

EFFECT OF STUDENTS TEAM ACHIEVEMENT DIVISION MODEL ON
ACADEMIC ACHIEVEMENT IN THE SUBJECT OF GENERAL SCIENCE AT
ELEMENTARY LEVEL

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Abstract

This study investigates the effect of Student Team Achievement Division model on the academic achievement of elementary-level students in General Science. The study was to compare the effect of the student team achievement division method and lecture method. The true experimental design was used for the study. Islamabad Model School for Boys was selected as the sample frame. Using the simple random sampling technique, 60 students were chosen as the study sample. The students' academic achievement test was administered as a pretest, and based on the pretest scores, the students were divided into two equivalent groups: a control group (30 students) and an experimental group (30 students). The control group was taught using the lecture method, while the experimental group with the student team achievement division method. After seven weeks of treatment, a posttest was administered. Descriptive statistics Mean and Standard Deviation were used to evaluate the student's academic achievement. The inferential statistics t-test was applied to compare the effect of the students' team achievement division and lecture method. The results revealed that the students' team achievement division method significantly improved students' academic achievement in General Science compared to the lecture method. It is recommended that educators adopt the students' team achievement division method for teaching General Science to enhance students' performance rather than rely solely on the traditional lecture method.

Keywords: Students Team Achievements, Control Group, Experimental Group, Lecture Method, General Science,

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INTRODUCTION

Collaborative learning is very focused on students by using group work to allow students to work together and achieve common goals and achievements in the form of groups. In team based learning situations, students must coordinate their efforts to complete tasks. Student Team Achievement Divisions are one type of team based learning. According to Millis (2023), it is one of the most straightforward team based learning methods and has been extensively researched by earlier scholars. It is frequently employed to teach diverse subjects and educational levels. The five essential components of the Students Team Achievement Division model all are about team based learning. In the presentations, materials will be delivered in class, encompassing lecture discussions, direct instruction on tasks, and audiovisual presentations. Students must concentrate on the presentations to fully grasp the lesson. By doing so, they are anticipated to perform well on quizzes (Kreng, 2020). It comprises heterogeneous groups with the disparity in the learning qualities among them for their common success and learning together in the same group. Following class presentations and team preparations, students will take the individual quiz and must work independently. This approach allows students to utilize their knowledge based on what they have studied. The scores are determined by the improvement of the student from earlier quizzes. Points will be awarded to the group that exhibits noticeable progress from prior assessments. Team recognition will then be conferred upon the group that meets the specified criteria. This recognition may take the form of badges, certificates, or suitable rewards (Elpisah, 2020)

RATIONAL OF THE STUDY

The collaborative learning Model, known as Student Teams-Achievement Divisions (STAD), involves small groups of students with varying levels of skill working in unison to achieve a common educational objective (Kreng, 2014). It was developed based on the principles of effective teaching methods (Fatima, 2020). This strategy is employed to fulfill clearly defined instructional targets, as it involves small teams of students with diverse competencies, who unite to reach a shared learning aim (Hasmyati, 2018).

PROBLEM STATEMENT

Team based learning has been used to promote learning in a few schools in Pakistan, such as the city and APS school systems, but traditional teaching methods are still used in public and private sector schools. Moreover, the purpose of this research is to assess the effects of the Students Team Achievement Division framework and the team-oriented learning approach on students' performance in general science at the elementary education level. The National Education Policies of Pakistan (2009, 2017) recognize the significance of quality education, affirming that every child is entitled to quality education as stated in Article 25-A of the Constitution. Similarly, the National Qualification Framework 2015 emphasizes student learning through cooperative and collaborative abilities. (Sudijono, 2014).

SIGNIFICANCE OF THE STUDY

This research can assist in bridging the gap between the effective engagement of the Students Team Achievement Division model in educational institutions and the advancement of literature.. This research is valuable to curriculum developers, educators, and education specialists in designing, implementing, and assessing instructional interventions in general science education.

OBJECTIVES OF THE STUDY

The Objectives of the Study were:

To examine the effect of the Students' Team Achievement Division Method on the academic achievement of elementary-level students in general science.

To determine the effect of Lecture Method on the academic achievement of elementary-level students in general science

HYPOTHESES

H₀₁. The Students' Team Achievement Division (STAD) method has no significant effect on the academic achievement of elementary-level students.

H₀₂. The Lecture Method has no significant effect on the academic achievement of elementary-level students.

REVIEW OF LITERATURE

The core idea of the STAD method is to encourage students to support and assist one another in mastering the subject matter. When students aim for their team to earn rewards, they must cooperate, provide mutual support, and thoroughly learn the material. They help their teammates perform to the best of their abilities by working collaboratively and ensuring everyone understands the lessons or instructional content. Through intensive interaction and the development of positive interpersonal relationships during the learning process, students' motivation is heightened, stimulating their cognitive engagement (Yulini, 2023). According to Luzyawati, (2024), this approach proves to be advantageous for long-term education, particularly in achieving optimal learning outcomes. High levels of motivation, self-confidence in one's ability to think critically, and strong inquiry skills significantly contribute to improving students' academic achievements. Team-based learning strategies are widely implemented due to their foundation in research-validated theories, making them adaptable for almost any teacher to apply in alignment with their teaching philosophies. Cooperative learning strategies, such as the STAD model, are particularly effective in producing positive learning outcomes. Studies on cooperative learning consistently demonstrate that these practices enhance student learning compared to traditional methods. The well-structured cooperative learning approaches, ensure active participation from all group members. Motivation plays a vital role in any teaching strategy, and it can integrate this by fostering both intrinsic and extrinsic motivation, rewarding top-performing teams. Working collaboratively allows students to achieve shared goals and solve problems collectively, promoting teamwork and providing additional opportunities to apply learning in practical contexts (Alijanian, 2022).

COMPONENTS OF STAD

The first component (1) is Submission of Material, which involves instruction delivered by the teacher to the class in a traditional manner. Teaching in STAD does not significantly differ from conventional instruction, except that the Lessons should focus on the principles of the material being studied. Once the teacher explains the content one or two times, students collaborate in groups to address the given questions.

The second component (2) refers to the Groups; in the framework of the Students Team Achievement Division model, groups consist of 4-6 students with varying abilities and genders. The purpose of creating these groups is to ensure that every participant collaborates in the learning process and, even more crucially, to prepare each member for robust individual evaluations. The group is essential as it fosters cooperative efforts among peers to achieve the desired academic standards. To organize group composition, student report card standings are analyzed, and they may also be categorized based on their final exam performance. Grouping is conducted using this ranking list. Each team is

composed of one student from the highest tier, one from the lowest tier, and two students with intermediate skills. The instructor arranges the students according to this scheme. Teachers should strive to minimize significant conflicts among group members, although students are not permitted to choose their friends. The third component (3) encompasses the Test or Quiz; after approximately one or two instructional sessions and collaborative group activities, students complete individual assessments. This stage is where each student aims to excel as a result of their learning. Students recognize that their dedication and achievements will significantly influence the overall success of the group. The fourth component (4) involves Individual Improvement Scores which intend to set achievable goals for students who exert effort and attain better results than they have previously achieved. The tracking of student achievement scores follows this order: initial score, test score, improvement score, and group score. The fifth component (5) is Group Scores; to evaluate group performance, individual scores from each member are collected, documented, and totaled to determine each group's scores. From these group scores, it becomes evident which groups secured the highest results, thus earning the promised rewards. The factors assessed in this study include learning motivation. Learning motivation is the primary psychological drive within students that propels them into learning endeavors, guarantees their perseverance in those tasks, and directs them towards achieving a goal.

COOPERATIVE LEARNING TECHNOLOGY

This study examines the significance of cooperative learning technology in primary education and methods for enhancing its approach. Collaborative learning encourages teamwork, critical analysis, and social skill development among students, making it vital in primary classrooms. Incorporating innovation into cooperative learning approaches provides numerous advantages, such as access to digital materials, increased engagement, and expanded connectivity. (Abdullaevna, 2024).

STAD FOR SKILL DEVELOPMENT

It underscores Serota (2023) the significance of pedagogical approaches that prioritize skill development over a sole reliance on theoretical knowledge. Numerous innovations and models, notably cooperative learning, have been formulated to address these educational demands. Cooperative learning frameworks emphasize collaborative engagement among students in small groups to achieve shared academic objectives. Among these frameworks, the Student Teams Achievement Division model has demonstrated notable efficacy. (Kamid, 2022).

STAD IN 21 CENTURY

This model organizes students into heterogeneous groups, enabling them to assist one another in completing academic assignments while preparing for individual assessments. (Mahadi et al., 2023). According to Rejeki, (2023) merits of the STAD model lie in its capacity to elevate student participation, cultivate social skills, and foster an inclusive learning environment. This theoretical framework promotes engagement among learners in the exchange of insights and experiences pertaining to the subject matter being imparted, thereby facilitating the enhancement of students' comprehension of the instructional content.

CRITICAL SUMMARY OF LITERATURE REVIEW

The Student Team Achievement Divisions model has been thoroughly examined within the field of cooperative learning, and research has revealed both its advantages and obstacles. Below is a critical overview of the literature, emphasizing the model's

theoretical contributions, practical implementations, and limitations. Numerous studies highlight STAD's positive influence on academic performance across subjects, including mathematics, science, and language arts. It encourages mastery learning through peer engagement and personal accountability.

RESEARCH DESIGN

The research employed a true experimental approach, utilizing a pre-test, post-test control group format. It comprised two groups: the experimental group and the control group, both matched based on the scores obtained by the students in the pre-test from 8th grade General Science, published by the National Book Foundation (2023). The experimental group received instruction through the Students Team Achievement Division (STAD) method, while the control group was instructed via the Lecture Method. At the conclusion of the study, a post-test was administered to both groups.

SAMPLE AND SAMPLING OF THE STUDY

The sample comprises a smaller segment of individuals, items, or instances that embody the traits of the broader population from which it is derived. Initially, the researcher chose 60 participants from the available pool of 130 students at Islamabad Model School for Boys Nai Abadi, employing a simple random selection method.

RESEARCH INSTRUMENT

The researcher developed the research instrument named the Students' Academic Achievement Test with the help of the supervisor.

PRE-TEST

A pre-test was designed using selected units from the 8th-grade General Science textbook. It was administered to categorize the sample of the study into experimental and control groups before giving the treatment.

POST-TEST

In terms of content and question types, the post-test was identical to the pre-test. However, the arrangement of test items was changed

DATA ANALYSIS

After scoring the responses of students on the pre-test and post-test, SPSS, version-25 (Statistical Package for the Social Sciences) was utilized. Following data collection from the students, the data were analyzed. Descriptive analysis was employed to compute the measures of central tendency (Mean) and measures of dispersion (Standard Deviation). The researcher conducted a dependent t-test to compare the achievement of students within the same group in the pre-test and post-test. Another inferential statistical test called the independent sample t-test was employed, which serves to compare the achievements of experimental and control groups and to assess the significant differences between both groups.

ACADEMIC ACHIEVEMENTS OF THE STUDENTS BEFORE TREATMENT

TABLE 1: ACADEMIC ACHIEVEMENTS OF THE CONTROL AND EXPERIMENTAL GROUP (PRE-TEST)

Group	N	M	SD	SEM
Control	30	32.25	9.589	2.369
Experimental	30	31.23	8.325	1.764

Note. Descriptive statistics (Mean and Standard Deviation) were used to determine the academic achievement of students in General Science before the treatment.

Table 4.1 shows that, the pretest marks of the control group were: N=30, M=32.25, SD=9.589, SEM= 2.369 and pretest marks of experimental group were; N=30, M=31.23,

SD=8.325, SEM= 1.764. The pretest results indicate that both the control and experimental groups have similar initial performance levels, as reflected in their mean scores (M = 32.25 for the control group and M = 31.23 for the experimental group). The slight difference in means suggests minimal variation between the groups before any intervention. Additionally, the standard deviation (SD = 9.589 for the control group and SD = 8.325 for the experimental group) shows that the scores in the control group were slightly more spread out, indicating greater variability compared to the experimental group. Furthermore, the standard error of the mean (SEM), which measures how precisely the sample mean represents the population mean, is lower for the experimental group (SEM = 1.764) compared to the control group (SEM = 2.369), suggesting that the experimental group's mean score is a more stable. Overall, the statistical values suggest that both groups started at comparable levels before any experimental intervention

ACADEMIC ACHIEVEMENTS OF THE STUDENTS AFTER TREATMENT

TABLE 2: ACADEMIC ACHIEVEMENTS OF CONTROL AND EXPERIMENTAL GROUP (POST-TEST)

Group	N	M	SD	SEM
Control	30	59.70	29.358	1.864
Experimental	30	78.70	10.478	2.589

Descriptive statistics (Mean and Standard Deviation) were used to calculate the academic achievements of students in General Science after the treatment. The posttest marks of control group were: N=30, M=59.70, SD=29.358, SEM= 1.864 and the posttest marks of experimental group were; N=30, M=78.70, SD=10.478, SEM= 2.589. Table 4.2 shows that the posttest marks of the experimental group were significantly more than the posttest marks of the control group. Additionally, the standard error of the mean (SEM), is smaller for the control group (SEM = 1.864) compared to the experimental group (SEM = 2.589). However, the larger SEM in the experimental group, suggests a strong effect of the intervention. Overall, these results indicate that the experimental group outperformed over the control group after the intervention.

COMPARISON BETWEEN THE MARKS OF THE PRETEST

TABLE 3: COMPARISON BETWEEN MARKS OF PRETEST OF CONTROL AND EXPERIMENTAL GROUP

Pre-test	N	Mean	SD	Df	t	p
Control Group	30	32.25	10.444	58	.235	.856
Experimental Group	30	31.23	8.325			

Independent sample t-test was used to compare the pretest marks of the control and experimental groups. The pretest marks of control group were; N= 30, M= 32.25, SD=10.444, and pretest of experimental group were; N=30, M= 31.23, SD= 8.325. t= (58) .235 and p=.856 > 0.05. Table 4.3 shows that there was no significant difference between the pretest marks of the control and experimental group. There was no significant difference between the academic achievement of the control and experimental group before the treatment.

ANALYSIS RELATED TO HYPOTHESIS (H₀₁)

TABLE4: COMPARISON BETWEEN PRETEST AND POSTTEST MARKS OF EXPERIMENTAL GROUP

Experimental Group	N	Mean	SD	Df	t	p
Post test	30	78.70	10.478	29	19.635	.000

Experimental Group	N	Mean	SD	Df	t	p
Post test	30	78.70	10.478	29	19.635	.000
Pre-test	30	31.23	8.325			

Paired sample t-test was used to find out the difference between pretest and posttest marks of experimental group. The posttest marks experimental group were; N= 30, M= 78.70, SD=10.478, and marks of pretest of experimental group were; N=30, M= 31.23, SD= 8.325. $t = (29) 19.635$, $p = .000 < 0$. Table 4.4 indicates a significant difference between the posttest and pretest marks of the experimental group. Hence, the Students Team Achievement Division Model has a significant effect on the academic achievement of the elementary level students in General Science. Therefore, the null Hypothesis “The Students’ Team Achievement Division (STAD) method has no significant effect on the academic achievement of elementary-level students” was rejected.

FINDINGS

It was found that;

1. The average marks of the control group were slightly higher than that of the experimental group. The marks of the control group were: N=30, M=32.25, SD=9.589, SEM= 2.369 and pretest marks of experimental group were; N=30, M=31.23, SD=8.325, SEM= 1.764. (Table 4.1).
2. The average marks of the experimental group in General Science are significantly more than the average marks in General Science of the control group. The marks of control group were: N=30, M=59.70, SD=29.358, SEM= 1.864 and the posttest marks of experimental group were; N=30, M=78.70, SD=10.478, SEM= 2.589. (Table 4.2).
3. There was no significant difference between the pretest marks of the control and experimental group. The marks of pretest of control group were; N= 30, M= 32.25, SD=10.444, and pretest of experimental group were; N=30, M= 31.23, SD= 8.325. $t = (58) .235$ and $p = .856 > 0.05$ (Table 4.3).
4. The Students Team Achievement Division method has a significant effect on the academic achievement of elementary-level students in General Science. The marks of the posttest of the experimental group were; N= 30, M= 78.70, SD=10.478, and marks of the pretest of the experimental group were; N=30, M= 31.23, SD= 8.325. $t = (29) 19.635$, $p = .000 < 0$. (Table 4.4).

DISCUSSION

This study aims to compare the effect of two teaching methods: the Student Team Achievement Division Method and the Lecture Method on the academic performance of elementary school students. The study was conducted under controlled conditions, where the researchers attempted to manage the threat of external variables.

The study aligns significantly with previous research on team based learning, particularly the Student Team Achievement Division (STAD) model, reinforcing its effectiveness in improving student academic achievement. The literature extensively supports the premise that STAD enhances learning outcomes by fostering peer collaboration, promoting active engagement, and reinforcing individual accountability. The findings of your study validate these claims, demonstrating that STAD yields better results, especially for lower and medium achievers, compared to the traditional Lecture Method. Research by Slavin (1995) and other scholars highlights STAD’s positive impact on students’ academic performance across various subjects, including science, mathematics, and language arts. Your study supports this notion by showing that

students taught using STAD performed better in General Science than those taught via the Lecture Method. This improvement is particularly evident among lower and medium achievers, a finding that is consistent with prior studies emphasizing the benefits of cooperative learning for struggling students. The structured group activities in STAD enable weaker students to receive peer support, which enhances their conceptual understanding and boosts their confidence.

CONCLUSIONS

The control group had slightly higher average marks than the experimental group in the pretest. However, this difference was not statistically significant, indicating that both groups had similar prior knowledge and academic understanding before the intervention.

To investigate the effect of STAD model on the academic achievement in general science of 8th grade, the finding revealed that the experimental group demonstrated significantly higher average marks in General Science compared to the control group in the posttest. This indicates that the applied intervention had a positive impact on students' academic performance, leading to improved learning outcomes.

To compare the effect of STAD model on the academic achievement in general science of 8th grade, the pretest analysis showed no significant difference between the control and experimental groups, confirming that both groups had a similar academic standing before the intervention. This ensures that any improvements observed in the posttest results can be attributed to the applied teaching methods rather than pre-existing academic disparities.

To find out the effect of STAD model on the academic achievement in general science of 8th grade The Students Team Achievement Division (STAD) method significantly enhanced the academic achievement of elementary-level students in General Science. The experimental group's posttest scores were substantially higher than their pretest scores, indicating that these learning strategies effectively improve students' performance. The results highlight the STAD method as a powerful instructional approach, fostering better engagement, knowledge, and academic success compared to traditional teaching methods.

RECOMMENDATIONS

It is recommended that teachers may develop a team based learning environment by using the student team achievement division method which is very helpful for the teaching and learning process and students can learn better through team-based activities in the classroom.

It is recommended Students actively participate in team discussions and activities, for the development of strong communication skills to share ideas clearly and listen to others effectively class discussion during learning can be very effective.

The teacher may set group goals for learners to stay focused and productive, which can assist team members who may struggle with good learning and

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