Group Work Vs Pair Work: A Comparison of Critical Thinking Skills

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ABSTRACT

Cultivating critical thinking and problem-solving abilities is crucial in higher education, particularly as language learning evolves from a focus on grammatical accuracy to communicative competence. Collaborative learning, which is fundamentally grounded in Vygotsky's sociocultural theory, faces persistent challenges such as imbalanced participation and the presence of dominant personalities, both of which continue to shape the dynamics within the classroom environment. Current research supports the pedagogical advantages of collaborative work; however, there is a lack of understanding of how these interactions specifically impact critical thinking in naturalistic settings. This study sought to investigate the relationship between critical thinking skills and interaction types by comparing perceptions of pair work and group work. A quantitative survey was administered using an instrument divided into four main sections: demographic profile, perceived critical thinking/problem-solving skills, and perceptions of pair and group work interaction. The participants comprised 199 students from a Malaysian public university. The findings reveal a significant positive relationship between both interaction types and the development of critical thinking, although the level of engagement varied across academic clusters. The implications of this study suggest that educators should strategically balance pair and group work to reduce learner anxiety and ensure equitable participation, thereby enhancing cognitive development.

Keywords: Group work, Pair work, Critical thinking skills, Problem-solving, Collaborative learning, Higher education.

INTRODUCTION

Background of Study

Implementing foreign language study as part of the curriculum benefits higher education students' internationalization by improving multilingual abilities, personal and cognitive growth, and intercultural competence. The foreign language learning approach has recently transitioned from grammatical to communicative competence. Furthermore, rather than just memorizing, language acquisition in higher education promotes student-centered approaches that can lead to problem solving as well as realistic language use for real-world applications, and promotes critical thinking, cultural understanding, and digital literacy through digitally enabled foreign language learning. The communicative technique advocates for pair and group work activities to improve communication and interpersonal skills among students. De Hei et al. (2016) constructed the Group Learning Activities Instructional Design (GLAID) framework to help teachers design, implement, and evaluate group learning activities in higher education courses. The components were defined as interaction, learning objectives and results, assessment, task features, structuring, guidance, group constellation, and facilities. The framework guides students through collaborative tasks or assignments with real-world applications of the target language.

Statement of Problem

Recently, language researchers have shown increased interest in collaborative, peer, and cooperative learning grounded in Lev Vygotsky's sociocultural theory. A psychological framework introduced by Lev Vygotsky (1980) highlighted the function of group work as a mediating context for language learning and interaction as a key mechanism for development. It is the foundation for many studies on collaborative learning activities. The differences between the actual developmental level assessed via independent problem-solving and the future developmental level evaluated via problem-solving with adult guidance or collaboration with more proficient peers (Lev Vygotsky, 1980). Peer learning exercises also highlight the importance of directed learning and social contact in the growth of cognitive ability. Learning activities that take the shape of group or pair work are based on the idea that more experienced peers may help a student understand a concept better than they could alone.

Cheng's (2021) empirical research findings affirm that interactions induce meaning negotiation, language-related situations, and shared problem-solving, all of which are consistent with Vygotsky's sociocultural theory. The cooperative approach, which involves anticipated student participation and engagement through pair or group tasks, may motivate and assist students in improving their language learning skills. This strategy was also commended for its ability to improve students' interpersonal skills and academic performance. Ma'suda (2025) argued that an organized approach to pair and group work improves learners' speaking fluency, accuracy, and confidence. As a result, students are more motivated and actively engaged in conversations. Therefore, pair and group work help provide a supportive learning environment that encourages meaningful conversation and minimizes learners' anxiety.

However, Aprillia and Atikah (2025) reported persistent uneven participation in both pair and group work. Learners with higher language proficiency or strong personalities tend to dominate interactions, restricting the possibilities for less confident or low-proficiency peers to participate effectively. This discrepancy not only limits individual speaking opportunities but may also cause frustration and disengagement among quieter students. According to Sherman and Tůma (2023), there is still a lack of knowledge in classroom activities that include pair work and group work related to deep interactional analyses of how these dynamics unfold in real classrooms. Although conversation analytic studies exist in other domains, such as outside controlled settings, they are limited.

Recent research validates the pedagogical usefulness of pair and group work activities for language learning, but it also reveals considerable limitations to learners' success. Although prior studies have examined group work interactions and group dynamics, little is known about learners' critical thinking. The interactional anatomy of cooperative work in naturalistic classroom settings and the effects of prolonged exposure on learner development remain unexplored. The present study addresses this gap by investigating collaborative learning in terms of critical thinking skills.

Objective of the Study and Research Questions

This study was conducted to explore critical thinking skills for group and pair work interaction. Specifically, this study aims to answer the following questions:

- How do learners view critical and problem-solving abilities?
- How do learners view interactions in pair work?
- How do learners view interactions in group work?
- Is there a relationship between pair work and critical thinking?

(H1- There is no relationship between pair work and critical thinking)

- Is there a relationship between group work and critical thinking?

(H2-There is no relationship between group work and critical thinking

- Is there a significant difference for critical thinking, pair work and group work across clusters?

(H3-There is no significant difference for critical thinking, pair work and group work across clusters)

LITERATURE REVIEW

Theoretical Framework of the Study

- Social Cognitive Theory and Group Interaction

Bandura (1977) introduced the theory that identifies three factors in learning: person, behavior, and environment. In this theory, Bandura explains how people learn and behave by observing others and interacting with their environment. Learning occurs as a result of the interaction of personal factors, behavior, and environment. These three factors constantly affect each other. Personal beliefs affect behavior, behavior affects the environment, and the environment influences personal beliefs. According to Nabavi (2012), the Social Cognitive Learning Theory stems from the idea that people learn by observing other people. Understanding human thought processes is essential for comprehending personality.

This social cognitive theory is related to group interactions because a person learns behaviors by observing and interacting with other group members. Observation, peer modelling, and feedback help shape behavior. Self-efficacy increased with group support, leading to active participation in the group.

- Conflict Resolution Strategies

Conflict Resolution Strategies, also known as Conflict-Management Styles, were introduced through the Thomas-Kilmann Conflict Mode Instrument in 1974 by Kenneth W. Thomas and Ralph H. Kilmann (Shonk, 2025). Shonk (2025) explained that this instrument was created to gauge the conflict style of a person. Thomas and Kilmann (1974) discovered through their instrument that there are five distinct strategies of conflict which are competing, accommodating, avoiding, compromising, and collaborating. Killmann (n.a), in his website Killmann Diagnostics, demonstrated these strategies in the diagram below.

Figure 1: The Five Modes of Response to Conflict Situations

Thomas and Kilmann (2008) explained that competing is the act of prioritising one's concerns, regardless of means, at the expense of others. It is a power-oriented mode that is both assertive and uncooperative. Meanwhile, collaboration is assertive yet cooperative. Thomas and Kilmann (2008) clarify that collaborating is when an individual works together with others to identify the cause of the conflict to achieve the best solution for both.

Compromising stands between competing and collaborating; however, it is mild in its assertiveness and cooperativeness compared to the latter. Thomas and Kilmann (2008) described compromising as finding the middle ground by finding a solution accepted but partially satisfied by both sides. The strategy with the least assertiveness and cooperativeness is avoidance, as it is when an individual does not address the conflict and does not pursue their or others' concerns (Thomas and Kilmann, 2008). Finally, accommodating falls on the most cooperative, yet least assertive, scale. According to Thomas and Kilmann (2008), accommodating is the opposite of competing, where an individual prioritizes the concerns of others while neglecting his or her own.

Based on the discussion, collaborating seems to be the most effective way to tackle conflict; however, different strategies can be effective according to the different stages and types of conflict in management (Shonk, 2025). This study examined the application of these strategies in group and pair work among university students in Malaysia.

Group Work Communications and Conflicts

In recent years, there has been an increasing number of studies on collaborative learning, focusing on groupwork communications and conflicts. Sim et al. (2021) investigated the strategies that language learners use to solve group work conflicts on language tasks. This quantitative study consisted of 32 questionnaire items. A total of 164 university students enrolled in a language proficiency course were selected as the respondents. The data revealed that conflicts arise when team members are unable to discuss or listen to diverse perspectives on the topic. In addition, nonverbal communication is used to express disagreement and avoid misunderstandings.

Similarly, Zakaria et al. (2023) explored student interaction during group work by adopting the Tuckman Model. A questionnaire consisting of 29 items was distributed to 200 undergraduate ESL students. This study found positive influences on students in all four stages of the Tuckman Model: forming, storming, norming, and performing. Additionally, the results showed a moderate positive relationship between the stages of forming and norming, as well as between forming and performing.

Chen & Lee (2022) investigated conflicts in peer interaction of collaborative second language writing by adopting complexity theory focused on student perspectives. This study selected 15 university students to form five face-to-face writing groups. The results were triangulated using observation notes, stimulated recall interviews, and screen recordings. The study found that, in most situations, cognitive disagreements resulted in superior writing outcomes. However, when cognitive conflicts were combined with other types of conflicts, the pupils performed worse in writing.

Students should learn agreement and disagreement skills to avoid conflicts or improve communication. Nevertheless, problem-solving skills should also be applied during group work.

Conceptual Framework of the Study

Figure 2 illustrates the conceptual framework of this study. This study investigates critical thinking types for group and pair work. Interactions during group and pair work have been known to help build learners' communication and problem-solving skills (Rahmat, 2020). When learners try their best to get their points across or negotiate ideas, they improve their negotiation skills.

The variables were critical thinking, pair work, and group work. The instrument for critical thinking was adapted from Belbin (2013). The constructs for critical thinking skills and problem-solving are (i) thought-oriented, (ii) action-oriented, and (iii) people-oriented. Next, the instrument for pair work was adapted from Baleghizadeh and Farhesh (2014) and supported by constructs such as (i) social instructions, (ii) knowledge construction, and (iii) social and cultural context. Lastly, the instrument for group work was adapted from Bateman et al. (2022) with constructs such as (i) purpose and goals (PG), (ii) roles (R), (iii) team processes (TP), (iv) intergroup relations (IR), (v) passion and commitment (PC), and (vi)skills and learning (SL). Lastly, the variable. This study also investigated whether there is a relationship between critical thinking and pair and group work (Figure 2).

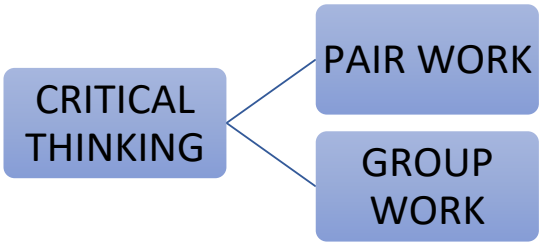

Figure 2- Conceptual Framework of the Study Pair Work vs Group Work: A comparison for Critical Thinking

METHODOLOGY

This quantitative study explored critical thinking skills for group and pair work interactions. A convenient sample of 199 participants responded to the survey questionnaire. The instrument used is a 5 Likert-scale survey and is rooted from Belbin (2013), Bateman et al. (2002), and Baleghizadeh and Farhesh (2014) to reveal the variables in Table 3 below. Table 1 shows the categories used for the Likert scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Undecided, 4 = agree, and 5 = Strongly Agree.

Table 1- Likert Scale Use

1	Strongly Disagree
2	Disagree
3	Neutral
4	Agree
5	Strongly Agree

Table 2- Distribution of Items in the Survey

SECTION	VARIABLE	CONSTRUCT	ITEM		Cronbach Alpha
A	CRITICAL THINKING & PROBLEM SOLVING Belbin (2013)	Thought-Oriented	4	10	.859
		Action-Oriented	3		
		People-Oriented	3		
B	GROUP WORK Bateman, et.al. (2002)	Purpose and Goals (PG)	3	22	.954
		Roles (R)	3		
		Team Processes (TP)	3		
		Team Relationships (TR)	4		
		Intergroup Relations (IR)	3		
		Passion and Commitment (PC)	3		

		Skills and Learning (SL)	3		
C	PAIR WORK Baleghizadeh & Farhesh (2014)	Social Interactions	4	12	.941
		Knowledge Construction	4		
		Social & Cultural Context	4		
				44	.965

A total of 44 items were used in the survey. The items were grouped into three sections: A, B, and C, with different variables. Section A focuses on the variable Critical Thinking and Problem Solving with 10 items, Section B focuses on Group Work with 22 items, and Section C on Pair Work with 12 items. The Cronbach's alpha values for Section A, section B is .941, and Section C were .954, .941, and .965, respectively. The Cronbach's alpha value for all sections was above 0.70, suggesting good reliability and agreement among items, ensuring the instrument's accuracy.

Table 3- Reliability Levels, Cronbach's Alpha Ranges, and Their Interpretations

Reliability Level	Cronbach's Alpha range	Interpretation
Excellent	0.9 and above	Indicates very high internal consistency
Good	0.80-0.89	Reflects strong internal consistency
Acceptable	0.70-0.79	Indicates acceptable internal consistency
Questionable	0.60-0.69	Reflects questionable internal consistency
Poor	Below 0.6	Indicates poor internal consistency

Reliability analysis was performed to determine the internal reliability of the instrument. Table 3 shows the distribution and interpretation of the Cronbach's alpha range. According to Ahmad et al. (2024), Cronbach's alpha scores between 0.7 and 0.9 are considered acceptable to excellent.

Table 2 also shows the reliability of the survey. The analysis shows a Cronbach's alpha of .859 for Critical Thinking and Problem Solving, .954 for Group Work, and .941 for Pair Work. The overall Cronbach's alpha for all 44 items was .965, thus revealing the good reliability of the instrument used. Further analysis using SPSS was performed to present the findings and answer the research questions.

FINDINGS

Demographic Analysis

According to Zienefuss et al. (2021), researchers report demographic data in percentages to establish sample representatives and allow generalizability to a larger population. The report also provides an overview of the participants' characteristics. Percentages offer a clear and understandable picture of sample makeup.

Table 4- Percentage for Demographic Profile

Question	Demographic Profile	Categories	Percentage (%)
1	Gender	Male	40%

		Female	60%
3	Cluster	Science & Technology	46%
		Social Sciences & Humanities	54%

The demographic profile percentage for this investigation is illustrated in Table 4. The table indicates that 40% of the respondents are masculine, while 60% are female. The Science and Technology cluster comprises 46% of the respondents. Conversely, 54% of the respondents are affiliated with the Social Science cluster.

Descriptive Statistics

Why is it necessary to report the mean and standard deviation? According to Vetter (2017), the mean (M) represents the average or center of a dataset. The standard deviation (SD) indicates the typical distance of individual observations from the mean, which shows the data's variability or spread. A low SD indicates that the data points are clustered close to the mean whole a high. A higher SD indicates a wider spread. It is good to have a high SD.

Findings for Critical thinking and problem-solving abilities

This section presents data to answer research question 1- How do learners perceive critical and problem-solving abilities?

Table 5- Mean for Thought-Oriented (TO)

ITEM	Mean	SD
TOQ1 When suddenly asked to consider a new project, I can take an independent and innovative look at most situations.	3.69	0.69
TOQ2 In seeking satisfaction through my work, I like to make critical distinctions between alternatives.	3.66	0.79
TOQ3 When trying to solve a complex problem, I like to weigh up and evaluate a range of suggestions thoroughly before choosing.	3.98	0.71
TOQ4 When suddenly asked to consider a new project, I approach the problem in a carefully analytical way	3.82	0.73

To answer the first research question regarding how learners perceive critical and problem-solving skills, Table 5 presents the mean scores for the "Thought-Oriented" (TO) qualities. Overall, the findings indicate a high level of self-perceived critical thinking competence among the respondents, with the highest mean score of 3.98 recorded for the item TOQ3. This suggests that students strongly value weighing and thoroughly evaluating a range of suggestions when solving complex problems. This is followed by item TOQ4 (mean = 3.82), which reflects a preference for approaching new projects in a careful and analytical way, and TOQ1 (mean = 3.69), which indicates the ability to maintain an independent and innovative perspective. The slightly lower, yet still positive, mean score of 3.66 for TOQ2 shows that while students are inclined to make critical discriminations between alternatives to seek work satisfaction, they are most confident in their systematic and evaluative capabilities during the problem-solving process. All mean scores were above the neutral midpoint, highlighting generally positive perceptions of critical thinking skills.

Table 6- Mean for Action-Oriented (AO)

ITEM	Mean	SD
AOQ1 In seeking satisfaction through my work, I tend to have a creative approach to solving problems.	3.75	0.73
AOQ2 In carrying out my day-to-day work, I tend to see pattern in solving problems where others would see items as unconnected.	3.63	0.75
AOQ3 I take considerable amount of time to make judgement but most often, the judgement made is accurate.	3.40	0.74

Table 6 presents the mean scores for the action-oriented " (AO) attributes. The highest mean score of 3.75 was recorded for AOQ1, reflecting a creative approach to problem-solving when seeking satisfaction at work, indicating that students generally view themselves as innovative in addressing challenges. This was followed by item AOQ2, with a mean score of 3.63 for the ability to identify patterns in problem-solving that others might overlook, suggesting moderate confidence in recognizing connections within complex situations. The lowest mean score of 3.40 for item AOQ3 pertains to the time taken to make judgments, although students still believe their decisions are ultimately accurate. Collectively, these results show that learners prioritize creativity and pattern recognition in their problem-solving processes, even if they may be more cautious or deliberate when making final decisions. All mean scores were above the neutral midpoint, highlighting generally positive perceptions of their action-oriented critical thinking skills.

Table 7- Mean for People-Oriented (PO)

ITEM	Mean	SD
POQ1 I can see how ideas and techniques can be used in perceiving new relationships.	3.87	0.84
POQ2 I analyse other people's ideas objectively, by evaluating both advantages and disadvantages	4.14	0.67
POQ3 If I am suddenly given a difficult task with limited time and unfamiliar people, my feelings seldom interfere with my judgement.	3.67	0.84

Table 7 presents the mean scores for the "People-Oriented" (PO) attributes. The highest mean score of 4.14 was recorded for POQ2, related to the objective analysis of others' ideas, indicating that students were highly confident in their ability to impartially evaluate the advantages and disadvantages of peer contributions. This was followed by a mean score of 3.87 for POQ1, the ability to see how ideas and techniques can be used to identify new relationships, reflecting a strong capacity for recognizing connections in collaborative settings. The lowest, yet still positive, mean score of 3.67 for POQ3 pertains to the ability to remain emotionally detached from judgments when faced with difficult tasks and unfamiliar teammates. Collectively, these results suggest that learners are particularly skilled at objective peer evaluation, which is a crucial component of effective collaborative problem solving. All mean scores were above the neutral midpoint, highlighting generally positive perceptions of their people-oriented critical thinking skills.

Findings for pair work

This section presents data to answer research question 2- How do learners perceive interactions in group work?

Table 8- Mean for Social Interaction (SI)

ITEM	Mean	SD
SIQ1 I like learning activities in which students work together in pairs	3.98	0.78

SIQ2 Pair work creates a relaxing learning environment.	3.98	0.80
SIQ3 Students give more help to each other during pair work	3.95	0.78
SIQ4 I prefer to work within a pair rather than work alone.	3.82	0.97

Table 8 shows the mean social interaction for pairwork. The table shows that SIQ1 and SIQ2 share the highest mean of 3.98, indicating that students like the learning activities in which they work in pairs, and that pairwork creates a relaxing learning environment. This is followed by item SIQ3, with a mean of 3.95, which showed that the students helped each other during pairwork (mean = 3.95, SD = 0.78). Lastly, the lowest mean score of 3.82 was for item SIQ4, which indicates that the students preferred to work in pairs rather than alone.

Table 9- Mean for Knowledge Construction (KC)

ITEM	Mean	SD
KCQ1 Pair work helps students solve tasks more effectively and efficiently.	4.01	0.81
KCQ2 Pair work helps students more chances to exchange ideas with each other.	4.11	0.82
KCQ3 Pair work helps students better understand information after explaining it to others.	4.06	0.79
KCQ4 When pairs are well-organised, the work is completed quickly.	4.19	0.77

Table 9 presents the mean for the knowledge construction of the pair work. The highest mean 4.19 of for item KCQ4 shows that when pairwork is well organized, the work gets done quickly. This is followed by the mean of 4.11 for item KCQ2, which states that pairwork helps students exchange ideas with each other. The lowest mean scores were 4.06 for KCQ3 and 4.01 for KCQ1, which state that pair work helps students understand information better after explaining it to others, and KCQ1 Pair work helps students solve tasks better and faster.

Table 10- Mean for Social and cultural context (SCC)

ITEM	Mean	SD
SCCQ1 Students learn more about how to share the responsibilities when working in pairs	4.07	0.76
SCCQ2 I feel more accepted by others after working within a pair	3.85	0.83
SCCQ3 It is important that each person takes responsibility for learning as well.	4.16	0.73
SCCQ4 I never felt let down when I work in pairs.	3.82	0.91

Table 10 shows the mean for the social and cultural contexts of pair work. The highest mean 4.16 of for item SCCQ3 shows that it is important that each person takes responsibility for learning. This is followed by the mean 4.07 of for item SCCQ3, which states that students learn more about how to share responsibilities when working in pairs. The lowest mean scores of 3.85 for item SCCQ2 and 3.82 for item SCCQ4 show that students feel more accepted by others after working in pairs and never feel let down when working in pairs.

Findings for group work

This section presents data to answer Research Question 3: How do learners perceive pair work interactions?

Table 11- Mean for Purpose and Goals (PG)

ITEM	Mean	SD
PGQ1 Our team has a meaningful shared purpose.	4.06	0.67

PGQ2 We are strongly committed to a shared mission.	4.03	0.66
PGQ3 We set and met challenging goals.	4.04	0.66

Table 11 shows the mean for the Purpose and Goals. PGQ1 had a mean score of 4.06 and a standard deviation of 0.67. PGQ2 had a mean score of 4.03 and a standard deviation of 0.66. Similarly, item PGQ3 had a mean score of 4.04 with a standard deviation of 0.66. The mean score and standard deviation values for these three items showed a high level of consensus.

Table 12- Mean for Roles (R)

ITEM	Mean	SD
RQ1 Team members clearly understand their roles in the project.	4.00	0.77
RQ2 When an individual's role changes, an intentional effort is made to clarify it for everyone on the team.	4.05	0.68
RQ3 Everyone values what each member contributes to the team	4.20	0.70

Table 12 shows the mean scores for the roles. RQ1 had a mean score of 4.00 and a standard deviation of 0.77. RQ2's mean score is 4.00, and its standard deviation is 0.68. For RQ3, the mean score was 4.20, and the standard deviation was 0.70.

Table 13- Mean for Team Processes (TP)

ITEM	Mean	SD
TPQ1 We address and resolve issues promptly.	3.96	0.73
TPQ2 Our team works with great flexibility so that we can adapt to changing needs.	4.01	0.68
TPQ3 When we choose consensus decision-making, we do so effectively.	4.00	0.75

Table 13 presents the mean score and standard deviation for Team Processes. TPQ1 had a mean score of 3.96, with a standard deviation of 0.73. The TPQ2 had a mean score of 4.01, with a standard deviation of 0.68. The TPQ3 had a mean score of 4.00 and a standard deviation of 0.75.

Table 14- Mean for Team Relationships (TR)

ITEM	MEAN	SD
TRQ1 Team members appreciate each other's unique capabilities.	4.13	0.69
TRQ2 Team members are effective listeners.	4.04	0.72
TRQ3 Communication in our group is open and honest.	4.06	0.78
TRQ4 Team members trust each other.	4.06	0.73

Table 14 shows the means for Team Relationship (TR) in a team. The table indicates that TRQ1 has the highest mean of 4.13, which indicates that the unique capabilities of a member are appreciated by the rest. The second highest with the mean of 4.06 are TRQ3 and TRQ4, which represent the importance of communication and trustworthiness within the team. Finally, TRQ2 had the lowest mean, 4.04, demonstrating whether they were good listeners.

Table 15- Mean for Intergroup Relations (IR)

ITEM	MEAN	SD
IRQ1 We can resolve conflicts with other teams collaboratively.	3.91	0.68
IRQ2 We effectively communicate with other groups.	3.86	0.74
IRQ3 Our collaborations with other teams are productive, worthwhile, and yield good results.	3.92	0.68

Table 15 presents the mean score for Intergroup Relations (IR) with other teams. The table shows that IRQ3 has the highest mean at 3.92, which stands for the positive impact of collaborating. With a mean of 3.91, IRQ1 fell into second place, representing the ability to solve conflicts collaboratively. Finally, IRQ2 had the lowest mean at 3.86, indicating the ability to communicate effectively with other groups.

Table 16- Mean for Passion and Commitment (PC)

ITEM	MEAN	SD
PCQ1 Working on our team inspires people to do their best.	3.98	0.70
PCQ2 People are proud to be part of the team.	3.87	0.77
PCQ3 My team is proud of its accomplishments and is optimistic about our work.	4.007	0.68

Table 16 indicates the mean for Passion and Commitment (PC) within a team. PCQ3 has the highest mean of 4.007, showing the positive feelings of the members to its work. The second highest is PCQ1 with the mean of 3.98, representing the positive feeling towards working in teams. The lowest mean is 3.87, which is represented by PCQ2 (people are proud to be part of our team).

Table 17- Mean for Skills and Learning (SL)

ITEM	MEAN	SD
SLQ1 We have the skills we need to do our jobs effectively.	4.00	0.69
SLQ2 We view everything, even mistakes, as opportunities for learning and growth	4.17	0.64
SLQ3 Team members embrace continuous improvement as a way of life.	4.11	0.64

Table 17 presents the mean for Skills and Learning (SL) within the team. With a mean of 4.17, SLQ2 had the highest mean, which shows the team members' willingness to improve. The second falls on SLQ3 with 4.11, indicating that the team members never stop improving. Finally, SLQ1 had the lowest mean of 4.00, demonstrating the skill necessary to complete their job effectively.

Exploratory Statistics

According to He (2024), correlation is a statistical technique that shows how strongly two variables are related to each other or the degree of association between them. It is a common tool for describing simple relationships without making statements about cause and effect. This section presents data to answer the research questions on correlation. To determine if there is a significant association between the mean scores for pair work and group work with critical thinking, data were analyzed using SPSS for correlations. The results are presented separately in the tables below.

Findings for the Relationship between pair work and critical thinking

This section presents data to answer Research Question 4: Is there a relationship between pair work and critical thinking? (H1- There is no relationship between pair work and critical thinking)

To determine if there is a significant association in the mean scores between metacognitive, effort regulation, cognitive, social, and affective strategies, data were analyzed using SPSS for correlations. The results are presented in Tables 18, 19, and 20.

Table 18- Correlation between Critical Thinking

		CRITICAL THINKING	PAIR WORK
CRITICAL THINKING	Pearson (Correlation	1	.563**
	Sig (2-tailed)		<.001
	N	199	199
	Sig (2-tailed)	<.001	<.001
	N	121	
PAIR WORK	Pearson (Correlation	.563**	
	Sig (2-tailed)	<.001	
	N	199	199

**Correlation is significant at the 0.01 level (2-tailed)

Pair work and critical thinking are related, as Table 18 demonstrates. According to a correlation study, critical thinking and pair work are highly significantly associated (r=.563**) and (p=<.001). He (2024) asserts that direct correlation is quantified on a range from 0.1 to 1.0, with the coefficient being significant at the 0.05 level. A insignificant positive correlation can be seen in the scale og 0.1 and 0.3, while the scale between 0.3 and 0.5 demonstrates moderate positive correlation. Finally, a high positive correlation is represented by a scale between 0.5 and 1.0. This suggests a significant positive correlation between critical thinking and collaborative work. As a result, the null hypothesis is disproved.

Findings for Relationship between group work and critical thinking

This section presents data to answer Research Question 5: Is there a relationship between group work and critical thinking?

(H2-There is no relationship between group work and critical thinking

Table 19- Correlation between group work and critical thinking

		CRITICAL THINKING	GROUP WORK
CRITICAL THINKING	Pearson (Correlation	1	.682**
	Sig (2-tailed)		<.001
	N	199	199

GROUP WORK	Pearson (Correlation	.682**	1
	Sig (2-tailed)	<.001	
	N	121	121

Table 19 demonstrates that group work and critical thinking are related. The link between group work and critical thinking is considerable (r=.682**, p=<.001). He (2024) adds that positive correlation is evaluated from 0.1 to 1.0 and is significant at.05. Positive correlation between 0.1 and 0.3 is mild, strong between 0.3 and 0.5, and great between 0.5 and 1.0. Critical thinking and group work also go well together. Therefore, the null hypothesis is rejected.

Inferential Statistics

According to He (2024), there are three main functions of a T-test and ANOVA. First, both were performed to compare the means. This test was also performed to determine whether the average scores (mean) or values of two groups, or one group against a known value, were different enough to be considered statistically meaningful and not just due to random chance. Second, t-tests and ANOVA were performed to test the hypotheses. Researchers use t-tests and ANOVA to test hypotheses about means, such as whether a new treatment significantly impacts a variable or whether there is a difference in performance between two distinct groups. Finally, t-tests and ANOVA were performed to identify significant differences. The output of a t-test provides a p-value (significance). If this p-value is below a predetermined threshold (often 0.05), it indicates a statistically significant difference, allowing researchers to draw conclusions about the populations from which the samples were drawn.

This section presents data to answer Research Question 6: Is there a significant difference in critical thinking, pair work and group work across clusters?

(H3-There is no significant difference for critical thinking, pair work and group work across clusters)

Table 20- T- Test for critical thinking, pair work and group work across clusters

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance		Mean	Std. Error	95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Difference	Difference	Lower	Upper
CRITICAL_THINKING	Equal variances assumed	3.281	.072	1.777	197	.039	.077	.12236	.06886	-.01344	.25816
	Equal variances not assumed			1.759	182.166	.040	.080	.12236	.06957	-.01491	.25962
GROUP_WORK	Equal variances assumed	3.041	.083	-.366	197	.357	.715	-.02601	.07110	-.16623	.11420
	Equal variances not assumed			-.362	183.198	.359	.717	-.02601	.07177	-.16761	.11559
PAIR_WORK	Equal variances assumed	.996	.320	-1.073	197	.142	.284	-.09693	.09031	-.27503	.08118
	Equal variances not assumed			-1.085	197.000	.140	.279	-.09693	.08930	-.27303	.07917

With reference to Table 20, a t-test was conducted to examine the effects of critical thinking, pair work, and group work on clusters. The analysis shows no significant difference in critical thinking (F=3.281, p=0.077), pair work (F=0.996, p=0.284), and group work (3.041, p=0.715) across clusters. The null hypothesis was accepted.

CONCLUSION

Summary of Findings and Discussions

This study investigated the influence of collaborative learning, specifically through pair and group work, on enhancing critical thinking and problem-solving skills among higher education students in language learning

contexts. The findings are organized according to each research question, with general answers provided and connections made to previous studies to contextualize these results.

RQ1: How do learners perceive critical and problem-solving skills? Students reported strong self-perceptions of both people-oriented and thought-oriented skills, such as objectively analyzing ideas and thoroughly evaluating suggestions. This supports Vygotsky's sociocultural theory, which emphasizes the role of peer interactions in cognitive development. These results are consistent with Cheng (2021), who found that collaborative learning fosters negotiation and shared problem-solving.

RQ2: How do learners perceive pair work interaction? Pair work was viewed positively, with students noting its supportive environment and the opportunities for mutual help and efficient task completion. These findings align with Baleghizadeh and Farhesh (2014), who reported increased motivation and idea exchange in pair work settings. However, some challenges with equal participation were noted, echoing Aprillia and Atikah (2025).

RQ3: How do learners perceive group work interaction? Group work was also favorably perceived, especially regarding shared purpose, clear roles, and open communication among group members. Students valued team members' unique contributions and trusted the group. These findings support the GLAD framework (De Hei et al., 2016), which highlights the importance of structured group interactions for deeper learning. Issues such as dominant personalities and uneven participation were consistent with Sherman and Tůma's (2023) findings.

RQ4: Is there a relationship between pair work and critical thinking skills? A strong positive relationship was found between pair work and critical thinking, supporting Ma'suda (2025), who argued that structured pair work enhances fluency, confidence, and critical engagement. This reinforces Bandura's Social Cognitive Theory, which highlights peer modeling in cognitive development.

RQ5: Is there a relationship between group work and critical thinking skills? Group work also showed a strong positive correlation with critical thinking, in line with Bateman et al. (2002), who demonstrated that effective group processes contribute to higher-order thinking skills. Cheng (2021) further validated the pedagogical usefulness of collaborative activities.

RQ6: Are there significant differences in critical thinking, pair work, and group work across the clusters? No significant differences were found across academic clusters, suggesting that the benefits of collaborative learning are consistent, regardless of discipline. This contrasts with some prior studies that reported disciplinary differences, indicating that the structured approach used in this study may help to equalize outcomes.

In summary, the study's findings are largely in accordance with established theories and past research, confirming that both pair and group work are effective in fostering critical thinking and problem-solving skills among students. The unique contribution of this study lies in its direct comparison of pair and group work within naturalistic classroom settings, providing empirical evidence to inform future pedagogical strategies in the field.

Implications and Suggestions for Future Research

These findings underscore the significance of Vygotsky's sociocultural theory and Bandura's Social Cognitive Theory in contemporary language learning contexts. Additionally, this study corroborates the GLAID framework's focus on structured interactions to enhance learning depth. In light of these discoveries, it is pertinent to consider the implications for pedagogical practice. Educators should strategically balance pair and group activities to optimize cognitive development, reduce learner anxiety, and ensure equitable participation. Incorporating conflict resolution strategies, as proposed by Thomas and Kilmann (1974), is recommended to address group dynamics and foster inclusive learning environments that promote student engagement. Future research could investigate the long-term effects of collaborative learning on critical thinking across various disciplines, explore interventions to overcome participation challenges, and examine the role of digital tools in facilitating effective pair and group work.

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