards science. The reliability of this scale was 0.71.

Analysis

Following data collection, assesses Pre-Test 1 and reports the outcomes. The researcher notes Post-Test 1 and Post-2 results at the end of the trial. SPSS was used for integrating the outcomes of both tests. A particular t-test was utilized to associate the findings of the both groups.

Results and Findings

Independent sample T-Test, were used to analyses the data collected and the paired samples t-test on the mean variance in students' learning attitudes.

Table 1: Pre-test: Experimental and control Group

Group	N	M	SD	Df	T	P
Control	17	81.25	9.13	32	.456	.706
Experimental	17	81.95	9.63	4		

In this table 1, on the pre-test, the t-test was used to compare the control and experimental groups' attitudes towards science learning. There was no statistically noteworthy change in the pre-test mean results. The mean score for the control group's group is 81.25 (SD = 9.13), while the value mean for the experimental group is 81.95 (SD = 9.63). On their pre-test 1, the two groups were determined to be closely equivalent, with no statistically significant difference ($p = .706$).

Table2: Post-test 1, 2: Experimental and control Group

Group	N	M	SD	Df	t	p
Post-test 1						
Control	17	90.41	7.07	32	.879	0.14
Experimental	17	93.17	10.87	8		
Post-test 2						
Control	17	86.35	7.42	32	.749	0.01
Experimental	17	93.64	10.21	4		

Compared to the experimental group's average (M=93.17, SD=7.87) and the control group's average (M=90.41, SD=7.07) in the below table 2, Post-test 1 showed no statistically significant distinction among the groups ($p = 0.14$). The experimental group's mean (M= 93.64) was higher than the control group's (M= 86.35). Post-test 2 mean results were significantly different ($p = 0.01$) in favour of the group performing the experiment.

Table:3 pre-test and post-test: Controland Experimental group

Group	N	M	SD	Df	t	p
Control group						
Pre-test	17	90.35	10.11	16	-3.45	.001
Post-test	17	95.35	12.42			
Experimental group						
Pre-test	17	81.70	10.01	16	-1.304	.211
Post-test	17	99.64	13.21			

Table 3 reveals that the control group's post-test average (Mean=95.35, SD=12.42) was higher than its pre-test average (Mean=90.35, SD=10.11). The control group's post-test value was often higher than its pre-test score due to a large variation ($p = 0.01$). The experimental group's post-test average score was higher than its pre-test average (Mean=81.70, SD=10.01). The

experimental group's post-test average score was significantly greater than the pre-test score ($p = 0.01$).

Discussions

This study focused into how the attitudes of elementary level learner towards science influenced as a result of their involvement in a cooperative learning setting. The findings of present research demonstrated that cooperative learning had a progressive effect on learners' attitudes towards learning about science in comparison with conventional teaching techniques. Similar research by Balfakih (2003) revealed that while teaching elementary-level science, cooperative education was more active than the more conventional method. In a comprehensive review of published and unpublished sources relating to cooperative learning in elementary science classrooms, Romro (2009) discovered that cooperative learning improves students' scientific achievement. According to the research of Ajaja and Eravwok (2010) and Bukunola and Idwu (2012), students' accomplishment results on tests in science were significantly greater in the group that participated in cooperative learning than in the traditional learning group.

The recent results indicated that students with a good attitude towards science performed more effectively in school than those with a negative perspective or attitude. Piper (2019), Freedman (2012), Eccles (2017), and others discovered a similar strong or positive association between students' motivated attitude towards science and their academic achievement. The findings of this study corporate cooperative learning's usefulness in improving students' capacity to pair up, identify, conclude, anticipate, clarify, draw, determine, evaluate, logic, discriminate, observe, and categories in a scientific setting. The findings are backed by prior studies that demonstrated significant variations among cooperative learning and more traditional ways (Chiang, 2012; Hosseini et al., 2017).

Conclusion

Statistical analysis of pretest and posttest scores of experimental and control groups compared via T-test and paired t-test indicated that there was not a significant variance in pre-test outcomes among both groups i.e., both exhibited similar degree of a learning attitude. Nevertheless, a significant variance in their overall post-test scores revealed that those who participated in the experimental group had a greater favorable or positive learning attitude regarding science lessons following the treatment than individuals in the control group. Participants in the experiment group significantly operated to learn through elaboration rather than repetitions, as evidenced by an important significant difference. Cooperative learning was shown to be more progressive than traditional learning in terms of transferring scientific information.

Recommendations

The current study employed the cooperative learning methodology to a particular classroom curriculum area: science. This technique might also be attempted on other secondary and higher secondary school courses, as well as with different types of pupils. In accordance with the study's findings, teacher trainers, textbooks writers, and curriculum developers may all

collaborate closely. As a result, science textbooks may be revised, and follow-up exercises could be redesigned to encourage collaborative learning.

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