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The Study How the Collaborative Learning Improve Student's Achievement at Higher Level

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ABSTRACT

This study demonstrate how collaborative learning approach affect or improve student's achievement. The study was directed by three objectives and three research questions. Survey studies and mix-method approaches were among them. Examining in-depth papers that emphasize collaborative learning to raise student accomplishment is the goal of this study. The effect of collaborative learning (CL) on critical thinking abilities has been the subject of numerous studies. Later, this study also looked into how students felt about CL. A combination of methods was used. As the samples are chosen participants for a quantitative inquiry, 225 students 101 male and 124 females from an education department at a university were included. The quantitative data were analyzed using independent sample t-test, mean, stander deviation, degree of freedom, t value, two tailed p value and the qualitative data were analyzed using an interactive model of analysis. The results showed that CL significantly and favorably affected students' academic performance. The students believed that CL improved their emotional intelligence, motivation to learn, cognitive growth, and open-mindedness. However, the most popular tools for gathering and analyzing research data were the t-test, ANOVA and ANCOVA. In light of the study's findings, a number of suggestions have been made for further research, chief among them the necessity of broadening the range of study designs that emphasize critical and creative thinking abilities. Qualitative studies on the growth of critical and creative thinking abilities must be conducted more frequently. Researchers are advised to select a more suitable data analysis method.

1 INTRODUCTION

Two or more individuals work together to learn something or try to accomplish something, that is called collaboration. The necessity of using collaborative learning as a teaching and learning technique based on the active and primary role of learners is highlighted by educational reforms at all levels. This entails engaging the pupils in cooperative learning, group projects, and conversations. Among the factors influencing its effectiveness are the learning framework, class size, and teacher experience (Gisbert, 2018).

1.1 C. L Activities Impact on Students Learning

Collaborative learning activities include group projects, joint problem solving, debates, study teams, collaborative writing and other activities. Taking into account of collaborative teaching, it could help students take charge of their education, build social and academic connections, and achieve shared objectives. It has a good effect on students' learning outcomes as well. During collaborative learning, students communicate both virtually and in person to create shared knowledge. (Molla & Muche, 2018).

1.2 Importance of C.L

Applying the collaborative model is crucial since teamwork is more fulfilling than working alone (Nuramalina et al., 2019). The four skills required in the twenty-first century communication, teamwork, critical thinking, and creative thinking are therefore among the extra skills that students in the twenty-first century need to help them learn (Aslamiah et al., 2021).

Collaborative learning experience helps students to gain a deeper understanding of their course content (McHugh et al., 2020). Provides many educational benefits, for those pupils who are lagging behind and can improve their scores with their friends' assistance (Warsah et al., 2021). Collaborative learning is an appropriate and more effective method of preparing students to become 21st-century learners who can apply their knowledge and skills to solve problems, complete tasks, or create something (Azar et al., 2021).

Research indicates that when groups connect positively and cohesively, they may collaborate more and achieve better learning outcomes. (Isohätälä et al., 2021). Gilbert (2021) Collaborative learning techniques offer an environment that naturally fosters the growth of interactive skills (Mende et al. (2021).

1.3 C. L and Social Skill

Gokhale (1995) reveals that students' social interaction helps them finish a shared task, which develops their academic abilities and group work skills. Collaborative learning spaces give students the opportunity to learn from their peers. Additionally, they can be used to provide feedback on group work, which aids students in staying on task and resolving problems as they arise (Sharma et al., 2019).

In educational institutions, cooperation is crucial (Koesnandar, 2021). Selecting the right learning model is essential to improving learning standards. In education, the collaborative approach is one that encourages improving learning standards (Nuramalina et al., 2019).

1.4 Students Needs or Engagement

Collaborative learning models meet the requirements of students while improving learning and yielding exceptional student outcomes. However, there are benefits to employing this paradigm that can improve students' learning outcomes (Ointu et al., 2022). The definition of "collaborative learning" is disputed, despite the fact that it has been applied in a wide range of fields and disciplines (Jenni, R. & Mauriel)

Role plays, group discussions, case studies, simulations, and problem-solving exercises are some of these techniques that encourage active participation rather than only passive

listening. They foster an atmosphere in which learners actively expand their knowledge and develop a deeper comprehension of the material (Afzal, Rafiq & Kanwal, 2023).

Interactive teaching methods have a positive effect on university level students' learning results, according to research done in South Asia. They encourage deeper learning, critical thinking, and higher order cognitive abilities all of which are necessary for students to meet their academic and professional goals (Jamil & Bhuju, 2023).

Academic institutions have shown a great deal of interest in collaborative learning. This teaching strategy improves learning results and student engagement by including students as active participants in the educational process. Higher education institutions and instructors are starting to see how collaborative learning can improve student engagement and academic success. E-learning tools, and collaborative learning in particular, are growing in popularity in higher education as a means of raising educational standards. Students can share knowledge and enhance their critical thinking and social skills through collaborative learning (Rohman, 2021).

1.5 C. L Create Productive Successful Environment

By combining these two approaches, educators may create a productive and successful learning environment for students. The results of this investigation are anticipated to be beneficial. Some of the best cooperative learning strategies for classroom settings, including problem-based learning, will be covered in this study. We will assess the benefits and drawbacks of each tactic and offer instances of its use at different educational establishments. This study is to help academics and university administrators in the field of higher education select appropriate and fruitful collaborative learning in order to improve student learning outcomes and their engagement in the learning process. The purpose of this study is to help educators, researchers, and university administrators choose appropriate and productive collaborative learning spaces (TEM Journal. August 2023).

Rationale of the Study

The goal of this study is to comprehend the collaborative learning has long been linked to better academic achievement, but its effects on the development of social skills are also drawing more attention. In an attempt to close this gap, this study looks at how cooperation improves academic performance while also fostering the development of critical social skills.

Students who are exposed to traditional approaches that do not sufficiently engage them suffer with motivation, comprehension, and retention. According to earlier studies, students who participate in collaborative learning frequently perform better than their counterparts in conventional settings in terms of understanding, remembering, and applying what they have learned. By offering a variety of opportunities for engagement and peer-to-peer scaffolding, collaborative settings can help close performance gaps for diverse learners. This research is significant because of its possible influence on educational policy and practices. The study aims to encourage the use of collaborative learning practices that can result in more holistic student development by offering a detailed review of social and academic components. By understanding these effects, educators may create learning settings that are more conducive to students' cognitive and social growth.

Purpose of the Study

The study determined the impact of collaborative learning improve students' academic achievement. Specifically, the study determined the;

1. Impact of group learning on pupil’s academic achievement.
2. Effect of problem solving skill that improve pupil’s learning achievement.
3. Interaction impact students' academic performance.

Research Objectives.

The objective of the study is that:

1. To define how collaborative learning affects student's achievement at university level.
2. To evaluate how C.L effect problem solving skill improve students' performance at higher level.
3. To predict how cooperative learning affects students' social skills to improve their learning at higher education.

Research Questions.

The research questions of the study will be as under

1. How does cooperative learning effect on academic success of students at the university level?
2. Do collaborative learning effects students problem solving skill to improve student's achievement's?
3. Do group projects encourage students to interact with one another?

The purpose of this study was to investigate how collaborative learning affects students' academic performance. Our hypothesis was that students' comprehension of the course material would be enhanced by cooperative learning.

Research Methodology

This is a mix method study. This study uses a variety of methods. The researcher will prepare and conduct pre- and post-tests to the experimental groups. The researcher will also conduct semi-structured interviews with university professors and students in Punjab province. All higher education students and faculty members working in the institution's education department will make up the study's population. The sample was picked from a cluster sample of public sector enterprises, with different departments chosen based on time constraints and available resources. The sample method known as cluster sampling was created. Similarly, a cluster sample of instructors and students was chosen from several departments within the faculty of education in order to finish this study. Every instructor who expressed interest in taking part was chosen. They were between the ages of twenty and forty-five. It is advised that a structured questionnaire be the primary instrument utilized to gather data for this investigation. The questionnaire should include a mix of multiple-choice, closed-ended, and possibly some open-ended questions in order to better understand respondents' viewpoints. The study's sample size is 225 respondents, whereas the experimental study's sample size is 115 respondents.

The purpose of the questionnaire is to assess respondents' attitudes, concerns, and opinions regarding group learning in higher education. The creation of interview and questionnaire questions will be aided by literature. The validity will be assessed using the expert opinion technique. A trial test of the tool will be conducted on a limited basis. An unbiased opinion on how C.L are utilized to enhance students' educational experiences will be obtained through a methodical interviewing process. That will be confirmed by experts, and the pilot study will aid in evaluating the tool's reliability. Data will be collected using a paper copy questionnaire.

In situations where teachers or students have internet connection, Google Sheets will be used after talking with and receiving clearance from the supervisor and the director of the department. Interviews will take place with permission from the university teachers. Students' assessments of their abilities will be gathered through a questionnaire, and university students will take an exam to verify and assess the data they submit. SPSS statistical data analysis will be used in this study to accomplish a number of important goals.

First, the views of university-level instructors on the incorporation of cooperative learning in higher education will be compiled and described using descriptive statistics. The

mean scores, standard deviations, and medians of these data provide insight into the main trends and variances in their answers. Second, we will extrapolate results from the sample data to the larger population using inferential statistics, such as confidence intervals and research objectives testing. This will allow us to determine how educators generally feel about the possible influence on academic outcomes.

Analysis of the relationships between variables will be done in order to determine the factors affecting attitudes and perceptions of integration. By making it easier to evaluate the direction and strength of relationships between various variables, correlation statistics will highlight any noteworthy correlations. T-tests, ANOVA, ANCOVA, Pre-test, Post-test used to determine significantly influences the level of technological exposure that male and female higher education instructors related component of integration.

Results:

Research Question 1: How does cooperative learning effect on academic success of students at the university level?

Table 1. To define how collaborative learning affects student's achievement at university level.

t-test about C.L affects student's outcomes

Obj1	Gender	N	Mean	SD	df	t	P-Value (sign2-tail)
C.L* and P.I**or A.L***affects students outcomes	Male	101	31.910	6.028	223	.427	.670
	Female	124	32.258	6.104		.427	

Note: C.L*(Collaborative Learning, Factor: **(Peer Interaction) ***(Active Learning)

Table no 1 show the result of the independent sample t-test used to compare the mean scores of males and females are displayed. Two factors are active learning and peer contact. There are 101 males in the sample with a mean score of 31.9109 (SD = 6.03) and 124 females with a higher mean score of 32.25 (SD = 6.10). The df for the test is 223. The t-value is 427 and the two-tailed p-value is.670. The p-value being higher than 0.05 indicates that there is no statistically significant difference in academic learning between male and female individuals.

Table 2

Research Question 2: Do collaborative learning effects students problem solving skill to improve student's achievement's?

Table 2 To evaluate effects students' problem-solving skill improve students' performance at higher institutions.

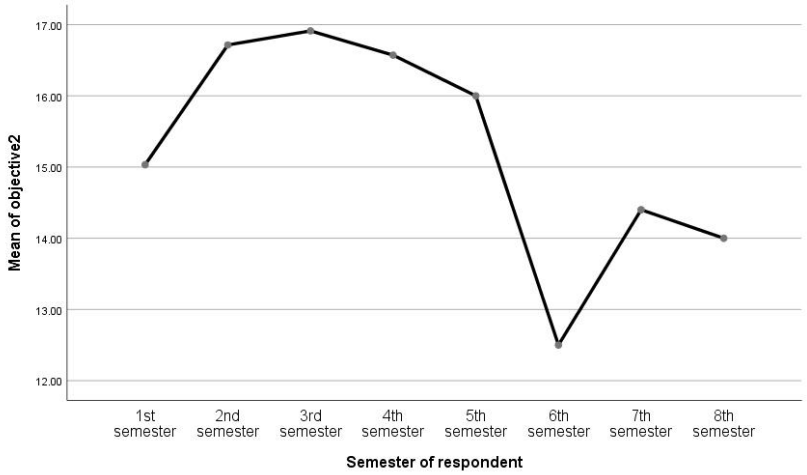
ANOVA test about problem solving skill affects students learning

Obj2	Semester	N	Mean	Std. Deviation	df	f	Sig 2-tailed
Problem solving	1st	31	15.032	2.639	7	2.200	.035
	2nd	49	16.714	3.883			
	3rd	68	16.911	4.021			

skill affect students learning	4th	49	16.571	3.942			
	5th	8	16.000	4.208			
	6th	4	12.500	3.696			
	7th	5	14.400	3.507			
	8th	11	*14.000*	*3.660*			
	Total	225					

Table 2 presents the results of the ANOVA, which show an F-statistic of 2.200 and a p-value of 0.035. We reject the null hypothesis since the p-value is below the traditional significance threshold of 0.05. This suggests that students' problem-solving abilities vary statistically significantly over the course of semesters. First semester: SD = 2.64, mean = 15.03. Mean for the second semester = 16.71, SD = 3.88. The mean was 16.91 and the standard deviation was 4.02 during the third semester. Fourth semester: SD = 3.94, mean = 16.57. Fifth semester: SD = 4.21, mean = 16.00. The mean was 12.50 and the standard deviation was 3.70 for the sixth semester. 7th semester; SD = 3.51, mean = 14.40. Average for the eighth semester: 14.00, SD = 3.66. According to these findings, the third-semester students had the best mean problem-solving abilities, followed by the second, first, and fourth semester students. Students in the fifth semester exhibit a small reduction in mean scores, while those in the sixth and seventh semesters show much larger losses. The eighth-semester students have the lowest mean scores, which would suggest that as they advance in their academic careers, their ability to solve problems is declining.

Means Plots



Research Question 3 Do group project encourage students to interact with one another?

Table 3. To predict how cooperative learning affects students' social skills to improve their learning at higher education.

ANOVA test about C.L affects social skill

Obj3	CGPA	N	Mean	Std. Deviation	df	f	Sig 2-tailed
C.L* affects students	2-2.5	16	30.000	5.440	3	2.159	.059
	2.6-3.0	90	30.788	6.101			
	3.1-3.5	70	33.271	7.206			

C.S**or CCA	3.6-4.00	49	32.755	7.198			
	Total	225	31.933	6.736			

Note:* (collaborative Learning),**(Communication Skill),(C0-Curriculum Activities)

The results of a statistical study that examined the connection between students' social skills and cooperative learning (C.L.) based on their cumulative grade point average (CGPA) are displayed in table 3. The CGPA is divided into four groups: 2.0–2.5, 2.6–3.0, 3.1–3.5, and 3.6–4.0. The mean ratings for each GPA group indicate the average perceived impact of cooperative learning on social skills. Students with a CGPA between 2.0 and 2.5 reported the lowest mean score (M = 30.00, SD = 5.44), suggesting a relatively lower perception of the positive effects of cooperative learning on social skills. Mean scores also tend to increase as GPA improves, with students in the 3.1–3.5 range showing the highest average (M = 33.27, SD = 7.21). This suggests that academically successful students may believe cooperative learning offers greater social advantages. The somewhat lower mean (M = 32.76, SD = 7.20) of the highest CGPA group (3.6–4.0) indicates a slight decrease. The ANOVA findings show an F-value of 2.159 at a significance level (Sig. 2-tailed) of 0.059. Since this figure is slightly higher than the conventional cutoff of 0.05, the mean differences between the CGPA groups are close but not statistically significant at the 5% level. This suggests a tendency where students with higher CGPAs may see cooperative learning more favorably, even though the difference is not big enough to be conclusive.

Mean Plot:

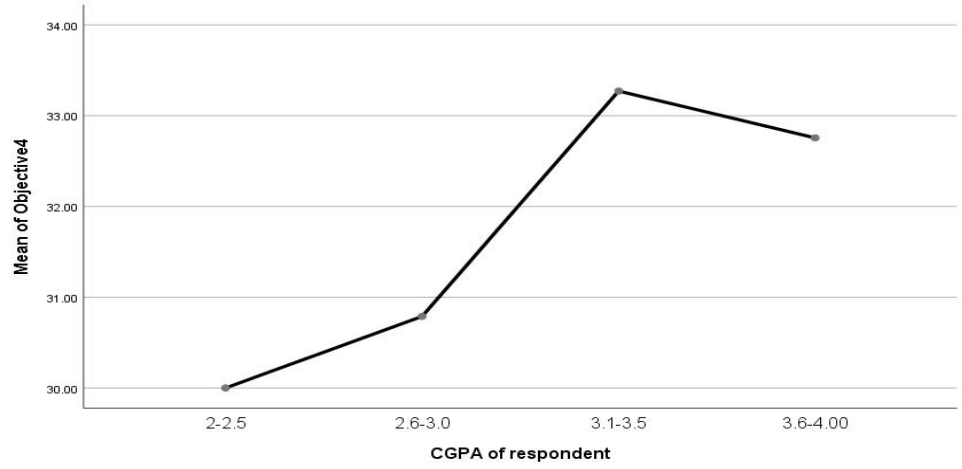


Table 4

Scale-factor analysis using Pearson Correlation Coefficients

	Peer Interaction	Active Learning	Problem Solving Ability	Communication Skill	Co-Curriculum Activities
P.L	1				
A.L	365**	1			
P.S	358**	.469**	1		
C.S	.340**	.320**	.349**	1	

C.C.A	.354**	.314**	.402**	.451**	1

Note: P.I(Peer Interaction), A.L (Active Learning) P.S (Problem Solving) C.S (communication Skill) C.C.A (co-curriculum activities)

Table 4 displays the outcomes of The correlation matrix yields Co-Curricular Activities (C.C.A.), Peer Interaction (P.I.), Active Learning (A.L.), Problem Solving Ability (P.S.), and Communication Skills (C.S.) are among the significant educational elements that are shown to correlate with each other in Table 4. The statistics show strong, statistically significant positive correlations between most of the variables. Students that actively participate in their education are more likely to collaborate and solve problems, as evidenced by the substantial correlations found between Active Learning and Peer Interaction (r =.365**) and Problem Solving Ability (r =.469**). Furthermore, communication skills show strong correlations, especially with peer interaction (r =.340**) and co-curricular activities (r =.451**), suggesting that participation in extracurricular activities can enhance expressive and interpersonal abilities. This implies that motivated children are more likely to engage in extracurricular and academic activities. When taken as a whole, the matrix shows a strong, interconnected framework where social interaction, motivation, active participation, and extracurricular activities all interact to affect students' development and achievement.

Table 5

Objective wise analysis using Pearson Correlation Coefficients

		O1	O2	O3
O1		1		
O2		500**	1	
O3		472**	442**	1

**correlation is significant at the 0.01. level (2-tailed

Note: O1=Objective 1, O2=Objective) 2, O3= Objective 3, O3=Objective 3, O4=Objective 4

Table 5 displays the connections among the three objects (O1, O2, and O3). Every diagonal value is 1, which denotes self-correlation or perfect identity (O1 with O1, O2 with O2, etc.). The result of 500 indicates that there is a strong or significant relationship between O1 and O2 (500**). (472**) is the value between O1 and O3. With a statistically significant value of (442**) ($p < 0.01$) for O2 and O3, these correlations appear to be significant.

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Table 6

Reliability of Research Instrument

Variables	N of Items	Cronbach Alpha's Value	Overall Reliability Analysis of Scale
C.L* affects students outcomes	10	.535	.700
Problem solving effects on learning	5	.599	
C.L* affect social skill	10	.620	

Note: *(Collaborative Learning)

Table 6 show the Cronbach's Alpha rating of 0.700, the scale's overall dependability shows a respectable degree of internal consistency, indicating that the items measure the intended constructs with a decent degree of reliability. When dissecting the scale's various parts: The Cronbach's Alpha for the 10-item measure "Collaborative Learning (C.L.) affects students' results" is 0.535. This value indicates low internal consistency because it is less than the commonly recognized cutoff of 0.6. It implies that there might not be a strong correlation between some of the items in this section and the construct being measured. To increase the items' coherence and dependability, a review and possible amendment are advised. The Cronbach's Alpha for the five-item component "Problem solving effects on learning" is 0.599. This value is on the verge of acceptance, suggesting moderate reliability, although being marginally below the ideal 0.6 criterion. Internal consistency could be increased by adding more related items or making minor adjustments to the item formulation. The 10 entries in the section titled "Collaborative Learning influences social skills" have a Cronbach's Alpha of 0.620. This indicates sufficient reliability because it falls within the permitted range. It implies that there is some degree of consistency in the items used to measure the social skill outcomes of collaborative learning.

Table 7

Pre Test/ Posttest academic achievement Score of Male or Female Students

Gender	N	Pre-Achievement Mean	Sd	Post-Achievement Man	Sd	Mean Gain
Male	50					
Female	65	1.69	.466	1.49	.502	3.1739

Table 7 indicates that male and female participants' pre- and post-achievement scores were analyzed in the study. Pre-achievement means scores for males (N = 50) were 1.69 with a standard deviation (sd) of 0.466, and post-achievement mean scores were somewhat lower at 1.49 with a sd of 0.502. This indicates a 3.1739 mean gain. The table did not fully include the specific statistical data for the pre- and post-achievement scores for the ladies (N = 65). Nonetheless, the comparison research raises the possibility of a gender difference in the effectiveness of interventions or learning outcomes. To fully evaluate the achievement indicators for the female group and conduct a thorough comparison between the two groups, further information would be needed.

Table 8

Summary of Analysis of Covariance (ANCOVA)

Source	Type III Sum of Squares	df	Mean Squares	F	Sig
Correct Model	1.162*	2	.581	2.402	.095
Intercept	4.377	1	4.377	18.089	.000
Pretest	.970	1	.970	4.011	.048
Posttest	.398	1	.398	1.645	.202
Error	27.099	112	.242		
Total	310.000	115			
Corrected Total	28.261	114			
a R Squared = .009(Adjusted R Squared= .004)					

Table 8 show the results of pretest and posttest results were regarded as dependent variables in the analysis of variance (ANCOVA), which looked at how gender (male and female) affected accomplishment scores. With F (2, 112) = 2.402, p =.095, the adjusted model was not statistically significant overall, indicating that the factors in the model do not account for a sizable portion of the variation in performance scores between groups. All subjects had a substantial baseline effect, as indicated by the extremely significant intercept (p <.001). Achievement was statistically significantly impacted by the pretest variable (F = 4.011, p =.048), indicating that starting performance levels had an impact on final results. However, there was no significant gender difference in the posttest scores (F = 1.645, p =.202), suggesting that both male and female performance was comparable after the intervention. Only roughly 4.1% of the variance in the dependent variable was explained by the model, according to the R-squared value of.041 (adjusted R^2 =.024). Although there is some indication that male and female pretest performance differed, posttest scores did not differ significantly, suggesting that the learning experience or intervention may have affected both groups equally.

Discussion.

The results from all eight tables offer a comprehensive picture of the ways in which different demographic and educational characteristics affect students' learning outcomes. Peer contact and active learning scores in Table 1 show no discernible gender differences, indicating that male and female students participate in these academic activities in comparable ways. However, Table 2 demonstrates a notable peak in the third semester and a rapid fall between the sixth and eighth semesters, indicating a major variance in problem-solving skills over semesters. This pattern can be an indication of growing academic pressure or the complexity of the curriculum over time.

Although the finding is marginally insignificant (p =.059), Table 3 examines the association between CGPA and views of cooperative learning (C.L.) on social skills and finds a positive trend: students with higher GPAs tend to regard C.L. more favorably. Strong, statistically significant relationships between active learning, peer interaction, communication skills, and extracurricular activities are shown in Table 4, underscoring the interconnectedness of these educational elements and bolstering the significance of social and academic engagement.

These relationships are supported by Table 5, which displays statistically significant strong positive correlations between the three main objects (O1, O2, and O3). Table 6 shows inconsistent reliability results. Some subscales, including the one assessing how collaborative learning affects student outcomes ($\alpha = 0.535$), have below-acceptable values, indicating the need for item revision, even though the overall Cronbach's Alpha of 0.700 suggests adequate internal consistency. Table 7 looks at how pre- and post-achievement scores differ by gender. Males exhibit a little increase, but interpretation is limited for females due to inadequate data. Last but not least, the ANCOVA results in Table 8 show that although pretest scores had a significant impact on posttest results, gender did not have a statistically significant effect, and the entire model only partially explained the variance in achievement (adjusted R2 =.024). The significance of semester-based curriculum evaluation, the possible impact of academic achievement on opinions of collaborative learning, and the vital role that social and active participation play in promoting student success are all highlighted by these findings taken together. Furthermore, the results imply that although treatments might be equally successful for both sexes, scale reliability and long-term academic engagement should be prioritized in order to effectively assist students' growth.

Conclusion

In summary, a thorough understanding of the variables affecting student learning outcomes is offered by the examination of data from several perspectives, including gender, academic achievement, social engagement, semester advancement, and the validity of assessment instruments. Significant variances across semesters demonstrate the fluidity of students' problem-solving skills and academic experiences, even if no significant gender disparities were observed in learning behaviors or post-intervention achievement. The potential academic and motivational benefits of peer-based involvement are highlighted by the fact that higher-performing students seem to see more gains from collaborative learning. The need of creating an integrated, socially rich learning environment is further shown by the strong correlations between key educational factors including communication skills, peer interaction, and active learning.

But the results also point to areas that require improvement, especially in terms of enhancing the validity of certain evaluation instruments and comprehending the reasons for a decline in academic interest in subsequent semesters. In order to better promote student progress and educational effectiveness, the study emphasizes the necessity of ongoing curriculum evaluation focused intervention.

Educational implications

1. Higher academic attainment and better performance can result from a collaborative learning environment that fosters an active and happy learning atmosphere in the classroom.
2. pertaining to the kinds of techniques and strategies that must be given top priority in teacher preparation programs for both aspiring and experienced educators.

Recommendation

Based on the findings of the study, the following recommendations were proposed;

1. Teachers should use the collaborative learning approach when instructing and learning. It has been shown to raise students' academic achievement.
2. Seminars and workshops that emphasize skill development and the benefits of using collaborative learning as an educational technique in the classroom should be organized by students or teachers.

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