Impact of Collaborative Teaching Techniques in Classroom on Higher Order Thinking Development among Elementary Students

Muhammad Aqeel Malhi[1], Dr. Shafqat Ali[2]

Abstract

By experimental research approach, this study investigates how collaborative teaching strategies affect the higher-order thinking abilities of elementary school pupils. The 80 students in the sample were split into two groups: the experimental group received collaborative teaching methods such peer discussions, problem-solving activities, and cooperative learning methodologies, while the control group received traditional lecture instruction. Collected data from control and experimental group was analyzed by using t-test. The results show that although both teaching approaches increased student learning, collaborative teaching greatly improved students' analytical, problem-solving, and critical thinking abilities. Significant progress was made by both high and low-achieving students in the experimental group, highlighting the value of interactive learning. To improve learning outcomes, the study suggests implementing blended learning, incorporating collaborative instructional strategies, and offering extra assistance to students who are having difficulty. The importance of collaborative teaching in elementary schools is demonstrated by these findings.

Key words: collaborative teaching strategies, higher-order thinking, experimental approach

Introduction

It is widely acknowledged in today's educational environment that helping primary school pupils develop higher-order thinking is essential to encouraging thinking differently. Higher-order thinking encourages pupils to analyze, assess, and produce information in addition to memorizing and recalling facts. However, rote learning and teacher-centered education are frequently emphasized in traditional teaching approaches, which limits students' opportunity to engage in complex cognitive processes. Collaborative teaching methods have become a viable educational strategy to improve students' involvement and intellectual growth in response to this difficulty (Sekwena, 2023).

Teachers and students actively participate in the learning process jointly using a variety of instructional strategies that are included in collaborative teaching

[1] Ph. D. Scholar SST Govt. High School Badomalhi, Narowal. Email: aqeelmalhi@gmail.com
[2] Assistant Professor, Minhaj University Lahore.

https://doi.org/10.58932/MULI0016

techniques. These methods include, among others, problem-based learning, cooperative learning, peer-assisted learning, and team teaching. Collaboration in the classroom fosters critical thinking and in-depth learning experiences by creating an atmosphere that values discussion, inquiry, and group problem-solving. According to research, these student-centered pedagogies can greatly improve students' social and cognitive abilities, preparing them to tackle challenging issues both within and outside of the classroom (Ghani, Zakaria, & Rahman, 2016).

Even while collaborative teaching methods are becoming more and more popular, there is still a dearth of actual data on how they directly affect primary children' growth in higher-order thinking abilities. Fewer studies have examined the efficacy of collaboration at the elementary school level, despite earlier research emphasizing its advantages in higher education settings. It is crucial to comprehend how collaborative teaching methods affect young students' higher-order thinking abilities because of the formative nature of cognitive and social development during the early school years (Tang, 2020).

Through an experimental inquiry into the effects of collaborative teaching practices on the development of higher-order thinking skills in elementary schools, this study seeks to close this gap. The study will compare the cognitive effects of students exposed to collaborative teaching approaches with those getting standard instruction using a controlled research methodology.

To give a thorough evaluation of the efficacy of collaborative teaching methods, the study will concentrate on important aspects of higher-order thinking, such as creativity, reasoning, problem-solving, and critical thinking (Dewi, Ern, Haris, Kundera, 2021). Constructivist learning theories, especially Vygotsky's social constructivism, which holds that meaningful engagement and social interaction are the foundations of knowledge construction, serve as the study's foundation. This viewpoint holds that learning is most successful when it is a collaborative, active process in which students develop understanding rather than just passively absorbing knowledge.

In educational research, collaborative teaching methods have become more popular in recent years as successful ways to improve students' cognitive capacities. To prepare students for difficult real-world problems, higher-order thinking (HOT), which includes analytical reasoning, problem-solving, and critical thinking, is crucial (Sarmila, Zaimah, & Lyndon, 2018). In elementary schools, the implementation of collaborative teaching strategies creates a student-centered learning atmosphere that promotes discussion, peer interaction, and knowledge co-construction. This review of the research investigates several collaborative teaching methods and how they affect elementary children' growth in higher-order thinking. A hierarchical framework for classifying cognitive processes, Bloom's Taxonomy, places a strong emphasis on helping pupils go from lower to higher thinking.

The results of this study would have a big impact on curriculum design, teacher preparation programs, and educational practices. Pedagogical changes

targeted at improving student engagement and cognitive development in elementary school could be informed by collaborative teaching if it is shown to be successful in developing higher-order thinking abilities. Additionally, the study will give teachers useful advice on how to put collaborative tactics into practice that optimize student learning results.
In conclusion, by examining the ways in which collaborative teaching strategies impact elementary students' development incorporation of student-centered pedagogies would be better. The study will empirically demonstrate the efficacy of these approaches by meticulous experimental analysis, providing insightful information to researchers, educators, and policymakers interested in raising educational standards.

Objectives

1. To investigate how the collaborative teaching approach affects elementary school pupils' growth in higher-order thinking abilities.
2. To assess comparative effectiveness of collaborative teaching techniques and conventional lecture-based education for the improve students' learning.

Hypotheses

H_o1: The collaborative teaching approach has no significant effect on elementary school pupils' growth in higher-order thinking abilities.

H_o2: There is no significant difference in the effectiveness of collaborative teaching techniques and conventional lecture-based education in improving students' learning.

Statement of the Problem

Even while higher-order thinking is becoming more widely acknowledged as an essential talent for kids, traditional teacher-centered teaching approaches still predominate in primary school, which restricts possibilities for in-depth cognitive engagement. An alternate strategy that encourages critical thinking and active student participation is collaborative teaching. There is, however, a dearth of scientific data regarding these tactics' efficacy at the elementary school level. By contrasting their efficacy with conventional lecture-based education, this study aims to examine how collaborative teaching approaches affect primary school pupils' growth in higher-order thinking abilities. The study intends to close this gap by shedding light on how collaborative learning might improve cognitive capacities and guide future teaching strategies.

Literature Review

Collaborative Education

According to Zakariya, Ibrahim, and Adisa, (2016), collaborative learning is an organized teaching strategy in which students collaborate in small groups to accomplish a shared objective. By promoting active engagement and shared

responsibility in the learning process, strategies like the Jigsaw method, Think-Pair-Share, and Reciprocal Teaching have been demonstrated to improve students' analytical and evaluative abilities.

Students educate and learn from one another through peer tutoring, which frequently matches more accomplished students with those who require more help. Peer tutoring has been shown to promote critical thinking, self-regulation, and metacognitive awareness—all of which are crucial elements of higher-order thinking (Zhou, Chen, & Chen, 2019).

Through practical investigation and problem-solving, inquiry-based learning promotes curiosity and self-directed thinking in children. Research indicates that collaborative inquiry projects help students build higher-order thinking abilities by enhancing their capacity to evaluate and synthesize knowledge. PBL is an instructional strategy that encourages deeper comprehension and critical thinking by having students tackle real-world problems in groups. Compared to elementary kids receiving standard teacher-directed education, research has shown that PBL participants have superior levels of creativity and reasoning (Zhou, Chen, & Chen, 2019).

Collaborative Teaching and Higher-Order Thinking

Numerous research demonstrate how collaborative teaching improves cognitive development. According to Mahamod, and Hassan, (2018), students who participate in cooperative learning settings have improved problem-solving abilities and the capacity to consider many viewpoints. In a similar vein, Kalaivani, and Tarmizi, (2014) found that group projects and peer conversations promote better reasoning abilities and a deeper conceptual grasp.

Collaboration greatly improves Higher Order Thinking (HOT) abilities including analysis, assessment, and innovation. Students are exposed to a variety of viewpoints that push their thinking as they participate in group discussions, problem-solving exercises, and peer evaluation. Because they have to defend their positions, weigh opposing viewpoints, and hone their arguments, this process develops critical thinking skills.

By increasing learning interactivity and significance, collaborative learning promotes intrinsic motivation and engagement. According to research, students who participate in group projects and debates are more likely to take responsibility for their education and show perseverance when faced with difficult assignments (Yen, & Shalili, 2015). Collaborative teaching has many advantages, but there are drawbacks as well. The efficacy of these strategies may be impacted by issues with classroom management, unequal participation, and the requirement for teacher facilitation (Khalid, 2017). Additionally, the results of collaborative learning experiences may be impacted by variations in students' aptitudes and communication styles. These difficulties can be lessened, though, with the right scaffolding, organized direction, and teacher professional development (AbuSeileek, 2012).

As students engage with peers and reflect on their learning methods and mental processes, collaboration also promotes metacognition. They gain the capacity to synthesize knowledge and come up with creative solutions through exercises including debates, project-based learning, and group problem-solving (Yen, & Shalili, 2015). Additionally, group work improves social and communication skills, which are critical for solving problems in the real world. Students increase their comprehension and intellectual flexibility by clearly expressing their ideas, actively listening, and expanding on those of others. All things considered, cooperation makes learning a dynamic, captivating activity that improves students' capacity for autonomous, critical, and creative thought.

The idea that collaborative teaching methods have a beneficial effect on primary children's development is strongly supported by the research. These approaches equip students with the skills necessary to grow by encouraging critical thinking, problem-solving, and metacognitive awareness. Future studies should look into how collaborative teaching affects students' academic performance over the long run and how technology can improve collaborative learning environments.

Methodology

This study used an experimental research methodology to examine how collaborative teaching methods affect elementary children' growth in higher-order thinking abilities. Eighty students make up the sample; forty were in the control group and forty were in the experimental group. To assess how students' higher-order thinking skills have changed, a pre-test and post-test design was employed. While the control group was instructed using conventional teaching methods, the experimental group was taught using collaborative teaching techniques, such as peer discussions, problem-solving exercises, and cooperative learning tactics. A higher-order thinking assessment test was used to gather data.

Data Analysis

Analyzing data is essential in experimental research to assess the importance of group differences. A statistical technique for determining if there is a statistically significant difference between two groups is t-test, which compares their means. In experimental investigations when researchers want to assess how an intervention, therapy, or condition affects various groups, this test is especially helpful. The t-test ensures valid and dependable results by evaluating the mean differences which is given in the tables below:

Table 1: *Comparison of the Control Group's Pre-Test and Post-Test Results with the Use of Traditional Lecture Method among Elementary Students*

Comparison Tests	Group Members	Mean	Std. Dev.	sig.
Pre-test results	38	10.192	2.011	.000
Post-test results	38	19.291	4.121	

The pre-test and post-test scores of the control group, who received instruction via the conventional lecture approach, are compared in Table 1's independent samples t-test results. 10.192 was the average score before the test, with a standard deviation of 2.011; 19.291 was the average score after the test, with a standard deviation of 4.121. The significance level between pre and posttest is .000, below the conventional cutoff of.05. This implies that students' performance improved measurably as a result of the conventional lecture style. The rise in the mean score, however, also suggests that although learning occurred, the degree of gain might have varied depending on other elements like teaching methods, student participation, or past knowledge.

Although the results show that the traditional lecture style had an effect, more comparisons with other teaching strategies would be required to assess its overall efficacy.

Table 2: *Pre-Test and Post-Test Results by Using Collaborative Teaching Method among Elementary Students*

Comparison Tests	Group Members	Mean	Std. Dev.	sig.
Pre-test results	39	11.205	2.671	.000
Post-test results	39	24.561	3.991	

Following the adoption of the collaborative teaching approach, student performance significantly improved, according to the data in Table 2. Compared to the post-test mean score (M = 24.561, SD = 3.991), the pre-test mean score (M = 11.205, SD = 2.671) is significantly lower. This significant rise implies that students' learning outcomes were positively impacted by the collaborative teaching technique. We can be certain that the observed improvement is not the result of chance because p is smaller than.05. Together with the low p-value, the rise in mean scores demonstrates how well collaborative teaching works to improve students' comprehension and performance.

All things considered, these results demonstrate how collaborative teaching methods can greatly enhance elementary children' learning by encouraging participation, communication, and a deeper understanding of the material. Therefore, the null hypothesis “the collaborative teaching approach has no significant effect on elementary school pupils' leaning achievement” rejected.

Figure I: *Comparison of the Experimental and Control Groups' Pre- and Post-Test Results*

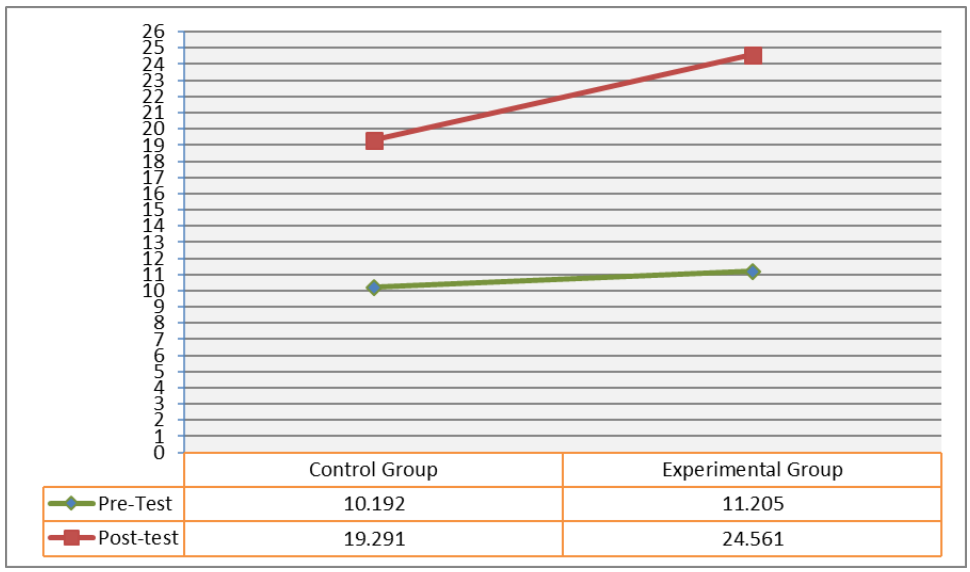

Table 3: *Comparison of the Experimental Group's Low Achievers by Using Collaborative Teaching Method among Elementary Students*

Comparison Tests	Group Members	Mean	Std. Dev.	sig.
Pre-test results	25	8.199	1.991	.000
Post-test results	25	19.911	3.767	

After using the collaborative teaching approach, low-achieving students' performance significantly improved, according to Table 3's data. With a standard deviation of 1.991 and a mean score of 8.199 before the test, the post-test mean score rose to 19.911 with a standard deviation of 3.767. Significance level .000 suggests that student achievement was significantly improved by the collaborative teaching approach. The rise in the average score indicates improved learning results, most likely as a result of interactive learning techniques, peer support, and active participation.

Table 4: *Comparison of Results by Using Collaborative Teaching Method Among Elementary Students*

Comparison Tests	Group Members	Mean	Std. Dev.	sig.
Pre-test results	14	14.211	2.811	.000
Post-test results	14	29.211	4.192	

Following the implementation of the collaborative teaching approach, the high achievers' performance significantly improved, according to the t-test results in Table 4. While the post-test mean rose to 29.211 with a larger standard deviation of 4.192, the pre-test mean score was 14.211 with a standard deviation of 2.811. The observed improvement is unlikely to be the result of chance, as indicated by the significance value (p =.000). This implies that the students' learning outcomes were positively impacted by the collaborative teaching approach, which successfully improved their comprehension and performance.

Figure 2: *Low and High Achieving Pupils in the Experimental Group: Comparison Before and After Experimentation*

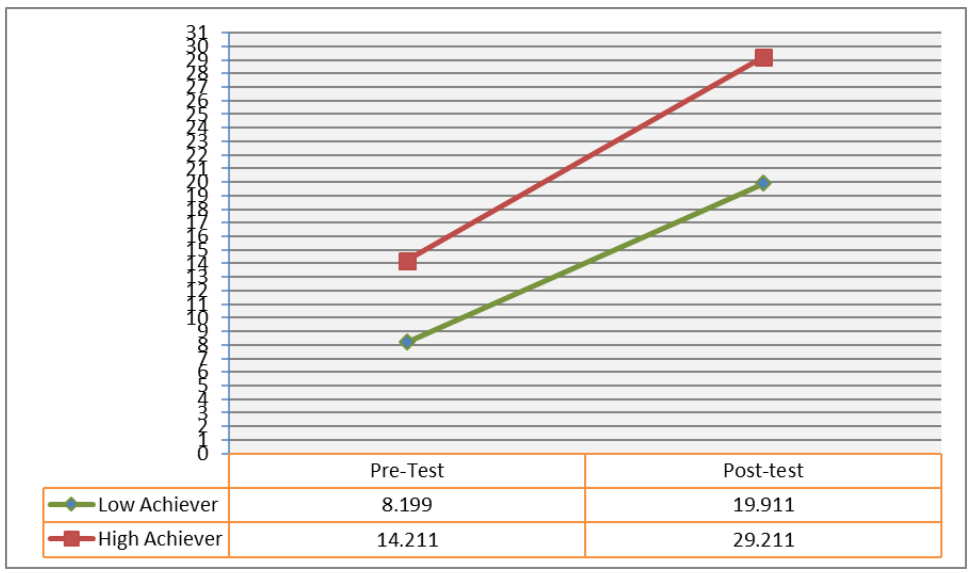

Table 5: *Comparison of Experimental Group (Collaborative Teaching) and the Control Group (Traditional Lecture Method)*

Comparison of groups	Group Members	Mean	Std. Dev.	sig.
Control group	38	19.291	4.121	.001
Experimental group	39	24.561	3.991	

Post-test scores of collaborative teaching and conventional lecture style are compared in table 5's independent samples t-test results. The experimental group has a higher mean score of 24.561 with a standard deviation of 3.991 than the control group, which has a mean score of 19.291 with a standard deviation of 4.121. p = 0.001, which is less than the traditional cutoff of 0.05 implies that compared to the typical lecture group, students in the collaborative teaching group fared noticeably better.

The above results finally showed that students' learning outcomes were improved by collaborative teaching. Additionally, the experimental group's smaller

standard deviation suggests that students' performance is more constant, confirming the value of collaborative learning in raising academic accomplishment as compared to traditional lecture method. Therefore, the null hypothesis “There is no significant difference in the effectiveness of collaborative teaching techniques and conventional lecture-based education in improving students' learning” rejected.

The above data analysis results highlighted some main points as conclusions:

1. Students' performance using the traditional lecture approach improved statistically significantly (p =.000), according to the control group's pre-test and post-test results (Table 1). This implies that learning gains are facilitated by even traditional teaching methods also.
2. Greater mean increase in post-test scores, suggesting that collaborative teaching produced noticeably better learning outcomes (p =.000).
3. The experimental group's low-achieving kids (Table 3) showed notable progress, demonstrating how collaborative approaches successfully assist struggling students by encouraging participation and peer interaction.
4. With a mean post-test score of 29.211, high-achieving students (Table 4) demonstrated impressive growth, confirming that collaborative teaching improves learning for students of all skill levels.
5. The superiority of collaborative teaching over conventional lecture-based training is demonstrated by the post-test comparison (Table 5).

Discussion

The study emphasizes how collaborative teaching approaches have a major influence on elementary kids' growth in higher-order thinking abilities. Although somewhat successful, traditional lecture-based training does not fully engage pupils in creativity, problem-solving, or critical thinking. Peer conversations, problem-based learning, and cooperative learning are examples of collaborative teaching techniques that produce an engaging atmosphere that promotes cognitive development. According to the experimental results, pupils in collaborative environments outperform those in traditional classes in terms of comprehension and analytical abilities.

Peer contact and planned mentoring also significantly improve learning results for low-achieving pupils. Additionally, high-achieving students exhibit notable progress, supporting the idea that collaborative learning is advantageous for students of all skill levels. Despite these benefits, successful implementation involves careful preparation and teacher facilitation to handle issues including unequal participation and classroom management. In the end, combining collaborative methods with conventional teaching methods can result in a well-rounded strategy that optimizes student involvement and learning.

Recommendations

1. **Use Collaborative Instructional Techniques in Classrooms:**

Schools should include group-based learning activities, peer discussions, and interactive problem-solving exercises in their curricula since collaborative teaching has been demonstrated to produce significant improvements in student performance. At every student level, this method can improve critical thinking and participation.

2. **Give Low-Achieving Students Extra Assistance**

Teachers should use focused interventions like peer mentoring, small-group discussions, and scaffolded learning activities to further support difficult students and improve their academic achievement, especially since collaborative teaching has significantly improved low achievers.

3. **Use a Combination Strategy for Optimal Results**

Traditional lecture techniques also aid in learning, even though collaborative teaching is more successful. By accommodating different student requirements and learning styles, a mixed educational approach—which combines direct instruction with group projects—can maximize learning outcomes.

References

AbuSeileek, A. F. (2012). The effect of computer-assisted cooperative learning methods and group size on the EFL learners' achievement in communication skills. *Computers & Education, 58*(1), 231-239. https://doi.org/10.1016/j.compedu.2011.07.011

Dewi, C. A., Erna, M. M., Haris, I., & Kundera, I. N. (2021). The effect of contextual collaborative learning based ethnoscience to increase student's scientific literacy ability. *Journal of Turkish Science Education (TUSED), 18*(3), 525-541.

Ghani, A. A., Zakaria, E. & Rahman, S. (2016). The impact of using visualization technique towards mathematics problem solving involving hots question. *Proceedings of International Conference on Mathematics and Science Education, Universitas Pendidikan Indonesia,* Bandung: West Jawa, Indonesia. Pp 53-59

Kalaivani, K., & Tarmizi, R. A. (2014). Assessing thinking skills: A case of problem-based learning in learning of Algebra among Malaysian Form Four students. *Journal of International Academic Research for Multidisciplinary, 2*(3), 166–173. https://doi.org/10.37934/arsbs.19.1.8089

Khalid, F. (2017). Understanding university students use of facebook for collaborative learning. *International Journal of Information and Education Technology, 7*(8), 595-600.

Mahamod, &., & Hassan, J. (2018). Knowledge, skill and attitude of Malay language teachers in using problem-based learning approach. *Journal of Advance Research in Dynamical and Control System, 10*(12), 1482–1487.

Sarmila, M. S., Zaimah, R., & Lyndon, N. (2018). Corporate social responsibility collaborative strategies for local communities. *International Journal of Engineering & Technology*, *7*(2), 596-601

Sarmila, M. S., Zaimah, R., & Lyndon, N. (2018). Corporate social responsibility collaborative strategies for local communities. *International Journal of Engineering & Technology*, *7*(2). 596-601.

Sekwena, G. L. (2023). Active learning pedagogy for enriching economics students' higher order thinking skills. *International Journal of Learning, Teaching and Educational Research, 22*(3), 241-255. https://doi.org/10.26803/ijlter.22.3.15

Tang, T. (2020). Developing critical thinking, collective creativity skills and problem solving through playful design jams. *Thinking Skills and Creativity*, *37*(8), 10-16. https://doi.org/10.1016/j.tsc.2020.100696

Yen, T. S. & Shalili, S. H. (2015). Effective Teaching of Higher Order Thinking (HOT) in Education. *The Online Journal of Distance Education and e–Learning, 3*(2), 28-39.

Yen, T. S. & Shalili, S. H. (2015). Effective Teaching of Higher Order Thinking (HOT) in Education. *The Online Journal of Distance Education and e–Learning, 3*(2), 133-149.

Zakariya, Y. F., Ibrahim, M. O., & Adisa, L. O. (2016). Impacts of problem-based learning on performance and retention in Mathematics among junior secondary school students in Sabon-Gari area of Kaduna State. *International Journal for Innovative Research in Multidisciplinary Field, 2*(9), 42–47.

Zhou, X., Chen, L. H., & Chen, C. L. (2019). Collaborative learning by teaching: A pedagogy between learner-centered and learner-driven. *Sustainability*, *11*(4), 11-14. https://doi.org/10.3390/su11041174