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Determinants of Team Performance in Hospitality Team Learning: A Case Study at a Polytechnic in Hangzhou

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Abstract

Purpose: The purpose of this study is to explore the factors influencing team performance in team-based learning within a hospitality program at a polytechnic in Hangzhou, China. **Research design, data and methodology:** A mixed methods design was adopted. Quantitative data were collected through surveys from 80 students and analyzed using multiple linear regression (MLR) to test the conceptual framework. A 12-week Intervention Design Implementation (IDI) was then carried out with a group of 30 students. Pre- and post-intervention surveys were compared using paired-sample t-tests. Qualitative interviews with students and teachers supported the intervention design and provided contextual understanding. **Results:** MLR analysis indicated that knowledge sharing ($\beta = 0.345$, $p = 0.027$) and team cohesion ($\beta = 0.622$, $p < 0.01$) significantly influenced team performance ($R^2 = 0.783$), while coordination and collective efficacy were not statistically significant. However, paired-sample t-tests showed significant improvements in all four factors after the intervention: coordination ($p = 0.013$), knowledge sharing ($p = 0.002$), collective efficacy ($p = 0.001$), and team cohesion ($p < 0.001$), along with team performance overall ($p = 0.001$). **Conclusions:** The findings highlight that while some factors initially show stronger influence, all targeted team competencies can be improved through structured interventions of supporting more effective team-based learning in hospitality vocational education.

Keywords: Team Cohesion, Knowledge Sharing, Team Learning, Team Performance, Hospitality Vocational

JEL Classification Code: A20, I23, O30, P46, Z30

1. Introduction

Vocational education in China is undergoing substantial transformation, guided by national policies such as the Three Teachings Reform, which emphasizes the modernization of teaching content, materials, and instructional methods (Liu & Wang, 2021). In response, Hangzhou Vocational and Technical College of Science and Technology has implemented several innovative pedagogical strategies to align with these reforms. Among them, team-based learning (TBL) has emerged as a widely promoted, student-centered instructional approach aimed at enhancing collaboration and problem-solving skills (Michaelsen et al., 2004).

Within this institutional context, the Hotel Management program under the School of Tourism was selected as a pilot for TBL implementation. All core and most general education courses within this program have adopted structured team learning activities. Despite its increasing application, the effectiveness of TBL in vocational hospitality education remains under-explored.

To evaluate implementation outcomes, the research team conducted semi-structured interviews with five instructors and ten students using purposive sampling. The findings revealed three primary challenges: (1) team performance was affected by a combination of individual characteristics

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and contextual dynamics; (2) student participation varied significantly, with notable inconsistencies in contributions; and (3) team tasks often followed rigid templates, limiting innovation and engagement (Oakley et al., 2004).

This study addresses a key problem in current practice: although TBL has been widely adopted, its application often lacks empirical grounding and pedagogical adaptability within vocational contexts. Specifically, hospitality programs require nuanced strategies to support teamwork, yet most existing models fail to account for the unique interpersonal, cognitive, and operational demands in this field.

From a theoretical standpoint, existing literature focuses heavily on TBL in general education and higher education settings, with limited attention to vocational hospitality education in China. This gap highlights the need to investigate how constructs such as coordination, knowledge sharing, team cohesion, and collective efficacy interact to influence team performance in this specific context.

Therefore, this study is guided by the following objectives:

(1) To identify key factors influencing team performance in team-based learning within hospitality vocational education.

(2) To assess the impact of a structured intervention on improving team performance outcomes.

(3) To contribute empirical insights that inform both theoretical development and practical application of team learning in vocational contexts.

The significance of this study lies in its potential to guide instructors, curriculum designers, and policymakers by providing evidence-based strategies to enhance team learning effectiveness, particularly in the Chinese vocational education sector.

2. Literature Review

2.1 Coordination (COOR)

Coordination refers to the process by which team members align their efforts to achieve shared goals and manage task interdependencies effectively. Early studies defined coordination as a unified group decision-making process (Simon, 1947), later expanded to emphasize the synchronization of actions and responsibilities within teams (Malone & Crowston, 1994).

More recent work emphasizes the need to balance different dimensions of coordination. Kc et al. (2022) distinguish between internal coordination, which supports individual learning, and external coordination, which enhances overall team efficiency. Their study found that teams that manage this trade-off effectively tend to perform better, especially in complex, dynamic settings.

Empirical evidence also supports the positive role of coordination in team-based learning. For example, Lee and Zhao (2020) found that structured coordination strategies in hospitality management teams improved collaboration efficiency and project outcomes.

However, coordination does not always yield positive results. Avoyan et al. (2023) demonstrated that under high time pressure, coordination benefits can be diminished, resulting in lower team performance. This finding suggests that contextual factors such as deadlines and workload must be considered when designing team learning environments.

In this study, coordination is defined as the degree to which group members effectively organize and align their tasks to ensure cohesive collaboration during team-based learning. Accordingly, the following hypothesis is proposed:

H1: Coordination has a significant influence on team performance in team learning.

2.2 Knowledge sharing (KS)

Knowledge sharing is a key process in team-based learning that involves the exchange of relevant information, skills, and experiences among team members. It enhances collaboration, fosters mutual understanding, and contributes to more effective team performance.

Recent studies have shown that knowledge sharing positively influences team viability and productivity. For example, Xue et al. (2022) found that in global virtual teams, knowledge sharing significantly improved team performance and moderated the adverse effects of cultural individualism. Their findings emphasized the importance of open communication and trust in maintaining long-term team effectiveness.

In vocational education settings, knowledge sharing helps reduce errors, promotes efficiency, and improves decision-making. However, its benefits are not guaranteed under all circumstances. A study by Li et al. (2025) revealed that time pressure can hinder employees' ability to share knowledge by weakening their future-oriented thinking. When individuals feel rushed or overwhelmed, they may withhold information, limiting the overall effectiveness of team collaboration.

In this study, knowledge sharing is defined as the intentional and voluntary exchange of task-relevant knowledge among peers during collaborative learning activities. Based on these findings, the following hypothesis is proposed:

H2: Knowledge sharing has a significant influence on team performance in team learning.

2.3 Collective Efficacy (CE)

Collective efficacy refers to a team's shared belief in its capability to organize and execute actions necessary for achieving goals (Bandura, 1997). It includes confidence in completing tasks together rather than individually (Lindsley & Thomas, 1995; Shamir, 1990).

Recent empirical research supports its importance. Elms et al. (2022) found that strong collective efficacy, combined with effective coordination and interpersonal cohesion, boosts team performance. Moreover, a meta-analysis of over 6,000 teams reported a strong, positive relationship between collective efficacy and group performance.

However, overly strong collective efficacy can have drawbacks. Lee et al. (2022) showed that when actual team competence is low, high collective efficacy may lead to overconfidence and subsequent performance declines.

In this study, collective efficacy is defined as the shared belief in the team's ability to successfully perform tasks during team-based learning. Based on these insights, the following hypothesis is proposed:

H3: Collective efficacy has a significant influence on team performance in team learning.

2.4 Team Cohesion (TC)

Team cohesion refers to the strength of interpersonal bonds and the degree of commitment members feel toward their group (Hogg & Hains, 1996). It reflects both emotional connectedness and unity in pursuing collective goals. Prior research shows that cohesion fosters collaboration and is positively associated with member satisfaction and team performance (Carron et al., 1998; Chang & Bordia, 2001).

Recent findings further support its critical role in team success. A meta-analysis by Grossman et al. (2022) confirmed that cohesive teams consistently perform better, particularly when communication is open and goals are clearly defined. In the educational domain, Thornton et al. (2020) found that student teams with strong cohesion demonstrated higher engagement and superior academic outcomes. Similarly, Kwon (2023) observed that team-building interventions tailored to a team's specific context significantly improved cohesion, especially in sports and learning teams.

However, cohesion must be balanced. Forsyth (2021) warned that highly cohesive groups may resist change or discourage critical thinking. Lee et al. (2022) also noted that in teams with low actual competence, excessive cohesion may lead to overconfidence and reduce performance.

In this study, team cohesion is defined as the collective sense of belonging and mutual support experienced during team-based learning. Based on these insights, the following hypothesis is proposed:

H4: Team cohesion has a significant influence on team performance in team learning.

2.5 Team Performance (TP)

Team performance refers to the extent to which a team meets or exceeds established standards for output, quality, time, and cost (Hackman, 1987; Hoegl & Gemuenden, 2001). It reflects both the final outcomes and the effectiveness of teamwork processes (Levine & Moreland, 1990). In educational settings, performance has also been linked to the quality and frequency of interactions within student teams (Paydon, 2012).

Recent research highlights several influencing factors. Homan et al. (2023) found that team values—specifically benevolence and achievement orientation—positively predict team performance in real-world settings, underscoring the role of shared values. Coordination, particularly its internal and external balance, has also been shown to influence the learning-performance trade-off in dynamic teams (Kc et al., 2022). Additionally, Moyo (2024) demonstrated that structured team-based learning interventions improve student diagnostic and teamwork skills, leading to enhanced perceived performance in educational contexts.

However, conditional factors can complicate performance outcomes. For instance, teams under high uncertainty may see diminished benefits of agreeableness unless values align with task demands (Lim et al., 2023). Moreover, in the absence of shared values or leadership support, team-based interventions sometimes fail to boost performance measurably (Paydon, 2012).

In this study, team performance encompasses goal achievement, task quality, efficiency, and collaborative processes. It also includes perceived performance, capturing team members' assessments of their team's quality, creativity, and effectiveness.

3. Research Methods and Materials

3.1 Research Framework

The conceptual framework for this study is built upon three complementary theoretical models that explain how team dynamics influence performance in collaborative learning settings.

Han et al. (2018) proposed a model where coordination, goal commitment, and knowledge sharing act as mediators between shared leadership and perceived team performance. This model emphasizes the importance of internal team processes in enhancing outcomes, especially in structured

collaborative environments.

Black et al. (2019) focused on the role of team cohesion, finding it to be a key predictor of performance, particularly when mediated by self-efficacy and emotional intelligence. Unlike Han et al., who centered on task processes, Black et al. highlight the emotional and relational aspects of team functioning.

Wang and Ahmed (2013) offered a broader view by linking transformational leadership to team performance through team learning processes, including coordination and collective efficacy. Their model captures both behavioral and cognitive dimensions, positioning learning as a central mechanism for performance improvement.

By comparing these models, it becomes evident that team performance is shaped through a combination of behavioral coordination, cognitive confidence (collective efficacy), relational cohesion, and knowledge exchange. These variables are not isolated; they interact in complex ways to influence how teams operate and succeed.

The integrated conceptual framework (Figure 1) reflects these insights, positioning coordination, knowledge sharing, collective efficacy, and team cohesion as key antecedents of team performance. This framework incorporates behavioral, relational, and cognitive factors, providing a comprehensive basis for analyzing performance outcomes in team-based learning environments.

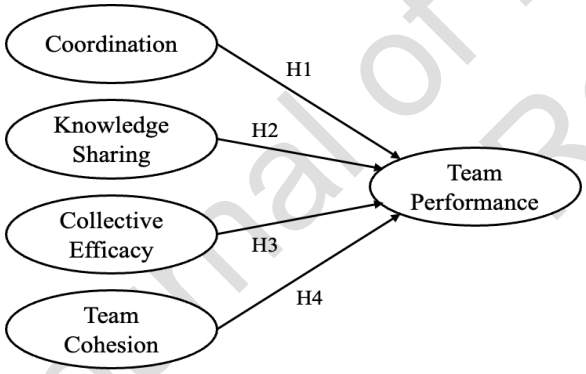

Figure 1: Conceptual Framework

3.2 Research Methodology

This study adopted a mixed methods research design, specifically a sequential explanatory approach, in which quantitative data collection and analysis are followed by qualitative inquiry to further interpret the results.

The research was conducted in four distinct phases, combining statistical testing with contextual interpretation.

In Phase 1, a quantitative survey was administered to the full research population (n = 80) from the Hotel Management program. The survey, delivered via Wenjuanxing (WJX), measured students' perceptions of coordination, knowledge sharing, collective efficacy, team cohesion, and team performance. Data collection for this phase occurred between June and August 2024. Multiple linear regression (MLR) was used to test all hypotheses at a significance level of $p < 0.05$. All variables were retained—regardless of statistical significance—for their potential practical impact during the intervention.

In Phase 2, a subsample of 30 students from Class 3 (Hotel Management) participated in a pre-intervention survey. At the same time, semi-structured interviews were conducted with 10 students and 5 instructors to obtain contextual insights and inform the intervention design. This phase provided the qualitative foundation for adapting the intervention to the learning environment.

Phase 3 involved the implementation of a 12-week Intervention Design Implementation (IDI) with the same 30 students. The intervention targeted improvements in group dynamics and collaboration, based on the four independent variables outlined in the conceptual framework.

In Phase 4, a post-intervention survey was administered to the same group using WJX, and 10 students were re-interviewed to evaluate their experience and the effectiveness of the intervention. Paired-samples t-tests were conducted to compare pre- and post-intervention scores across all constructs to assess significant changes in team performance and related factors.

This multi-phase, mixed methods approach enabled a comprehensive analysis of both quantitative relationships and qualitative perspectives, yielding theory-driven and practice-oriented insights into team-based learning in vocational education.

Ethical approval for the study was obtained from the Academic Affairs Office of Hangzhou Vocational & Technical College of Science and Technology. All participants provided informed consent, and data confidentiality was maintained throughout.

To minimize researcher bias, data collection procedures were standardized, and participants were informed that their academic standing would not be affected by participation. Although the researcher served as the course instructor during the IDI phase, all responses were anonymized and only accessed after data compilation.

3.3 Research Population, Sample Size, and Sampling Procedures

3.3.1 Research Population

The research population consisted of 80 students enrolled in the Hotel Management program at the College of Tourism Management, Hangzhou Polytechnic College. These students were selected for participation in the initial quantitative survey (pre-survey).

According to institutional records from Hangzhou Polytechnic College (2024), approximately 900 students were enrolled in the Hotel Management major at the time of the study. Thus, the selected sample represents approximately 8.9% of the total population, which is considered sufficient for exploratory research using regression analysis.

The sample included students from two academic levels: Class 1 from the first year and Class 3 from the second year. This stratified selection ensured variation in experience and exposure to team-based learning activities within the program.

3.3.2 Sample Size

The sample for this study was collected in three phases: pilot testing, main survey, and intervention.

First, a pilot test was conducted with 30 randomly selected Hotel Management students to assess the clarity and reliability of the questionnaire. Based on the results, minor revisions were made to improve item validity.

Next, the finalized questionnaire was distributed to 80 students from the same program for the main study. According to Roscoe (1975), a sample size between 30 and 500 is generally adequate for most behavioral studies, particularly when using multiple regression. The sample of 80, representing approximately 8.9% of the population ($n \approx 900$), was used to test the conceptual model.

Finally, 30 students from the original sample volunteered to join the Intervention Design Implementation (IDI). These participants were selected based on their availability, willingness to complete the full intervention, and prior survey participation. They completed the same questionnaire before and after the 12-week intervention and also participated in follow-up interviews.

3.3.3 Sampling Procedure

This study employed a multi-stage sampling approach combining random and convenience sampling methods.

In the first stage, a pilot test was conducted with 30 Hotel Management students to assess the reliability of the questionnaire items. Following the refinement of the instrument, a larger sample of 80 students was selected for the main survey. One class from each academic year was randomly selected to ensure representation across different levels of study. The survey was administered using the online platform Wenjuanxing (WJX).

In the final stage, 30 students were selected through convenience sampling from one of the researcher's own classes to participate in the Intervention Design Implementation (IDI). This class was chosen based on accessibility and the researcher's direct instructional involvement, allowing for consistent facilitation of the intervention. These same 30 students completed both pre- and post-intervention questionnaires to evaluate the impact of the intervention on team performance.

The results from the multiple linear regression (MLR) analysis informed the design of the IDI phase, allowing the intervention to target the most relevant factors influencing team performance.

3.4 Research Instruments

3.4.1 Questionnaire Design

The researcher developed the questionnaire through a structured three-step process. First, the measurement items were sourced from four previously published studies: Lin et al. (2008), Bock et al. (2005), Jung and Sosik (2014), and Michaelsen et al. (2004). Second, the selected items were reviewed and adapted to fit the context of Chinese university students, ensuring cultural and linguistic appropriateness. Third, the content validity of the instrument was evaluated using the Index of Item-Objective Congruence (IOC).

3.4.2 Questionnaire Components

The survey questionnaire was systematically organized into three sections. The first section contained screening questions designed to exclude non-target participants. The second section comprised demographic questions aimed at collecting basic background information, such as gender and other relevant details. The third section consisted of pre-survey items measuring the independent variables (IVs) and dependent variable (DV) among the 30 participating students from Hangzhou Polytechnic College. These items established a baseline understanding of the variables prior to conducting the full study.

3.4.3 IOC Results

To assess content validity, the questionnaire was reviewed by three independent experts: two university lecturers from Assumption University and one PhD scholar from Macao Polytechnic University. They evaluated each item using the Index of Item-Objective Congruence (IOC). Each item was rated as +1 (clearly relevant), 0 (uncertain), or -1 (not relevant).

To enhance the rigor of the assessment, inter-rater reliability was calculated using the average congruence coefficient across raters. The mean IOC scores exceeded the threshold of 0.67 for all items, confirming satisfactory content validity. No items were removed following expert review.

3.4.4 Reliability and Validity

A pilot survey was conducted with 30 randomly selected students, who were asked to complete the questionnaire and provide feedback. Following this, internal consistency reliability was assessed using Cronbach's alpha. According

to Nunnally and Bernstein (1994), a Cronbach's alpha value of 0.70 or higher is considered acceptable. The reliability results for each construct are presented in Table 1, showing that all constructs demonstrated excellent internal consistency.

Table 1: Pilot Test Result (n=30)

Variable	Source of Questionnaire (Measurement Indicator)	No. of Items	Cronbach's Alpha	Strength of Association
COOR	Lin et al. (2008)	4	0.965	Excellent
KS	Bock et al. (2005)	5	0.982	Excellent
CE	Jung and Sosik (2014)	5	0.934	Excellent
TC	Michaelsen et al. (2004)	6	0.960	Excellent
TP	Michaelsen et al. (2004)	5	0.960	Excellent

4. Results and Discussion

4.1 Demographic Profile

In this section, data were presented in terms of frequency and percentage. Participants for the intervention were selected from one of the author's classes. The demographic profile of both the overall research population (n = 80) and the subgroup of students who participated in the Intervention Design Implementation (IDI) (n = 30) is summarized in Table 2. According to the table, among the 30 students in the intervention group, 19 respondents (63.3%) were female, while 11 respondents (36.7%) were male. These results indicate that female students constituted the majority of the class.

Table 2: Demographic Information

IDI Participants (n=30)		Frequency	Percentage
Gender	Female	19	63.3
	Male	11	36.7

4.2 Multiple Linear Regression

A multiple linear regression (MLR) analysis was conducted using data from 80 valid questionnaires to evaluate the effects of four independent variables, Coordination, Knowledge Sharing, Collective Efficacy, and Team Cohesion, on the dependent variable, Team Performance. The analysis was performed using Jamovi, and the assumptions of multicollinearity were assessed via the variance inflation factor (VIF). Since all VIF values were below the threshold of 5 (Hair et al., 1995), multicollinearity was not considered a concern.

The regression model yielded an R^2 value of 0.783, indicating that approximately 78.3% of the variance in team performance could be explained by the four predictor variables included in the model. This demonstrates a strong explanatory power for the overall model.

Table 3: The MLR Results on Team Performance (n=80)

Variable	Standardized Coefficients Beta Value	t-value	p-value	R^2
Coordination	0.025	-0.293	0.860	0.783
Knowledge Sharing	0.345	2.261	0.027*	
Collective Efficacy	0.023	0.149	0.882	
Team Cohesion	0.622	5.217	<0.01*	

Note: p-value <0.05*

As shown in Table 3, Knowledge Sharing ($\beta = 0.345$, $t = 2.261$, $p = 0.027$) and Team Cohesion ($\beta = 0.622$, $t = 5.217$, $p < 0.01$) had statistically significant positive effects on team performance, suggesting that students who engaged more in knowledge sharing and experienced greater team cohesion were more likely to report higher levels of team performance. Among the two, Team Cohesion had the strongest standardized impact on team performance.

In contrast, Coordination ($\beta = 0.025$, $t = -0.293$, $p = 0.860$) and Collective Efficacy ($\beta = 0.023$, $t = 0.149$, $p = 0.882$) did not exhibit statistically significant relationships with team performance, as their p-values exceeded the 0.05 threshold.

Afterwards, IDI was conducted to follow below hypotheses:

H5: There is a significant difference between coordination and team performance between the pre- and post-IDI phases.

H6: There is a significant difference between knowledge sharing and team performance between the pre- and post-IDI phases.

H7: There is a significant difference between collective efficacy and team performance between the pre- and post-IDI phases.

H8: There is a significant difference between team cohesion and team performance between the pre- and post-IDI phases.

4.3 IDI Intervention Stage

The Intervention Design Implementation (IDI) was conducted over a 12-week period and aimed to improve coordination, knowledge sharing, collective efficacy, and team cohesion in order to enhance team performance. The intervention was informed by both the quantitative findings from the multiple linear regression (MLR) and qualitative insights from student and teacher interviews during the pre-IDI phase.

The design of the intervention was guided by the Intervention Design and Implementation (IDI) Model (Kellogg Foundation, 2004), which emphasizes problem identification, stakeholder engagement, and the use of evidence-based, context-sensitive strategies. This structured model ensures that interventions are not only targeted and

measurable but also ethically sound and sustainable in educational settings.

The intervention was implemented in three sequential phases, as illustrated in Figure 2, and included structured activities such as group formation, peer feedback, team competitions, and coordination tasks.

It is important to note that this study did not include a separate control group. Instead, a within-subject design was used, comparing participants' pre- and post-intervention results using a paired samples t-test, which is a commonly accepted method in educational intervention research (Gravetter & Wallnau, 2016).

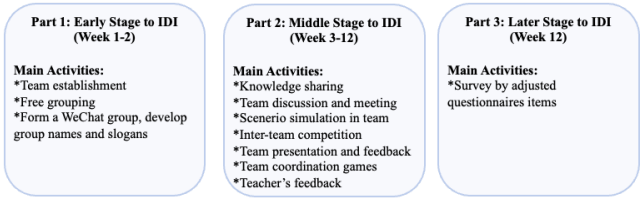

Figure 2: IDI Activities

4.4 Results Comparison between Current and Expect-SP

To evaluate the impact of the Intervention Design Implementation (IDI), the researchers conducted paired-sample t-tests on all five key variables: Coordination, Knowledge Sharing, Collective Efficacy, Team Cohesion, and Team Performance. The results are presented in Table 4.

Table 4: Paired-sample T-test Results

Variable		Mean	SD	SE	p-value
Coordination	Pre-IDI	4.16	0.892	0.163	0.013
	Post-IDI	4.38	0.594	0.108	
Knowledge Sharing	Pre-IDI	4.09	0.828	0.151	0.002
	Post-IDI	4.27	0.634	0.116	
Collective Efficacy	Pre-IDI	3.99	0.722	0.132	0.001
	Post-IDI	4.16	0.576	0.105	
Team Cohesion	Pre-IDI	4.09	0.773	0.141	<0.001
	Post-IDI	4.31	0.558	0.102	
Team Performance	Pre-IDI	4.07	0.801	0.146	0.001
	Post-IDI	4.31	0.579	0.106	

The paired-sample t-test results demonstrated statistically significant improvements across all five variables following the IDI intervention.

Coordination significantly increased from pre-IDI (M = 4.16, SD = 0.892) to post-IDI (M = 4.38, SD = 0.594), p = 0.013. The mean difference was 0.217, indicating that the IDI contributed positively to team coordination. This supports H5, confirming that coordination significantly improved post-intervention.

Knowledge Sharing improved from pre-IDI (M = 4.09, SD = 0.828) to post-IDI (M = 4.27, SD = 0.634), with a statistically significant p-value of 0.002 and a mean difference of 0.180. Thus, H6 is supported, demonstrating a meaningful enhancement in knowledge exchange behaviors.

Collective Efficacy increased from pre-IDI (M = 3.99, SD = 0.722) to post-IDI (M = 4.16, SD = 0.576), p = 0.001, with a mean increase of 0.173. This confirms H7, indicating that students' belief in their group's ability to succeed was significantly strengthened.

Team Cohesion rose significantly from pre-IDI (M = 4.09, SD = 0.773) to post-IDI (M = 4.31, SD = 0.558), $p < 0.001$, with a mean increase of 0.222. This result supports H8, highlighting improved interpersonal bonds and unity among group members.

Lastly, Team Performance itself showed a statistically significant increase from pre-IDI (M = 4.07, SD = 0.801) to post-IDI (M = 4.31, SD = 0.579), p = 0.001, with a mean difference of 0.240. This demonstrates the overall effectiveness of the intervention in enhancing students' team performance.

Beyond statistical significance, effect size calculations using Cohen's d were performed to assess the practical impact of the intervention. The results revealed small to moderate effects across all variables, with the largest improvements observed in team performance (d = 0.34) and team cohesion (d = 0.33). Coordination (d = 0.29), collective efficacy (d = 0.26), and knowledge sharing (d = 0.24) also demonstrated positive changes. These findings indicate that the intervention not only produced statistically significant results but also led to meaningful improvements in students' collaborative behaviors and outcomes.

The results indicate that the IDI intervention had a positive and statistically significant effect on all targeted variables. Improvements were observed in coordination, knowledge sharing, collective efficacy, and team cohesion, which collectively contributed to the enhancement of overall team performance. These findings reinforce the utility of structured team-based interventions in vocational education settings to foster collaborative learning and improve group outcomes.

5. Conclusions and Recommendation

5.1 Conclusions

This study adopted a mixed-methods approach to evaluate the effectiveness of structured team-based learning interventions in a vocational education setting. The research focused on students enrolled in the Hotel Management program at Hangzhou Polytechnic College. Instrument validity and reliability were confirmed through the Item-Objective Congruence (IOC) index and Cronbach's alpha, respectively. Quantitative data from 80 valid student

responses were analyzed using multiple linear regression (MLR) to assess the influence of coordination, knowledge sharing, collective efficacy, and team cohesion on team performance. A subset of 30 students then participated in a 12-week Intervention Design Implementation (IDI), and changes were measured using paired-sample t-tests.

The regression analysis showed that knowledge sharing and team cohesion significantly influenced team performance, while coordination and collective efficacy were not statistically significant predictors in the pre-intervention phase. This could be due to a ceiling effect, as pre-intervention mean scores ranged from 4.0 to 4.4 out of 5, suggesting limited room for upward movement. Social desirability bias may have also influenced responses, particularly in a group-learning environment where students may feel compelled to rate themselves and their peers positively.

Interestingly, the post-intervention t-tests revealed statistically significant improvements in all four independent variables. This suggests that coordination and collective efficacy, although not significant in the initial regression model, responded positively to the targeted interventions. One possible explanation is that regression analysis, being cross-sectional, does not capture dynamic changes over time, whereas the intervention allowed students to build trust and develop confidence in their teams gradually. This underscores the value of combining static and longitudinal measures when evaluating team-based learning.

Comparison with previous literature supports these findings. For instance, Chou et al. (2012) emphasized the mediating role of collective efficacy in strategic decision-making teams, while Homan et al. (2023) identified benevolence and achievement as team values that enhance performance. The observed improvements post-intervention align with studies advocating for collaborative activities to build interpersonal trust and shared confidence among learners (Kwon, 2023; Lee et al., 2022).

The absence of a control group remains a limitation, as it reduces the ability to attribute improvements solely to the intervention. Nevertheless, the consistent positive shifts across all variables reinforce the potential effectiveness of structured pedagogical design in vocational learning.

Theoretically, this study contributes to the understanding of team dynamics in applied education contexts by operationalizing coordination, knowledge sharing, collective efficacy, and team cohesion within a vocational learning framework. While the study did not propose a new theoretical model, it strengthens the applicability of existing frameworks such as Social Cognitive Theory and team learning models in practice-oriented education. Future research could build on this foundation to propose a model tailored to vocational team-based learning.

5.2 Recommendations

This study found that a structured team-based learning approach can improve student performance in vocational education. Based on these results, several practical recommendations are offered for teachers, curriculum planners, and institutions.

Teachers should assign clear team roles to students, such as leader, timekeeper, or researcher and rotate these roles regularly to help students develop different skills and avoid repetition. Breaking team tasks into smaller parts with clear deadlines can help reduce procrastination and ensure that work is shared fairly. Using peer evaluations with clear criteria (such as contribution to tasks or problem-solving) can give a more accurate view of each student's involvement. Teachers should also give feedback during projects, not just at the end, so students have time to improve. Offering small rewards such as bonus marks or recognition can help motivate students to work well with others (Murillo-Zamorano et al., 2019).

Curriculum designers should include learning activities based on real-life hospitality situations, such as simulations or case studies, to help students apply what they learn. Using flipped classrooms, where students review materials before class and work on problems in class has been shown to improve engagement and learning outcomes (Baig & Yadegaridehkordi, 2023; Sevillano-Monje et al., 2022). Around half of each class session should be dedicated to teamwork, with regular check-ins to help students stay on track.

Institutions should support teacher training in areas like managing group work, resolving conflicts, and guiding team discussions. Organizing peer learning groups or lesson planning sessions can help teachers share ideas and improve together (Burton et al., 2024).

To make learning more engaging, schools can introduce friendly competitions between groups such as debates or hospitality service challenges to encourage creativity and teamwork. These activities can use clear scoring systems and progress boards to make goals more visible and motivate students (Ng & Lo, 2022). Finally, students should be trained to use digital tools like cloud platforms and collaborative apps, while institutions must ensure reliable internet, updated hardware, and access to licensed software to support online and tech-based learning (Sevillano-Monje et al., 2022).

These strategies aim to improve the learning experience by helping students work together more effectively, stay motivated, and prepare for real-world teamwork in the hospitality industry.

5.3 Limitation and Further Study

This study has several limitations. First, the quantitative analysis focused on a single major within one institution. The lack of participant diversity may limit the generalizability of the findings. Future studies should include students from multiple majors and institutions to strengthen external validity.

Second, the intervention was conducted in a practice-oriented course. The results may differ in theoretical courses, where team-based learning is more difficult to apply. Future research should examine how collaborative strategies can be adapted to varying instructional contexts.

Third, the pre-post design did not include a control group. Without a comparison group, improvements could be influenced by external factors or maturation effects. Future research should adopt quasi-experimental designs to strengthen causal inferences.

Fourth, temporal effects of the intervention were not evaluated, and it remains unclear whether the gains are sustained long-term. Longitudinal follow-up would help determine the persistence of improvements.

Finally, while the study aligns with existing theories, no new theoretical model was proposed. Future research could integrate the observed dynamics into a conceptual framework specifically designed for vocational team-based learning environments, bridging theory and practice more effectively.

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