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Relationship Between Collaborative Learning and Perceived Academic Performance of Student: Mediating Role of Generalized Self-Efficacy

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Abstract

This pilot study is investigating the relationship among collaborative learning (CL), general self-efficacy, and perceived academic performance among university students in Islamabad, Pakistan. The study utilized a quantitative cross-sectional method through convenience and snowball sampling to collect data from 41 students through an online questionnaire. Both Pearson correlation and mediation analysis were done. Findings indicate that collaborative learning and perceived academic performance are positively correlated. However, collaborative learning (CL) and general self-efficacy (GSE) are not significantly correlated, and there is no mediation effect present in the study.

Keywords: Collaborative learning, General self-efficacy, Perceived academic performance, University students, Mediation analysis

1. Introduction

Collaborative learning has become significant in higher education and has enabled students to collaborate in the process of knowledge acquisition, dissemination, and problem-solving. In contrast to conventional individual learning, this method is based on the principles of collaboration and mutual accountability for achieving educational objectives. The theory of social interdependence asserts that an amicable cooperative climate will prompt students to help one another and strive to reach shared goals (Johnson & Johnson, 2005). Social constructivist theory shows the importance of social interaction in learning, that is, learning occurs within the so-called proximal development zone where collaboration and mediation is necessary for achieving results (Vygotsky's, 1978). Moreover, prior studies have clearly demonstrated that cooperative learning is beneficial in terms of academic results. In particular, Roseth et al. (2008) showed that cooperative goals are positively correlated with academic success and peer relations. Besides collaborative learning, SE plays a significant role in deciding students' motivation, perseverance, and behavior in academic situations. According to Bandura (1997), SE is a person's belief in their ability to plan the steps and then implement the steps necessary to achieve certain objectives. Many studies show a positive correlation between academic self-efficacy and academic success among students (Honicke & Broadbent, 2016). Nonetheless, SE applies not only to academic studies but also to self-efficacy in a more general sense which denotes people's belief about their possibilities of coping with problems in different spheres of life. The importance of differentiation between these concepts lies in the fact that the current research analyzes the concept of generalized self-efficacy through the Generalized Self-Efficacy Scale (GSES) rather than through any means serving to analyze self-efficacy in academic studies only.

Even though collaborative learning can give chance for peers to support each other, observe each other and solve common problems together, not everyone may benefit from it in the same way. The problems of uneven contribution to group work, social loafing and playing free rider can deter active participation by individuals (El Massah, 2018). Therefore, collaboration may help achieve good collective results while leaving individuals without important personal achievements. This leads to the question about whether the experience of collaboration is linked to people's self-efficacy levels. Prior research has investigated the relation between CL and SE. Liu et al. (2022) studied the concept of academic self-efficacy amid social media-based collaborative learning and

learning outcomes. Therefore, it can be said that the relationship between self-efficacy and collaborative learning is hardly new, although there are differences in learning environments, methods of research and teaching self-efficacy, and qualities studied. Thus, the present research sticks by examining the generalized self-efficacy rather than academic itself and focusing on its mediation relation between collaborative learning and perceived academic performance. It is done through the case of university students in Islamabad, Pakistan. Thus, the present study aims to analyze four connections: the link between CL and PAP, CL and GSE, GSE and PAP and the impact of the concept of self-efficacy as a mediator.

Current research is intended as a pilot study to show a preliminary understanding of the links between CL, GSE and PAP of university students in Islamabad, Pakistan. Since the study is exploratory and has a little sample size, the aim of the research is not to draw firm conclusions but rather to get preliminary evidence on the relationships mentioned above. The findings of the study at hand indicate the need for methodological considerations particularly with regard to the tools used for measurement thus highlighting the necessity of further research with a bigger sample size. Hence the findings could be of use when planning future research in this area.

2. Literature Review

2.1. Collaborative Learning and Perceived Academic Performance

Collaborative learning is an instructional student-centred approach where students achieve shared learning objectives through discussion, peer explanation, problem-solving, and group activities. It emphasizes communication, shared responsibility, and knowledge construction through social interaction by working in groups. Roschelle and Teasley (1995) defined collaboration as “a coordinated, synchronous activity that is the result of a continued attempt to construct and maintain a shared conception of a problem”. In higher education, CL commonly takes place through group discussions, peer feedback, project-based learning, presentations, and study groups.

Research suggests that CL can contribute positively to students' academic development. Upon the research conducted by Temirkhanov et al. (2024), they reported an affirmative link amid collaborative learning and students’ behaviors of engagement in terms of acquiring practical skills. The implications of this discovery included stating that collaborative approach could help students

be more engaged, share the knowledge they have, and use their practical skills. Thus, when investigating the issue of student engagement, Mudrikah et al. (2024) noted the same trend stating that student engagement influenced performance positively and that the method of CL had a mediatory impact on the relation of social factors and students' engagement. In summary, the study conducted by Anghel (2024) proved that CL can contribute to better academic results by enhancing students' engagement in the process of studying. The findings indicated that positive attitudes towards course-specific CL predicted higher achievement, whereas interaction frequency was negatively associated with achievement. This suggests that meaningful and relevant interaction may be more beneficial than simply increasing the frequency of group activities. Similarly, Bach and Thiel (2024) found that the quality of digital interaction was associated with students' self-reported learning gains and satisfaction in online higher-education courses. Prior-knowledge activation, organization of learning activities, positive group climate, and participation were important factors associated with learning gains.

Further evidence comes from cooperative learning, a related but more structured form of group-based learning. Through meta-analysis Güngör et al. (2026) reported a positive relation of cooperative learning and academic achievement and affective behaviours. Although cooperative and collaborative learning are conceptually distinct, these findings provide supporting evidence for the educational value of structured peer learning.

CL may improve academic performance through knowledge sharing, peer feedback, deeper cognitive processing, and active engagement. Therefore, the following hypothesis is proposed:

H1:CL has a significant positive relationship with PAP of university students.

2.2. Collaborative Learning and Generalized Self-Efficacy

SE is the conviction of a person in their capability to arrange and take actions necessary for attaining certain objectives (Bandura, 1997). It is a significant psychological aspect influencing people's confidence, motivation, effort, and persistence faced with challenges. According to Bandura, there are four main sources of self-efficacy: mastery experience, vicarious experience, social persuasion, and physiological or emotional state (Primawati et al., 2026). Self-efficacy might refer to either domain-specific self-efficacy such as academic self-efficacy which is being

confident about being able to carry out academic tasks or generalized self-efficacy which highlights one's overall perception of their capabilities regarding various situations. The present research focuses on generalized self-efficacy, as assessed by General Self-Efficacy Scale (GSES) developed by Schwarzer and Jerusalem (1995), rather than simply focusing on self-confidence in the academic area.

Collaborative learning may strengthen self-efficacy by providing opportunities for students to experience these sources of confidence. Shaikh et al. (2023, as cited in Primawati et al., 2026) identified collaborative learning as an important factor influencing university students' design self-efficacy. Students participating in group-based problem-solving and project activities reported higher design self-efficacy. Similarly, Qadeer (2026), examining 222 undergraduate and postgraduate students in Karachi, found that collaborative learning positively influenced critical thinking, with self-efficacy significantly mediating this relationship. Although the study focused on critical thinking rather than academic performance, it highlights the importance of self-efficacy in explaining the academic benefits of collaborative learning. As a consequence, collaborative learning may play a role in enhancing students' confidence in handling difficult situations although their relationship with general self-efficacy needs more research.

H2: CL has a significant positive relationship with GSE of university students.

2.3. Generalized Self-Efficacy and Academic Performance

Self-efficacy is widely recognized as an important factor associated with academic achievement. Students who believe in their academic abilities are more likely to demonstrate persistence, establish challenging goals, and apply effective learning strategies. Primawati et al. (2026), in a systematic review of 25 empirical studies, identified a positive relationship between self-efficacy, academic achievement, and learning engagement. Their findings suggest that students with higher self-efficacy demonstrate greater persistence and resilience when facing academic difficulties.

Other studies summarized by Primawati et al. (2026) provide further evidence. Huang et al. (2022, as cited in Primawati et al., 2026) examined the relationship between self-efficacy, learning achievement, and metacognitive monitoring. Han et al. (2021, as cited in Primawati et al., 2026) reported that self-efficacy in quantitative subjects predicted first-year GPA, while Hanham et al.

(2021, as cited in Primawati et al., 2026) identified a positive relationship between academic self-efficacy and academic achievement.

SE may also enhance academic performance by encouraging student engagement. Martin et al. (2023, as cited in Primawati et al., 2026) found that self-efficacy was associated with higher engagement, including participation, aspirations, and enjoyment, and lower disengagement. Students who believe in their abilities are more likely to participate actively, invest effort, and persist through academic challenges. Consequently, SE may contribute positively to students' academic performance. When it comes to the interpretation of the relationship between self-efficacy and academic performance, it is vital to differentiate academic SE from GSE. While academic self-efficacy is related to the level of students' belief in their skills to complete their assignments, generalized self-efficacy pertains to the extent of students' conviction in their ability to deal with difficult situations in various circumstances. Although prior research emphasizes the importance of academic self-efficacy, this study focuses on generalized self-efficacy. Thus, this research will concentrate on the relationship that exists between generalized self-efficacy and perceived academic performance.

H3: GSE has a significant positive relationship with PAP of university students.

2.3.1. Perceived Academic Performance

PAP refers to students' subjective evaluation of their learning progress, academic functioning, and attainment of academic goals, rather than an objective indicator such as GPA or examination scores. It is an important outcome in higher-education research because students' self-evaluations can influence their motivation, confidence, engagement, and future academic effort. Recent studies have used perceived academic performance as a valid self-report measure among university students. For example, Innab et al. (2026) measured perceived academic performance among nursing students and examined its relationship with self-efficacy and satisfaction with e-learning. Similarly, Gomez et al. (2025) measured perceived academic performance through students' self-ratings and found that it was positively associated with creative self-efficacy and personal strengths among Spanish undergraduates. These studies support the use of perceived academic performance as a meaningful outcome variable, particularly in survey-based research where objective academic

records are not available. Therefore, the present study measures students' perceived academic performance through self-report.

2.4. Generalized Self-Efficacy as a Mediator

The link between collaborative learning and academic success may relate to self-efficacy. By interacting with their peers through joint group work, peer observation, and constructive criticism, students are likely to build self-belief. At the same time, these kinds of experiences may lead to increased effort, persistence, and involvement in schoolwork.

The above correlation is in line with Bandura's Social Cognitive Theory which enumerates the sources of self-efficacy including mastery experience, vicarious experience, social persuasion, and physiological and emotional states (Bandura, 1997). Collaborative learning situations create favorable conditions for students to learn to use these sources. Although previous studies highlight the importance of self-efficacy in the development of academics, they have looked at different educational contexts and outcomes. Also, minimal amount of research has been conducted on the generalized self-efficacy in relation to the collaboration of learning. This study will look into the mediating role of generalized self-efficacy in this relation among students of universities. Previous research has suggested evidence regarding the mediating role of self-efficacy. Qadeer (2026) found that self-efficacy mediated the relationship between collaborative learning and critical thinking of university students in Karachi. In the same vein, Zhang and Vongurai (2025) found the positive effect of student-student interaction on self-efficacy as well as the effect of self-efficacy on learning achievements. Also, research done by Wang et al. (2022) revealed that learning interactions increased self-efficacy and brought learning engagement. Other studies highlighted self-efficacy in learning persistence (Tang et al., 2021, as cited in Primawati et al., 2026) and academic performance (Ba et al., 2025).

Thus, previous studies emphasize the importance of self-efficacy in academic progress, they look at its role within different learning contexts and outcomes. Hence, there is a need for further study of whether generalized self-efficacy serves as a mediator in the relationship between collaborative learning and perceived academic performance of university students.

H4: GSE mediates relationship between CL and PAP.

2.5. Research Gap

The existing literature shows that collaborative learning has a role in academic improvement of the students through interaction among peers, knowledge exchange, and participation. Nonetheless, it should be noted that effectiveness is not only based on the number of interactions but also on their quality and relevance (Anghel, 2024; Bach & Thiel, 2024). The former findings also examined various aspects of group learning, such as cooperative learning, interaction between students, and collaborative problem solving. Despite the fact that these methods have some common features, they have different meanings. One other area requiring further investigation is the role of self-efficacy as a mediator. While prior research has shown the relationship of self-efficacy and academic success (Primawati et al., 2026) and highlighted its mediation function regarding relationships between cooperative learning and students' interaction (Qadeer, 2026; Zhang & Vongurai, 2025), there have been very few empirical studies that analyzed self-efficacy as a mediator between collaborative learning and academic results. The previous research mainly focused on specific outcomes such as critical thinking, students' engagement, and learning achievements obtained through peer interaction instead of analyzing the full relationship predicted in the current study. Therefore, further research is needed to find out whether self-efficacy mediates the correlation between CL and PAP.

Consequently, the present study addresses this gap by examining the direct relationship between collaborative learning and academic performance, the relationship between collaborative learning and self-efficacy, and the mediating role of self-efficacy among university students. In addition, the current research contributes to this field of study by investigating generalized self-efficacy as a likely mediator between collaborative learning and perceived academic success, rather than focusing only on academic self-efficacy.

2.6. Research Model

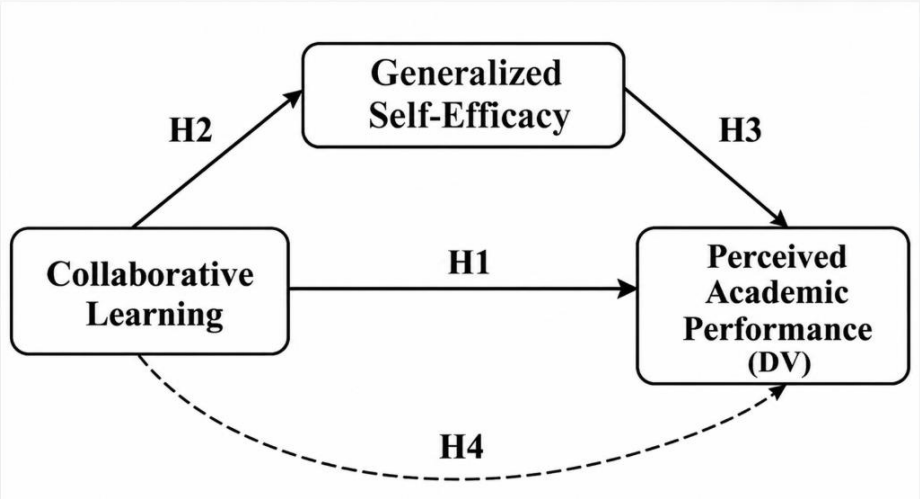


Figure 1: Research Model

3. Research Methodology

3.1. Research Paradigm and Approach

The study was executed within the context of a post-positivist paradigm of research. Post-positivism holds that social phenomena can be studied systematically through practical observations and statistical analysis, but the findings of research can be affected by various measurement errors and inconsistencies (Creswell & Creswell, 2018). The use of post-positivism was justified because the research was aimed at determining the connection between collaborative learning (CL), self-efficacy (SE), and perceived academic performance (PAP) through the use of quantitative evidence. The research was quantitative in nature, meaning that the research utilized numerical data gathered through a questionnaire, analyzed statistically. Quantitative research method is effective for evaluating relationships between variables and verifying hypotheses developed beforehand (Saunders et al., 2019). The research applied a deductive methodology as it established hypotheses on the basis of previous studies and theoretical argument prior to gathering and evaluating data (Bryman, 2016; Sekaran & Bougie, 2016).

3.2. Research Design and Time Horizon

A cross-sectional research design was used, that means the data were collected from participants at a single time in point. The cross-sectional study design permitted the researcher to assess the correlation of CL, GSE, and PAP within the available time (Saunders et al., 2019). Though it was effective for analyzing the relationships at one point in time, it could not demonstrate causation.

3.3. Target Population and Sampling Technique

Public and Private university students of Islamabad and Rawalpindi are target audience. University students were chosen for this study since CL activities such as group work, peer interaction, and joint academic responsibilities are pertinent to their education.

The sampling technique used in the research was non-random convenience sampling coupled with snowball sampling. Convenience sampling refers to a sampling process wherein participants are chosen for the research because they are available to the researcher; snowball sampling is a tool that allows those who are initially chosen from the target population to pass the invitation to participate to other potential respondents. These methods are useful when researchers cannot use random sampling methods or have limited access to the target population in the observational process (Etikan et al., 2016). The questionnaire link was shared with students via WhatsApp groups, and the respondents were encouraged to pass the link further among their friends. The participation was voluntary, and a total of 41 satisfactory responses were collected. Since the distribution of the questionnaire took place via the internet and through forwarding from one participant to the next, the researcher could not determine the number of people to whom the invitation was sent. Hence, no formal response rate could be calculated. The relatively small sample size of this study is one of its most significant limitations. A sample of 41 people limits the statistical power of the research, especially in the case of mediating analysis. Thus, non-significant findings should be viewed skeptically as it cannot be taken as valid proof regarding the absence of any relationship between the studied variables.

3.4. Study Setting and the Unit of Analysis

The study was performed in an education environment without any interference. Data was obtained through online questionnaires sent via WhatsApp as opposed to classroom observation performed

by the researcher. Respondents worked independently and shared information based on their previous learning experiences.

The individual university student is the unit of analysis since the three research variables were formulated based on respondents' answers. Each participant has provided information about his/her collaborative learning experience, self-efficacy beliefs, and academic performance. The unit of analysis is expected to be aligned with the variables' measurement level and hypotheses examined.

3.5. Research Instrument

3.5.1. Perceived Academic Performance Scale

Students' academic performance was evaluated via the Jabir and Farooq 2022, 24-item Students' Academic Performance Scale (SAPS) administered simultaneously to two cohorts, school leaders and teachers who were expected to use the scale to assess students' academic performance. This Scale has been used to measure perceived student's academic performance. From the researchers' work, they identified two dimensions of academic performance: a) Students' Individual Performance (16 items) and b) Students' Group Performance (8 items). They recognize that academic performance consists of both a process and an outcome; therefore, they do not view it simply as grade points or the results of a student's test. The researchers selected the scale because it was specifically designed to give a comprehensive assessment of how well students perform in school by including Cognitive (knowledge), Behavioral (skill), Affective (attitude), and Social (capacity to interact) variables that affect how well students do. Using both Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) to determine the psychometric properties of the PAP of students, the researchers established those properties of the scale to be very highly valid, indicating that the understanding and measurement of students' academic performance is based on two distinct factors - Individual Performance and Group Performance.

The SAPS showed acceptable model fit indices (RMSEA = .03, NFI = .90, RFI = .90, TLI = .92, CFI = .93), which were used by the authors when determining their conclusion that the scale is highly valid and provides a reliable method to assess all aspects of student academic performance **[Appendix 1]**. The researchers adopted previously validated scales for collaborative learning,

generalized self-efficacy, and Perceived academic performance; therefore, the reliability and content validity of the study were improved and the constructs being measured were assessed accurately and reliably through collaboration.

3.5.2. Self-efficacy Scale

The GSES Scale was created by Schwarzer and Jerusalem (1995) as part of their research on self-efficacy, the belief in one's ability to cope with challenges, solve problems, reach goals, and overcome challenges. The GSES scales used in this study provide 10 sample questions, including "I can always manage to find a solution to difficult issues, if I try hard enough"; "I usually manage to handle whatever comes my way". Using a 4-point Likert scale (1 = Not at all True; 2 = Rarely True; 3 = Mostly True; 4 = Exactly True), responses to these items were used to measure participants' generalized self-efficacy beliefs across a variety of academic contexts and learning experiences. GSES has consistently demonstrated excellent reliability (Cronbach's alpha coefficient) typically ranging from .76 to .90 across different countries and populations (Schwarzer & Jerusalem, 1995; Scholz et al, 2002) **[Appendix 2]**. The GSES measures generalized self-efficacy beliefs (i.e., self-efficacy that is not task-dependent); therefore, it is especially useful for evaluating confidence among students who are taking on academic challenges or completing task-type learning.

3.5.3. Collaborative Learning Scale

Collaborative learning was measured with a scale consisting of ten items that have been adopted from Cagatan and Quirap (2024). This scale assessed students' perceptions of the collaborative learning experience through indicators such as: (1) Positive Interdependence, (2) the Willingness to Work Together, (3) the Sharing of Knowledge, (4) Participation as a Group and (5) Collective Success. Examples of items on the collaborative learning scale are: "I value the sharing of ideas" and "I learn more productively by learning with my group members compared to working on my own." All responses were measured on a five point Likert scale with the following: 1 = Strongly Disagree to 5 = Strongly Agree **[Appendix 3]**.

The scale is also based on Social Interdependence Theory which theorizes that when individuals work together on a common goal, they will achieve improved learning outcomes compared to when they work independently (Johnson & Johnson, 2005). Based on previous data, the

collaborative learning scale has been found to be an effective instrument in measuring collaborative learning and demonstrated a statistically significant positive relationship with the academic performance of students (Cagatan & Quirap, 2024). Furthermore, the items within the scale comprehensively measure the core constructs of collaborative learning: positive interdependence, promotive interaction, and individual responsibility, thus making the collaborative learning scale a relevant tool to achieve the existing goals of this research.

3.6. Ethical Considerations

The ethical guidelines that have been implemented will be respected throughout the research process. Participants were informed about the purpose of the study before participating and given enough information to make an informed decision whether or not to participate in the study. Participation was completely voluntary and if a participant chose to withdraw, they could do so without fear of any repercussions or negative consequences. Confidentiality and anonymity were upheld by not collecting identifying information from participants and reporting results in aggregate form.

4. Results and Discussion

The empirical data, descriptive statistics, correlational statistics, regression statistics, and related discussions regarding the relation of CL and PAP and GSE as a mediator are discussed below.

Table 1: Sample Size and frequency distribution

		GENDER	AGE	STUDY LEVEL
N	Valid	41	41	41
	Missing	0	0	0

Table 2: Male and Female respondent' percentage

GENDER

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	7	17.1	17.1	17.1
	Male	34	82.9	82.9	100.0
	Total	41	100.0	100.0	

Of the 41 people who responded to our survey, 34 are men. That means that 82.9% of our total sample consists of men. There were only 7 women participating in our survey, which means 17.1% are women. The overwhelming majority of our participants in this sample fall into the category of male.

Table 3: Frequency of Different Age groups of Respondents

AGE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	19	2	4.9	4.9	4.9
	20	2	4.9	4.9	9.8
	22	6	14.6	14.6	24.4
	23	10	24.4	24.4	48.8
	24	8	19.5	19.5	68.3
	25	2	4.9	4.9	73.2
	26	4	9.8	9.8	82.9
	27	1	2.4	2.4	85.4
	28	1	2.4	2.4	87.8
	30	1	2.4	2.4	90.2
	34	1	2.4	2.4	92.7
	38	1	2.4	2.4	95.1
	40	1	2.4	2.4	97.6

	42	1	2.4	2.4	100.0
	Total	41	100.0	100.0	

A wide range of ages among respondents (ages 19-42) was apparent from an analysis of age demographics.

I. Concentration group: Respondents tend to cluster in their 20s, primarily early-to-mid 20s; however, respondents aged 23 comprised the largest group of respondents (n=10; 24.4%); the next largest groups are 24 years (n=8; 19.5%) and 22 years (n=6; 14.6%). Students in the 22-24-year age range comprise 58.5% of respondents.

II. Young outlier: Only 2 respondents between ages 19 and 20; each account for 4.9% of total respondents.

III. Mature/non-traditional group: The mature/non-traditional outliers are 27-42 years and have only one respondent per age (n=1; 2.4%); however, there are also four respondents who were aged 26 (9.8%).

Study Level

Table 4: Study Level Frequency Distribution

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Undergraduate	12	29.3	29.3	29.3
	Graduate	14	34.1	34.1	63.4
	Masters	15	36.6	36.6	100.0
	Total	41	100.0	100.0	

The data show that different levels of post-secondary education are fairly evenly represented.

I. Undergraduate Students: This group performed with 12 participants (29.3% of total sample) and are in the first tier of their university education.

II. Graduate Students: This group contains 14 participants (34.1% of the total sample).

III. Masters Students: The largest single academic group is composed of post-graduate Masters' students with 15 participants (36.6% of the total).

4.1. Descriptive Analysis

Table 5: Descriptive Analysis of Variables

	CL	SAP	SE
Mean	32.5707	81.8547	28.7195
Median	34.4000	83.2083	28.3000
Mode	34.40	82.21[a]	27.30
Std. Deviation	9.39019	11.43354	4.79537
Variance	88.176	130.726	22.996
Skewness	-.836	-.096	-.277
Std. Error of Skewness	.369	.369	.369
Kurtosis	.250	-.191	-.102
Std. Error of Kurtosis	.724	.724	.724
Minimum	9.10	58.08	18.20
Maximum	45.50	109.17	36.40
a. Multiple modes exist. The smallest value is shown			

Based on the results of descriptive statistics, it was found that Collaborative Learning (CL) has the mean score 32.57 (SD = 9.39), Perceived Academic Performance (PAP) has mean score 81.85 (SD = 11.43), and Generalized Self-Efficacy (GSE) has mean score 28.72 (SD = 4.8). Results showed that the distribution of CL is negatively skewed (–0.836) which means that most scores are to the higher side of CL distribution. SAP (–0.096) and GSE (–0.277) distributions are relatively symmetrical. Kurtosis values of CL (0.250), PAP (–0.191), and GSE (–0.102) are very close to 0 which indicates the distributions of each of the three CV variables do not depart from normality significantly. Nonetheless, in order to conclude that we have normal distribution it is necessary to analyze other information including maximum and minimum values obtained on those scales.

4.2. Distribution and Normality (Skewness and Kurtosis) Analysis

To assess the structural validity of parametric statistics (such as Pearson correlation and Hayes PROCESS mediation), the degree of normality of the distribution of the data by evaluating skewness (asymmetry) and kurtosis (the "peakness" or "flatness" of the distribution) is observed. According to common statistical standards (for example, Kline, 2016, pp. 136-137), normally distributed data is considered acceptable within a skewness range of -3 to +3, and an excess kurtosis of -10 to +10 (though the more stringent thresholds used to assess normally-distributed data would be visible at the extremes from -1 to +1).

4.2.1. Collaborative Learning (CL)

- Skewness (-.836): negative skew, suggesting that almost all of the students have high scores (positional perspective = almost exclusively positive perceptions of collaborative learning). Thus, the distribution of scores is skewed to the negative because the majority of the students received high grades.
- Kurtosis (.250): since the kurtosis is slightly positive, this suggests that the distribution is slightly leptokurtic (peaked), indicating that scores cluster relatively close to the midpoint of the sample distribution.

4.2.2. Perceived Academic Performance (PAP)

- Skewness (-.096): almost zero; extremely symmetrical; exhibits a nearly perfectly normal distribution.
- Kurtosis (-.191): because the kurtosis is slightly negative, this indicates the distribution is slightly platykurtic (less peaked); however, this distribution is functionally nearly perfectly *normal.*

4.2.3. Generalized Self-Efficacy (GSE)

- Skewness (-.277): very slightly negatively skewed, indicating a slight concentration of students with healthy baselines of self-efficacy.
- Kurtosis (-.102): very slightly negatively skewed; this indicates a safe degree of similarity in "flatness."

4.3. Correlation Analysis

Table 6: Correlation Analysis of SAP and SE

		CL	SAP	SE
CL	Pearson Correlation	1	.381*	-.018
SAP	Pearson Correlation	.381*	1	.378*
SE	Pearson Correlation	-.018	.378*	1
*. Correlation is significant at the 0.05 level (2-tailed).				

Prior to conducting full-blown mediation modeling, a bivariate correlation analysis (Pearson Correlation) was performed to determine preliminary relationship direction, strength, and significance between three core variables: CL, GSE and PAP.

4.3.1. Relationship between CL and PAP (H1 testing)

Statistical Findings: CL and SAP exhibits a statistically moderate significant correlation (Pearson coefficient of r = .381; 2-tailed significance = p = .014). Given that the p-value (p = .014) is less than the standard alpha level for significance (alpha = 0.05), this finding suggests that the relationship between these variables is statistically significant; further, because r is a positive value, this indicates that CL and SAP have a moderate-to-strong, positively linear correlation with one another. This finding supports H1 that there is a positive relationship between students' perceptions of engagement in collaborative learning experiences and their performance academically (suggesting additional empirical evidence).

4.3.2. Relationship Between CL and GSE (Testing H2)

The Pearson's correlation coefficient indicates r = -0.018 with a significance level of p = 0.910, indicating no statistically significant correlation between CL and GSE. The p-value indicates that there is no statistically significant correlation between collaborative learning and self-efficacy, as it is above the threshold of 0.05. The R-value of collaborative learning to self-efficacy is essentially zero, thus indicating that there is no linear relationship in this data set. These results do not support Hypothesis 2. A student's level of experience of or score on collaborative learning does not have

a statistically significant mathematical relationship to that student's level of personal academic self-efficacy within this sample of students.

4.3.3. Relationship between GSE and PAP (Testing H3)

The correlation between GSE and PAP of Students was computed statistically with a Pearson r correlation coefficient = 0.378, and a p-value of 0.015. This means that since the p-value (0.015) is less than the critical alpha (0.05), this statistical analysis supports the hypothesis that there is a statistically valid relationship between GSE and PAP. In addition, the positive r-value indicates a moderate or positive correlation. The result provides moderate support for the third hypothesis, which indicates that as a Student's GSE increases or strengthens, then their actual academic performance will also increase or strengthen in a positive relationship.

4.3.4. Critical Insight for mediation analysis (hypothesis 4)

The study on mediation considered whether Generalized Self-Efficacy is a mediator in the relationship between CL and PAP. It was found that CL did not significantly predict GSE (B = −0.0093, SE = 0.0818, t = −0.1136, p = .9102), however GSE predicted PAP when the CL variable was controlled for (B = 0.9179, SE = 0.3251, t = 2.8232, p = .0075). The bootstrap indirect influence value of Collaborative Learning on Perceived Academic Performance of the Students via Generalized Self-Efficacy is equal to −0.0085 with a 95% certainty range of [−0.1621, 0.2395]. As this range includes zero, it proves the absence of the indirect influence. Thus, Hypothesis 4 is rejected, which tells about no mediating effect of GSE as per the results of the research. Nevertheless, there is still a strong direct relationship between CL and PAP (B = 0.4730, p = .0070).

4.4.Regression Analysis

Table 7: Total, direct and indirect effects of X on Y using Regression Analysis

```
************** TOTAL, DIRECT, AND INDIRECT EFFECTS OF X ON Y **************

Total effect of X on Y
     Effect         se          t          p       LLCI       ULCI
      .4645      .1802     2.5771      .0139      .0999      .8290

Direct effect of X on Y
     Effect         se          t          p       LLCI       ULCI
      .4730      .1660     2.8488      .0070      .1369      .8091

Indirect effect(s) of X on Y:
            Effect     BootSE   BootLLCI   BootULCI
SEtotal     -.0085      .0991     -.1621      .2395

************************ ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95.0000
```

The PROCESS mediation results indicate that there is a positive effect of Collaborative Learning (CL) on Perceived Academic Performance (PAP) when both are measured simultaneously as Collaborative Learning has a direct effect on Perceived Academic Performance (β = 0.4645; p = .0139) and on Perceived Academic Performance after controlling for (GSE) as a mediator (β = 0.4730; p = .0070). Thus, Hypothesis 1 is supported. The negative indirect effect through GSE was found to be non-significant (β = -0.0085) as the 95% bootstrap confidence interval (BootLLCI = -0.1621; BootULCI = 0.2395) included a value of 0. Therefore, Hypothesis 4 was not supported and GSE does not mediate the relationship between Collaborative Learning and Perceived Academic Performance

Table 8: R2 and F values of SE, CL and SAP

Outcome Variable	Predictor Variable(s)	R2	F	Coefficient (β)	SE	t-value	p-value	95% Confidence Interval
Self-Efficacy **(M)**	Collaborative Learning (X)	.0003	.0129	-.0093	.0818	-.1136	.9102	[-.1747, .1561]
Academic Performance **(Y)** ***(Total effect Model)***	Collaborative Learning (X)	.1455	6.6417	.4645	.1802	2.5771	.0139	[.0999, .8290]
Academic Performance (Y)	Collaborative Learning (X)	.2937	7.8994	.4730	.1660	2.8488	.0070	[.1369, .8091]
(Full Mediation Model)	Self-Efficacy (M)			.9179	.3251	2.8232	.0075	[.2597, 1.5760]

4.4.1. Statistical Interpretation

The regression analysis indicates that (X) is significantly and positively correlated to the total effect (Beta = .4645, p = .0139) and direct relation (Beta = .4730, p = .0070) on (Y) (PAP). (M) (GSE) also positively and independently predicts a greater extent of (Y) (Beta = .9179, p =.0075). However, (X) (Collaborative Learning) does not have a significant prediction of (M) (Beta = -.0093, p = .9102). Collectively, (X) and (M) account for 29.37% of the total variance in (Y) and there is no mediation path between (X) and (M).

4.5.Reliability Analysis

4.5.1. Overall Scale Reliability Test

Table 9: Reliability Analysis Test of whole scale and inter-item

Reliability Statistics	
Cronbach's Alpha (*a)*	N of Items
.916	44 (Complete Scale)
.916	10 (CL Scale)
.864	24 (SAP Scale)
.881	10 (SE Scale)

4.6. Scale Reliability Analysis

To assess the internal consistency and reliability associated with the instruments included in this primary research study, a calculation of the overall alpha coefficient as well as the alpha coefficient of each individual subscale; Collaborative Learning (CL), Perceived Academic Performance (PAP), and Generalized Self-Efficacy (GSE) was completed. An alpha of .70 or higher (as per standardized psychometric practices) indicates acceptable levels of internal consistency between items measuring the same construct, while an alpha greater than .80 indicates very strong degrees of reliability (Hair et al., 2019).

- Overall Scale: The total instrument, containing 44 items, had an overall Cronbach's alpha of .916 indicating excellent reliability.
- Collaborative Learning Subscale: This subscale, consisting of 10 items, had an extremely high reliability coefficient of .916.
- Perceived Academic Performance Subscale: Made up of 24 items, this scale had a reliability coefficient of .864, indicating a high overall level of internal reliability.
- Generalized Self-Efficacy Subscale: This subscale used 10 items and had a high alpha value of .881.

4.6.1. Interpretation

The reliability analysis indicates that all subscale measures far exceed the widely accepted .70 psychometric reliability threshold. Therefore, all high Cronbach's alpha values suggest sufficient consistency and accuracy across the latent constructs as captured by their respective questionnaire items from the sample of students. Thus, the stability of the data collected is high and free of structural error; therefore, all collected data was statistically valid for purpose of completing robust regression and mediation analysis experiments.

4.7. Validity Test (Face and Construct Validity)

Table 10: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy for SE Scale	.832
Kaiser-Meyer-Olkin Measure of Sampling Adequacy for CL Scale	.902

The measure model of this study's assessment of the relationship between collaborative learning and perceived academic performance, as mediated by generalized self-efficacy, includes evaluations of reliability and validity for all scales (construct validity, face validity). An exploratory factor analysis (EFA) with principal axis factoring was used to establish construct validity of the 10-question collaborative learning (CL) scale by demonstrating excellent data suitability (KMO = .902, $p < .001$, Bartlett's test) and extracting one underlying factor with very strong factor loadings (i.e., .727 to .939 for all CL items). This provides evidence of convergent validity. An EFA using varimax rotation was performed on the generalized self-efficacy (GSE) scale, resulting in evidence of good data suitability (KMO = .832, $p < .001$) and two valid factors; seven items captured problem-solving resilience (i.e., factor 1), and two items assessed situational adaptability (i.e., factor 2) with factor loadings of .583–.860 and .748 and .825, respectively. Only one weak SE item was excluded due to reduced scale cohesion. Lastly, rather than using statistical factor analyses, the SAPS was established using the previous work of Sabri and Jabir (2021) by obtaining their instrument without any modifications to its content and qualifying to complete the items as academic measures. Factor matrix are considered for CL and SE loading factors **[Appendix 4]**

4.8. Theoretical and Practical Implications

Theoretical Implications: This study expands the field of modern educational psychology by challenging the assumption of a systematic relationship between a social environment for learning and a person's individual sense of cognitive competence. The strong direct link between Perceived academic performance and collaborative learning supports Vygotsky's (1978) Social Constructivism theory. Conversely, only a very weak association between collaborative learning and self-efficacy weakens Bandura's (1997) Social Cognitive theory. Together, these findings show that collaborative learning environments do not necessarily provide individuals with the vicarious or mastered experiences that they need in order to develop self-efficacy.

Practical Implications: Academic institutions and educators should consider group projects as beneficial ways to enhance the quality of performance on a short-term basis but should not consider collaborating on a group project to be an effective way to enhance individual student GSE To improve students' GSE, instructors need to design interventions that are aligned with the group work experience, such as individualised feedback about mastery, journals for self-reflection, and individualised frameworks for goal setting, to reduce the likelihood that students who are quieter or less confident will be overshadowed by others in a group task.

5. Conclusion

This research focused on the relationship between Collaborative Learning (CL) and Perceived Academic Performance (PAP) in the presence of Generalized Self-Efficacy (GSE) as a potential mediator among university students in Islamabad, Pakistan. The results showed a significant positive correlation between CL and PAP (B=0.4645, p=0.0139), thus validating H1. However, there was no significant relationship between CL and GSE (r=−0.018, p=0.910), thus disapproving H2. Subsequently, GSE was found to have a significant influence on PAP (B=0.9179, p=0.0075). Lastly, CL was seen to have no significant indirect impact on PAP through GSE (B=−0.0085, 95% bootstrap CI [−0.1621, 0.2395]), leading to rejecting H4. Therefore, according to the outcome of the research, CL and GSE are both important for PAP of students in the eyes of academic community but mediation model was not confirmed in this research.

5.1. Knowledge Contribution

This paper presents contextual evidence about the links between collaborative learning, general self-efficacy, and perceived academic achievement among higher education institutions in Islamabad, Pakistan. The correlation of importance between collaborative learning and perceived academic outcomes is based on the general premise of Vygotsky's Social Constructivism (1978) theory which supports the role of social interaction in learning. Similarly, the connection between general self-efficacy and perceived academic performance is supported by Bandura's Social Cognitive Theory (1997). However, the lack of significant relationship between collaborative learning and general self-efficacy suggests that collaboration may not directly lead to stronger general beliefs in one's capacity.

5.2. Study Limitations

The limitations of the research are numerous. To begin with, the use of a small sample (N = 41) limits both the statistical power of the study and its ability to generalize. In addition, it is possible that the use of convenience and snowball sampling has led to the introduction of bias. Thirdly, the study does not establish causality between the variables but makes use of self-reporting tools, which could lead to common method bias. Perceived academic performance may differ from actual academic performance of students. Moreover, it should be noted that the measurement tools used in this study require additional validation. Finally, another weakness of the research is that no information about any other variables, such as previous academic performance, academic field, and institution characteristics has been provided in the study.

5.3. Practical Recommendations

Institutions of higher learning should utilize structured collaborative learning techniques for their educational programs that involve group dialogue, peer-to-peer learning, and academic projects. Moreover, educationists must motivate students to become more self-efficient through offering constructive feedback, setting up individual learning objectives, and giving them the opportunity to accomplish independent achievements. Therefore, the combination of collaborative approaches and the support of individual learning will allow fulfilling educational objectives of students. Nevertheless, there should be further empirical testing of the statements mentioned above.

5.4. Directions for Future Research

Future studies should include larger samples of individuals and target various geographic areas and institutions of higher education across Pakistan. Longitudinal studies would provide better understanding of changes in collaborative learning processes and self-efficacy. Furthermore, scholars should take into consideration objective indicators of academic performance features (such as GPA and assessment results) during the research along with self-reported results. It would be also important to use various moderating variables (group size, peer acquaintances, and accountability.

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Appendix

Appendix 1: PAP Scale

S. No	Statement	Factor Loading
Sub-dimension One: Students' Individual Performance		
1	I can discriminate between minor information and major idea of the content.	.50
2	I complete my reading and writing tasks daily.	.50
3	I make notes for my subjects in an innovative way	.53
4	I ask the teachers different questions for teaching chapter	.54
5	I attempt application-based questions during class tests.	.58
6	I am able to write the central idea of the content in my own words.	.52
7	I ignore the distractive thoughts to focus on discussions.	.50
8	I am not scared by lengthy assignments.	.48
9	I am confident to enjoy aloud reading in class.	.51
10	I redouble the effort If I get low remarks about my reading performance	.50
11	I remain relaxed during oral and written class tests.	.51
12	I download audio and videos from the internet related to my subjects.	.47
13	I keep a smiling face during a discussion with my teachers and peers.	.52
14	I draw tables and figures to improve visual expression during writing.	.54
15	I maintain neat handwriting throughout the paper.	.47
16	I am excited to learn something new every day.	.47
Sub-dimension Two: Students' Group Performance		
17	I share my learning experiences with my friends and teachers	.52
18	I put effort to maintain good relations with my class fellows and teachers.	.61
19	I seek help from my fellows to get a better understanding of the lessons.	.72
20	I communicate with teachers to solve my learning difficulties.	.66
21	I make motivated friends in class to improve my performance.	.63
22	I contact my class fellows for study discussion through mobile.	.63
23	I discuss my test performance with my subject fellows.	.50
24	I communicate patiently with my classmates while they are angry	.45

Scale taken from Sabri and Jabir 2021, 24-item Students' Academic Performance Scale (SAPS)

Appendix 2: Generalized Self-Efficacy Scale

	Not at all true	Barely true	Moderately true	Exactly true
1. I can always manage to solve difficult problems if I try hard enough.	1	2	3	4
2. If someone opposes me, I can find means and ways to get what I want.	1	2	3	4
3. It is easy for me to stick to my aims and accomplish my goals.	1	2	3	4
4. I am confident that I could deal efficiently with unexpected events.	1	2	3	4
5. Thanks to my resourcefulness, I know how to handle unforeseen situations.	1	2	3	4
6. I can solve most problems if I invest the necessary effort.	1	2	3	4
7. I can remain calm when facing difficulties because I can rely on my coping abilities.	1	2	3	4
8. When I am confronted with a problem, I can usually find several solutions.	1	2	3	4
9. If I am in a bind, I can usually think of something to do.	1	2	3	4
10. No matter what comes my way, I'm usually able to handle it.	1	2	3	4

GSES taken from Schwarzer and Jerusalem (1995)

Appendix 3: Collaborative Learning Scale

Indicators	Mean	SD	Description	Interpretation
1. I find myself productive learning with my groupmates than learning alone.	4.14	0.92	Agree	High
2. I am confident working in groups than working alone.	4.11	0.92	Agree	High
3. Asking questions with my groupmates is helpful.	3.91	0.88	Agree	High
4. I value sharing of ideas.	3.92	0.88	Agree	High
5. I find group learning easier than individual learning.	3.87	0.85	Agree	High
6. I am willing to work in a group than working individually.	4.06	0.90	Agree	High
7. I believe in the saying that "two heads are better than one".	3.80	0.81	Agree	High
8. I like to explore things with my groupmates than working alone.	4.16	0.93	Agree	High
9. I am part of a goal-oriented group.	3.88	0.86	Agree	High
10.I felt happy about the success of the group as a whole.	4.31	0.96	Strongly Agree	Very High
Overall	**4.02**	**0.89**	**Agree**	**High**

Collaborative Learning scale taken from Cagatan and Quirap (2024).

Appendix 4: Factor Matrix

Factor Matrix for CL Scale

	Factor Loading 1
I like to explore things with my groupmates than working alone	.939
I find myself productive learning with my groupmates than learning alone	.924
I find group learning easier than individual learning	.891
I am part of a goal-oriented group	.861
I am willing to work in a group than working individually	.850
Asking questions with my groupmates is helpful	.832
I believe in the saying that "two heads are better than one"	.827
I felt happy about the success of the group as a whole	.813
I am confident working in groups than working alone	.806
I value sharing of ideas	.727

Extraction Method: Principal Axis Factoring.

a. 1 factors extracted. 4 iterations required.

Factor Matrix for GSE Scale

	Factor Loading	
	1	2
I can solve most problems if I invest the necessary effort	.816	
No matter what comes my way, I am usually able to handle it	.816	-.320
I can always manage to solve difficult problems if I try hard enough	.749	
If someone opposes me, I can find means and ways to get what I want	.748	
When I am confronted with a problem, I can usually find several solutions	.714	
Thanks to my resourcefulness, I know how to handle unforeseen situations	.681	.545
If I am in a bird, I can usually think of something to do	.591	
I can remain calm when facing difficulties because I can rely on my coping abilities	.549	
It is easy for me to stick to my aims and accomplish my goals	.521	
I am confident that I could deal efficiently with unexpected events	.499	.569

Extraction Method: Principal Axis Factoring.

a. 2 factors extracted. 14 iterations required.