

The Impact of Teacher Support and Peer Support on Chinese Vocational College Students' Self-Regulated Learning Ability: The Mediating Role of Learning Motivation

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ABSTRACT:

Against the background of China's high-quality vocational education reform, self-regulated learning (SRL) has become a core competency for technical skilled talents. Existing research mostly discusses teacher support or peer support separately, with few integrated empirical studies comparing their differentiated action mechanisms and the distinct mediating intensity of learning within Chinese vocational training scenarios. This study adopted explanatory sequential mixed methods research design. A stratified random sample of 500 full-time vocational students from two public vocational colleges in Qujing city, Yunnan Province, completed four multi-dimensional validated questionnaires covering teacher support, peer support, learning motivation and SRL ability. After quantitative structural equation modeling (SEM) with 5000 Bootstrap resampling, 16 representative participants were selected for semi-structured interviews to interpret statistical disparities from real training experience. Quantitative outcomes demonstrated that both teacher support ($\beta=0.428$, $p<0.001$) and peer support ($\beta=0.247$, $p<0.001$) exerted significant positive direct effects on students' SRL ability. Learning motivation played a partial mediating role in both pathways, yet the mediating proportion showed a striking gap: peer support's indirect effect accounted for 41.6% of its total influence, while teacher support only reached 8.7%. Follow-up thematic interview analysis explained this discrepancy: vocational teachers focus on one-to-one technical skill scaffolding, which directly optimizes students' learning operation strategies; peer groups rely on companionship and collective learning atmosphere to stimulate internal learning willingness, thus influencing SRL mainly through motivational pathways. Demographic tests found student cadres reported significantly higher levels of peer support, learning motivation and SRL, while gender, grade and major produced no meaningful group differences. This paper expands the localized application of

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Self-Determination Theory and Social Cognitive Theory in Chinese skill-based vocational education, and provides targeted instructional strategies for dual-qualified teachers and college administrators.

Keywords: vocational college students; teacher support; peer support; learning motivation; self-regulated learning; mixed methods; mediating mechanism

1. Introduction

1.1 Research Context and Practical Significance

China's national education strategy has continuously elevated the development priority of vocational education in recent years. Different from general undergraduate education centered on theoretical knowledge accumulation, higher vocational colleges take hands-on skill training and school-enterprise integrated internship as core teaching links (Yunnan Daily, 2025). Students spend more than half of their daily class hours in training workshops, where independent goal formulation, real-time operation monitoring and post-training error reflection directly determine the mastery of professional skills and long-term career adaptability (Yu et al., 2026). However, long-term classroom observation and domestic vocational education empirical studies have consistently pointed out a prominent common problem: most vocational students lack mature self-regulated learning awareness, and they tend to passively follow teachers' training arrangements without spontaneous planning and summary after class (Gao & Mohamad, 2025). Self-regulated learning (SRL), defined by Zimmerman's classic three-stage cyclic framework including forethought planning, performance monitoring and post-learning self-reflection, is recognized worldwide as an indispensable core literacy for lifelong vocational development (Zimmerman, 1990). Therefore, exploring the environmental factors that promote vocational students' SRL ability bears important practical value for optimizing training teaching modes and improving talent cultivation quality.

Two core interpersonal environmental resources run through vocational students' whole campus learning process: teacher support and peer support. Dual-qualified vocational teachers possess both theoretical teaching knowledge and frontline industry practical experience, and they can provide targeted operational correction and personalized learning guidance for students in repeated skill training (Xu et al., 2023). Classmates, as long-term collaborative training partners, maintain high-frequency daily interaction and form the most accessible mutual assistance network for students to exchange operational experience and relieve learning pressure (Zhu et al., 2025). Based on Self-Determination Theory (SDT) proposed by Deci & Ryan (2000), diversified supportive behaviors from teachers and peers can satisfy learners' three basic psychological needs: autonomy, competence and relatedness, thereby activating internal learning motivation. Bandura's Social Cognitive Theory (1986) further supplements that group atmosphere and interpersonal feedback will reshape students' cognitive judgment of learning value, and then adjust their autonomous learning behaviors. Nevertheless, most existing domestic and overseas vocational education research fails to integrate teacher support and peer support into a unified analytical model, and there is a lack of comparative research on their differentiated influence paths and the different mediating strength of learning motivation, which forms the core research starting point of this paper.

1.2 Literature Review and Research Gaps

1.2.1 Overseas Relevant Empirical Research

Foreign vocational education scholars have carried out abundant exploration on the relationship between social support and students'

self-learning performance. Systematic review research by Mejeu & Grieder (2025) sorted out 21 international intervention studies and confirmed that teacher's step-by-step scaffolding guidance can effectively improve students' metacognitive monitoring ability during skill practice. Sirk (2025) conducted a questionnaire survey on Estonian vocational students and found that peer collaborative training groups can significantly enhance learners' academic self-efficacy and learning persistence. However, the majority of overseas research samples are based on European apprenticeship training systems, whose class management modes, curriculum setting logic and student group psychological characteristics are quite different from Chinese school-enterprise integrated vocational colleges. The research conclusions formed under Western educational backgrounds cannot be directly transplanted to domestic teaching practice. In addition, foreign scholars mostly study teacher support or peer support as single independent variables, and few comparative studies on the two support sources' distinct motivational transmission mechanisms, resulting in insufficient depth of mechanism discussion.

1.2.2 Domestic Chinese Vocational Research

In recent years, local scholars have gradually paid attention to the predictive effect of social support on vocational students' learning development. Xu et al. (2023) verified that multi-dimensional teacher support can positively predict students' classroom learning engagement through cross-sectional data; Hou et al. (2025) found peer emotional companionship can effectively alleviate vocational students' learning anxiety and improve their learning initiative. After sorting domestic mainstream literature, three obvious research deficiencies are summarized: First, most previous studies only select one type of social support as the research object, without constructing an integrated model to simultaneously test and compare the direct effect sizes of teacher and peer support on SRL ability. Second, existing mediation research only generally confirms learning motivation plays an intermediary role, without quantifying the difference of mediating proportion between the

two support paths, and cannot explain why peer groups are easier to stimulate students' internal learning enthusiasm than teachers. Third, most domestic related papers only adopt single quantitative questionnaire data for statistical inference, lacking matched in-depth interview materials to interpret the statistical laws behind numerical results, making the discussion of internal learning mechanisms stay at superficial data description without combining real training scenarios.

1.3 Research Objectives, Research Hypotheses

Combined with the practical pain points of vocational teaching and the three major research gaps summarized above, this paper puts forward three hierarchical core research objectives:

Describe the overall level of vocational students' perceived teacher support, peer support, learning motivation and self-regulated learning ability, and test whether demographic variables (gender, grade, major, student cadre identity) produce significant score differences among the four core constructs. Construct a structural equation mediation model to verify the direct predictive effects of teacher support and peer support on SRL ability, and compare the difference of learning motivation's mediating proportion in the two relational paths via 5000 Bootstrap repeated sampling.

Carry out semi-structured interviews with typical survey participants, use students' real training experience to interpret the core statistical difference of mediating intensity, and put forward operable targeted suggestions for vocational teachers and college management departments.

Four standardized research hypotheses are proposed on the basis of SDT and Social Cognitive Theory:

H1 Teacher support has a significant positive direct predictive effect on Chinese vocational college students' self-regulated learning ability.

H2 Peer support has a significant positive direct predictive effect on Chinese vocational college students' self-regulated learning ability.

H3 Learning motivation can positively predict

vocational college students' self-regulated learning ability.

H4 Learning motivation plays a partial mediating role between teacher support / peer support and students' SRL ability; the mediating proportion of peer support path is obviously higher than that of teacher support path.

2. Methodology

2.1 Mixed Research

This study adopts explanatory sequential mixed-method research design, which divides the whole research into two sequential progressive stages: quantitative questionnaire survey as the first stage, and qualitative semi-structured interview as the supplementary explanatory stage.

The internal logic of this design lies in making up the respective defects of single quantitative or single qualitative research. Large-scale standardized questionnaires can collect group-wide overall data, test preset hypothetical causal paths and obtain universal statistical laws, but they cannot capture students' real subjective psychological feelings and specific scene logic behind the data. Small-sample in-depth interviews can supplement contextualized interpretation for numerical results, but their conclusions lack population representativeness and cannot be used to verify the proposed research hypotheses (Creswell & Creswell, 2023). The combination of two research forms can realize complementary advantages of macro data and micro individual experience, and improve the rigor and persuasion of the whole empirical research.

Stage 1 Quantitative research: Cross-sectional offline-online combined questionnaire survey, collect standardized scale data, complete descriptive statistics, correlation test, confirmatory factor analysis and mediation effect structural equation modeling.

Stage 2 Qualitative research: Randomly extract

volunteer participants from valid questionnaire samples for one-on-one offline semi-structured interviews, conduct three-level thematic coding on transcribed audio texts, and focus on explaining the huge gap of learning motivation's mediating proportion found in quantitative results.

2.2 Research Participants and Sampling Rules

2.2.1 Quantitative Questionnaire Sample

The research population of this quantitative phase is all full-time vocational students from two public higher vocational colleges in Qujing City, Yunnan Province: Yunnan Vocational Institute of Energy Technology and Qujing Vocational and Technical College. The total number of enrolled full-time students of the two schools is about 25,000, covering engineering technical majors and service management majors, which can represent the overall characteristics of local vocational student groups to a certain extent.

The sampling method adopts stratified random sampling, taking major category (technical / service) and grade as stratification standards to distribute electronic questionnaires proportionally in each class WeChat group. The questionnaire distribution time is set in the middle of the semester, avoiding the freshmen adaptation period and final exam review period to prevent students from filling in perfunctorily.

A total of 531 electronic questionnaires were distributed, and after eliminating invalid questionnaires with ultra-short filling time, continuous single-option regular answers and a large number of missing items, 500 valid samples were finally retained, with an effective recovery rate of 94.2%. According to statistical methodology norms proposed by Lynn (2016), a sample size above 500 fully meets the statistical power requirements of structural equation modeling and Bootstrap mediation effect test.

Table 1 Demographic Characteristics of Valid Sample (N=500)

Variable	Category	Frequency	Percentage
Gender	Male	204	40.8%
	Female	296	59.2%
Grade	Freshman	441	88.2%
	Sophomore	52	10.4%
	Junior	7	1.4%
Major Type	Technical	196	39.2%
	Service	304	60.8%
Student Cadre	Yes	145	29.0%
	No	355	71.0%

The sample is dominated by freshmen, with an unbalanced grade distribution; service majors account for more than 60% of the total sample, and less than one-third of students hold class cadre positions.

2.2.2 Qualitative Interview Sample

After completing quantitative data cleaning, random numbers were generated to screen volunteer interviewees from 500 valid respondents. The selection range balanced male and female students, different grades, technical and service majors, cadre and non-cadre identities to ensure diversified interview perspectives. A total of 16 participants were interviewed. During the coding analysis process, new core themes no longer appeared starting from the 14th interview, reaching the data saturation standard recognized by qualitative research (Guest et al., 2006). Each interview lasts 25–40 minutes, and all participants signed oral informed consent before audio recording to guarantee the authenticity and privacy of interview content.

2.3 Measurement Scales

Four mature multi-dimensional scales adapted to Chinese vocational student samples are adopted in this study, all adopting 5-point Likert scoring standard (1=Strongly Disagree, 5=Strongly Agree). Perceived Teacher Support Scale (PTSS, Wu et al., 2024): 25 items, four dimensions including instrumental support, emotional support, informational support and appraisal support; total Cronbach's $\alpha=0.980$.

Peer Support Questionnaire (PSQ, Mostafaei & Hosseinneshad, 2020): 22 items, five dimensions including information, emotional, instrumental, feedback and companionship support; total Cronbach's $\alpha=0.977$. Vocational Learning Motivation Scale (Zhang, 2025): 38 items, five dimensions covering intrinsic engagement, career self-motivation, social belonging, extrinsic responsibility and learning anxiety; total Cronbach's $\alpha=0.968$. ASLQ Self-Regulated Learning Scale (Nambiar et al., 2022): 36 items divided into forethought, performance control and self-reflection three stages matching Zimmerman's model; total Cronbach's $\alpha=0.971$. Harman single-factor test was carried out on all 121 scale items to test common method bias. The first extracted common factor only explained 32.47% of the total variance, which is lower than the critical value of 40%, proving there is no serious homologous deviation in this research data.

2.4 Research Implementation

Prior to data collection, formal ethical approval was obtained from Rangsit University Research Ethics Board (Certificate Number RSUERB630-646). Electronic questionnaires were released through WeChat mini-program online platform. The opening guidance clearly informed participants of anonymous filling rules, voluntary participation rights and exclusive academic use of all collected data to reduce social desirability bias. After sorting valid questionnaire data, contact volunteer participants one by one to arrange offline interview time in quiet campus meeting rooms,

and explain the audio recording rules and anonymization processing measures before the formal interview starts. All interview audio was fully transcribed into text word for word after the interview, and two independent researchers conducted open, focused and selective three-level coding on the transcript. The inter-coder reliability coefficient reached 89%, and inconsistent coding contents were unified through group discussion.

2.5 Data Analysis Software and Specific Methods

2.5.1 Quantitative Analysis Tools and Steps

Using SPSS for basic statistical processing, AMOS for structural equation modeling. Analysis sequence: descriptive statistics and normality test → independent sample t-test and one-way ANOVA for demographic group difference inspection → Pearson correlation analysis between latent variables → confirmatory factor analysis to test scale reliability and validity → SEM + 5000 Bootstrap resampling to complete direct effect and mediating effect significance test. Multicollinearity diagnosis is added in the correlation stage to avoid model deviation caused by high correlation between independent variables.

2.5.2 Qualitative Analysis Tools and Steps

Using Nvivo for auxiliary thematic coding. The three-level coding process is followed strictly: first extract original statements from transcripts as open codes, then aggregate similar contents into secondary classification themes, and finally summarize four core variable macro themes to sort out the internal logical chain between support, motivation and self-regulated learning.

3. Results

3.1 Quantitative Research Results

3.1.1 Data Preprocessing and Validity Screening

531 online questionnaires were collected via the WeChat mini-program. Invalid responses were

excluded based on completion time (<120 s), excessive repeated answers, and missing-item proportion ($>5\%$). This screening yielded 500 valid samples (94.2% effective rate), sufficient for structural-equation modelling and 5000-sample Bootstrap mediation tests (Lynn, 2016). Data were coded and analysed using SPSS and AMOS.

3.1.2 Demographic Characteristics of Participants

The sample comprised 296 female students (59.2%) and 204 male students (40.8%), reflecting the gender distribution of the participating vocational colleges. In terms of grade level, first-year students accounted for the largest proportion at 88.2% ($n = 441$), followed by second-year students (10.4%, $n = 52$) and third-year students (1.4%, $n = 7$). Regarding major type, 60.8% ($n = 304$) of participants were enrolled in service-oriented majors, while 39.2% ($n = 196$) were from technical majors. Additionally, 29.0% ($n = 145$) of respondents held student cadre positions, and 71.0% ($n = 355$) did not. The uneven grade distribution is acknowledged as a sample characteristic and is addressed in the limitations section of this dissertation.

3.1.3 Descriptive Statistics and Normality Assessment

Descriptive statistics for the four 5-point-Likert core variables are summarised in Table 3.1, where higher scores represent higher construct levels. Vocational-student sample means ranged 3.5–3.8, reflecting moderately high perceived support, learning motivation and self-regulated learning (SRL). Teacher support scored highest ($M=3.740, SD=0.698$), followed by peer support ($M=3.583, SD=0.660$), learning motivation ($M=3.566, SD=0.580$), and SRL ($M=3.537, SD=0.608$). Skewness (0.113–0.419) and kurtosis (0.132–0.533) satisfied $|skewness| < 2$ and $|kurtosis| < 7$ for large-sample parametric analyses (Cigdem & Oncu, 2024), verifying data normality.

Table 3.1 Descriptive Statistics and Normality Test Results for Core Variables (N = 500)

Variable	N	Mean	Std. Deviation	Minimum	Maximum	Skewness	Kurtosis
Teacher support	500	3.740	0.698	1.000	5.000	0.113	-0.446
Peer support	500	3.583	0.660	1.000	5.000	0.179	0.246
Learning motivation	500	3.566	0.580	1.132	5.000	0.245	0.533
SRL ability	500	3.537	0.608	1.222	5.000	0.419	-0.132

3.1.4 Reliability and Validity of Measurement Instruments

Common method bias was tested using Harman's single-factor test on all 121 items of the four core scales. The results showed that the first unrotated factor explained 32.47% of the total variance, which is below the conventional critical threshold of 40%. This indicates that there is no severe common method bias in the dataset, and the subsequent research

conclusions are reliable. Construct validity was examined through Kaiser-Meyer-Olkin (KMO) test, Bartlett's test of sphericity, and confirmatory factor analysis (CFA). The overall KMO value for all items was 0.978, and Bartlett's test of sphericity was statistically significant ($\chi^2 = 64091.932$, $df = 7260$, $p < 0.001$), indicating that the data had strong common factor structure and was highly suitable for factor analysis (Table 3.2).

Table 3.2 KMO and Bartlett's Test of Sphericity Results

Test	Statistic	Value	df	p
KMO	Overall KMO	0.978	-	-
Bartlett's Test	Chi-square	64091.932	7260	<0.001

Given the 121 total items across four scales, item parceling was applied in confirmatory factor analysis to reduce model complexity and enhance estimation stability. Sub-dimension average scores served as observed indicators for latent variables, a common practice for long-scale, large-sample research. First-order CFA results (Table 3.3) yielded acceptable model fit: CFI = 0.962,

TLI = 0.954, GFI = 0.997, SRMR = 0.038, $\chi^2/df = 4.653$. RMSEA = 0.086 slightly exceeded the 0.08 threshold, a typical large-sample outcome given chi-square and RMSEA sensitivity to sample size (Mejeh & Grieder, 2025). The measurement model was accepted based on satisfactory incremental fit indices.

Table 3.3 Fit Indices of the CFA Measurement Model

Fit Index	Value	Acceptance threshold	Evaluation
χ^2/df	4.653	< 5 acceptable	Acceptable
RMSEA	0.086	< 0.08 acceptable	Marginally acceptable

Fit Index	Value	Acceptance threshold	Evaluation
CFI	0.962	> 0.90 acceptable; > 0.95 good	Good
TLI	0.954	> 0.90 acceptable	Good
GFI	0.997	> 0.90 good	Excellent
SRMR	0.038	< 0.08 acceptable	Excellent

Convergent validity was evaluated via composite reliability (CR) and average variance extracted (AVE; Table 3.4). All four latent variables satisfied thresholds: CR = 0.911-0.972 (> 0.70) and AVE = 0.677-0.921 (> 0.50), supporting adequate convergent validity (Wu et al., 2024).

One low factor loading (0.605) for learning anxiety was expected, given its negative motivational nature. Fornell-Larcker testing confirmed discriminant validity, as each construct's AVE square root (0.823-0.960) exceeded cross-construct correlations.

Table 3.4 Convergent Validity Indices and Standardized Factor Loadings

Latent variable	Number of observed dimensions	CR	AVE	Standardized factor loading range
Teacher support	4	0.956	0.844	0.893 – 0.946
Peer support	5	0.961	0.832	0.880 – 0.933
Learning motivation	5	0.911	0.677	0.605 – 0.912
SRL ability	3	0.972	0.921	0.937 – 0.975

3.1.5 Bivariate Correlation Analysis

Pearson correlation analysis tested linear associations among the four core variables (Table 3.5). All pairwise correlations were positive and significant at ($p < 0.001$), offering preliminary support for the hypotheses. Peer support-learning motivation yielded the

strongest correlation ($r = 0.807$), followed by teacher support-SRL ability ($r = 0.785$), and teacher-peer support ($r = 0.745$). These patterns align with existing vocational-education findings (Xu et al., 2023; Zhu et al., 2025), laying a basis for subsequent structural-equation modelling.

Table 3.5 Pearson Correlation Matrix of Core Variables (N = 500)

Variable	1	2	3	4
1. Teacher support	1.000			
2. Peer support	0.745***	1.000		
3. Learning motivation	0.672***	0.807***	1.000	

Variable	1	2	3	4
4. SRL ability	0.785***	0.773***	0.744***	1.000

Note. *** $p < 0.001$

3.1.6 Group Differences in Core Variables

Independent-samples t-tests and one-way ANOVA examined demographic group differences (Table 3.6). No significant effects of gender, grade level or major type emerged for the four core variables (all $p > 0.05$), indicating generalisable associations between social support, motivation and SRL across these subgroups.

Nevertheless, student cadres scored significantly higher on learning motivation ($t=2.514$, $p=0.013$,

$d=0.265$), peer support ($t=3.091$, $p=0.002$, $d=0.319$), and SRL ability ($t=2.741$, $p=0.007$, $d=0.278$) than non-cadres; teacher-support differences were marginal ($p=0.088$). This matches prior work noting cadres' greater peer-interaction and organisational-engagement opportunities (Shao et al., 2024). Given the small third-year subsample ($n=7$) weakening ANOVA statistical power, non-significant grade findings should be interpreted cautiously and require replication with balanced samples.

Table 3.6 Group Difference Analysis Results for Core Variables

Grouping variable	Dependent variable	Analytical method	Statistic	p	Effect size	Significance
Gender	Teacher support	Independent t-test	1.442	0.150	0.133	ns
	Peer support	Independent t-test	-0.194	0.846	-0.018	ns
	Learning motivation	Independent t-test	-0.422	0.674	-0.039	ns
	SRL ability	Independent t-test	0.198	0.843	0.019	ns
Grade	Teacher support	One-way ANOVA	1.774	0.171	0.007	ns
	Peer support	One-way ANOVA	1.284	0.278	0.005	ns
	Learning motivation	One-way ANOVA	0.759	0.469	0.003	ns
	SRL ability	One-way ANOVA	0.013	0.988	0.000	ns
Major type	Teacher support	Independent t-test	-1.254	0.210	-0.114	ns
	Peer support	Independent t-test	0.037	0.970	0.003	ns

Grouping variable	Dependent variable	Analytical method	Statistic	p	Effect size	Significance
	Learning motivation	Independent t-test	1.648	0.100	0.152	ns
	SRL ability	Independent t-test	0.284	0.776	0.026	ns
Student cadre status	Teacher support	Independent t-test	1.712	0.088	0.170	ns
	Peer support	Independent t-test	3.091	0.002	0.319	**
	Learning motivation	Independent t-test	2.514	0.013	0.265	*
	SRL ability	Independent t-test	2.741	0.007	0.278	**

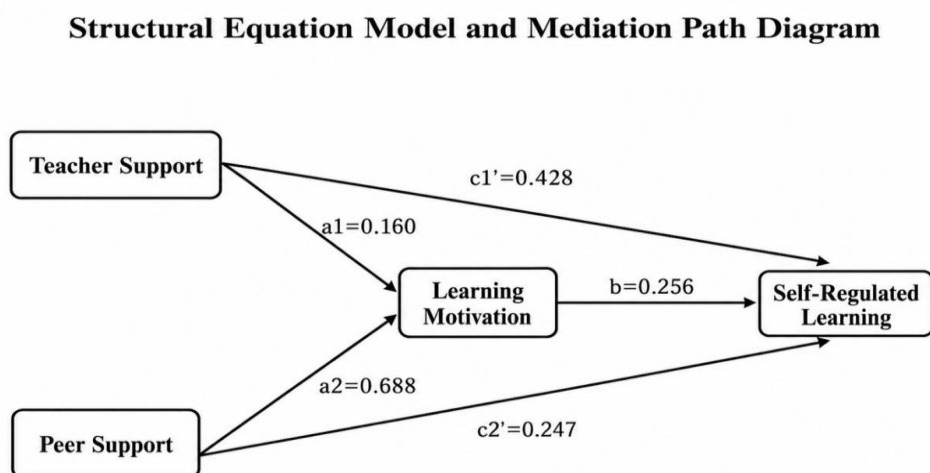
Note. ns = not significant; * $p < 0.05$; ** $p < 0.01$.

3.1.7 Structural Equation Modeling and Mediating Effect Test

An SEM was built to test direct and mediating hypotheses, with teacher- and peer-support as exogenous latent variables, learning motivation as the mediator, and SRL ability as the endogenous latent variable. The structural model yielded acceptable fit: $\chi^2/df = 5.004$, CFI = 0.957, TLI = 0.948, RMSEA = 0.090,

SRMR = 0.042. Consistent with the CFA outcome, slightly higher RMSEA stemmed from the large sample, while incremental fit indices justified path-coefficient interpretation. The model accounted for 66.3 % variance in learning motivation ($R^2 = 0.663$) and 71.8 % variance in SRL ability ($R^2 = 0.718$), demonstrating strong explanatory power.

Figure 3.1 Standardized Path Coefficients of the Structural Equation Mediation Model



Standardized structural-model path coefficients are shown in Figure 3.1. All hypothesized direct paths were positive and significant at $p < 0.001$. Teacher support positively predicted SRL ability ($\beta = 0.428$, $p < 0.001$), supporting Hypothesis 1; peer support also positively predicted SRL ability ($\beta = 0.247$, $p < 0.001$), supporting Hypothesis 2, and learning motivation positively predicted SRL ability ($\beta = 0.256$, $p < 0.001$), supporting Hypothesis 3. Both exogenous variables significantly predicted the mediator learning motivation. Peer support exerted a substantially stronger effect ($\beta = 0.688$, $p < 0.001$) than teacher support ($\beta = 0.160$, $p < 0.001$), underscoring peers' dominant role in vocational students' learning-motivation formation.

3.1.8 Mediating Effect Verification

Bootstrapping with 5000 resamples was used to examine the mediating role of learning motivation. Table 3.7 presents indirect, direct,

total effects and mediating-effect proportions. For the teacher-support-to-SRL-ability path, the indirect effect via learning motivation was 0.041, with a 95% confidence interval [0.009, 0.092] excluding zero, indicating significant partial mediation contributing 8.7% of the total effect. For peer support predicting SRL ability, the indirect effect through learning motivation was 0.176, with a 95% confidence interval [0.103, 0.256] excluding zero, also showing significant partial mediation that accounted for 41.6% of the total effect. These results fully support Hypothesis 4: learning motivation mediates the relationships between both forms of social support and SRL ability. This magnitude difference aligns with the theoretical framework. Teacher support influences SRL mainly through direct guidance and skill scaffolding, while peer support functions more via motivational activation and social contagion (Hou et al., 2025; Zhu et al., 2025).

Table 3.7 Bootstrap Mediating Effect Test Results (5000 resamples)

Mediating path	Indirect effect	95% CI Lower	95% CI Upper	Direct effect	Total effect	Proportion mediated
Teacher support → Learning motivation → SRL ability	0.041	0.009	0.092	0.428	0.469	8.7%
Peer support → Learning motivation → SRL ability	0.176	0.103	0.256	0.247	0.423	41.6%

3.1.9 Summary of Quantitative Findings

The quantitative phase produced three key findings. First, vocational-college students reported moderately high levels of teacher support, peer support, learning motivation and SRL ability, and all measures showed good reliability and validity. Second, both teacher and peer support exerted significant positive direct effects on SRL ability, highlighting social-environmental factors'

importance for self-regulatory capacity. Third, learning motivation functioned as a significant partial mediator in both support-SRL relationships, with far stronger mediating effects for peer support. While these results validate the hypothesized model, they leave open why such mediating-effect differences exist and how these statistical patterns appear in real-life contexts. The subsequent qualitative phase explores students' lived experiences to answer these

questions. Collectively, the data supported all four hypotheses: H1, H2 and H3 were confirmed, as was H4 regarding learning motivation's partial mediating role between two forms of social support and SRL ability.

3.2 Qualitative Research Results

After transcribing 16 interview audio recordings, 74 initial open codes were extracted and aggregated into 22 secondary themes, and finally four core variable macro themes were summarized. The saturation point appears at the 14th interview, and no new research themes emerge later. The analysis only focuses on interpreting the mediating proportion gap found in quantitative results, without redundant theme expansion.

3.2.1 Qualitative Explanations for Key Quantitative Findings

Qualitative data, as a core strength of explanatory sequential mixed-methods design, interpret key quantitative results through participants' lived experiences. Teacher support

yielded a weak mediating effect (8.7%): it mainly provides instrumental skill guidance instead of fostering intrinsic motivation, and thus influences SRL behaviour directly rather than via learning motivation. By contrast, peer support produced a strong mediating effect (41.6%). Through emotional bonding and group-norm contagion, peer atmosphere boosts learning motivation and subsequently facilitates SRL. Moreover, the forethought dimension represented the weakest SRL component; students rarely engage in long-term planning and are easily distracted by mobile devices. Student cadres showed stronger self-discipline and learning initiative due to role-derived responsibility. In addition, standardized vocational training and class management diminished gender- and major-related disparities, resulting in non-significant group differences.

Figure 3.2 Theoretical model of the influence mechanism structure of self-regulated learning ability of vocational college students.

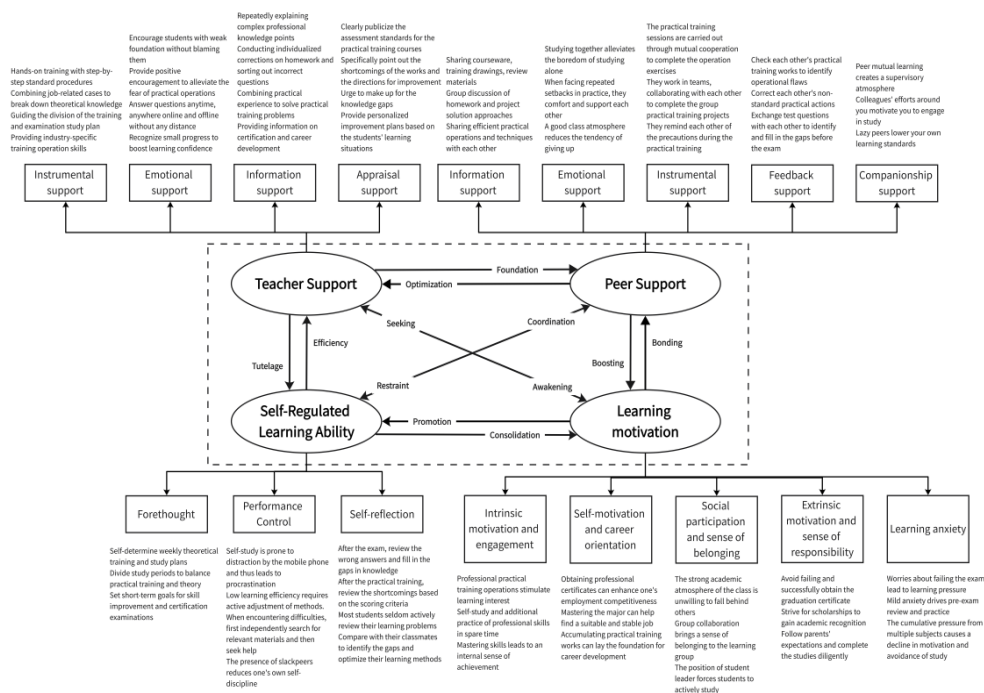


Table 3.8 Structural Relationships Among Core Categories

Relationship Path	Core Connotation
Teacher Support ↔ Peer Support	Teachers' unified teaching standards and resource supply lay the foundation for peer mutual assistance; a positive peer collaboration atmosphere shares teachers' tutoring pressure and promotes teachers to optimize practical training guidance. The two jointly build a multi-level learning support system.
Teacher Support → Learning Motivation	Teachers' encouragement and planning guidance alleviate students' learning fear of difficulty and stimulate their learning willingness; in turn, students with strong learning motivation will actively seek teacher resources to obtain more support.
Teacher Support → SRL Ability	Teachers directly teach planning, reflection and learning methods, and cultivate students' SRL literacy; students with strong SRL ability can use teacher-provided resources more efficiently and amplify the effect of teacher support.
Peer Support → Learning Motivation	Peer companionship and mutual supervision form a fine learning atmosphere and generate catch-up learning motivation; students with strong learning willingness will actively organize peer study groups to strengthen peer support.
Peer Support → SRL Ability	Peer mutual reminder and error correction reduce procrastination and optimize learning methods; self-disciplined students good at planning will actively organize group collaboration and improve the peer support network.
Learning Motivation → SRL Ability	Learning interest and career goals drive students to actively make plans, practice after class and review knowledge gaps; in turn, the sense of achievement gained from self-regulated learning consolidates intrinsic learning motivation.

3.2.2 Summary of Qualitative Findings

The qualitative phase extracts four core variable categories with clear dimensions and complete connotations, and verifies the interactive relationship between social support, learning motivation and SRL ability. More importantly, qualitative findings reveal the internal behavioral logic and psychological mechanism behind the differential effects of the quantitative model, realizing the complementary advantages of mixed methods research.

4. Discussion

4.1 Discussion of Key Findings

4.1.1 Status of Core Variables

Vocational students reported medium-high scores on teacher support, peer support, learning motivation and SRL; teacher support ranked highest while SRL (especially the forethought/planning dimension) was the lowest. Consistent with prior research, standardized, teacher-arranged training schedules deprive students of independent planning chances, weakening proactive goal-setting skills.

Students' motivation was mostly career-driven, with mild learning anxiety exerting dual effects: moderate pressure boosts exam review, yet sustained assessment stress causes learning avoidance, matching control-value theory. No significant gaps existed across gender, grade or majors, unlike general university samples. Standardized training and unified class management homogenize learning environments and narrow demographic differences.

4.1.2 Direct Effects of Teacher and Peer Support

Consistent with Hypotheses 1–2, both support types positively predicted SRL, yet teacher support had a much stronger direct path ($\beta=0.428$ vs. $\beta=0.247$). Vocational teaching centers on teachers' step-by-step skill demonstrations and targeted error correction, which directly scaffold students' metacognition and reflective habits, as validated by systematic reviews.

Peer support facilitates SRL via resource sharing, collaborative practice and mutual operational feedback, improving students' real-time

performance adjustment and self-reflection. The two support sources function complementarily: teachers deliver top-down structured skill guidance, while peers offer horizontal, workshop-specific assistance, filling a research gap where most prior studies only examine one support source separately.

4.1.3 Mediating Role of Learning Motivation

Learning motivation acted as partial mediator for both pathways (Hypotheses 3–4), yet mediation strength differed drastically: peer support's mediated proportion reached 41.6%, versus merely 8.7% for teacher support.

From self-determination theory, peer companionship and collective learning atmosphere satisfy students' belongingness needs, triggering contagious learning motivation that further promotes self-regulated study. In contrast, vocational teachers prioritize instrumental skill instruction over emotional encouragement and autonomy support; they rarely activate students' internal willingness to learn, so their influence on SRL mainly operates through direct skill scaffolding rather than motivational transmission.

Two distinct influencing mechanisms are confirmed: teacher-led direct skill cultivation, and peer-driven motivation activation, both indispensable for SRL growth.

4.1.4 Demographic Group Differences

Only student cadres showed significantly higher peer support, motivation and SRL capacity. Cadres interact more frequently with peers and bear role-model responsibility, which raises self-discipline and learning initiative.

Non-significant gender/major differences stem from uniform training systems eliminating group gaps. The unbalanced grade sample (88.2% freshmen) reduced statistical power to detect grade disparities, which is addressed in study limitations.

4.2 Theoretical Implications

This study simultaneously incorporates teacher and peer support to construct a dual-support model tailored to vocational skill training,

enriching context-specific SRL antecedent research.

The divergent mediating effects verify the applicability of self-determination and social cognitive theories in Chinese vocational education, clarifying how different social supports satisfy learners' psychological needs.

The explanatory sequential mixed-method design uses interview data to interpret quantitative statistical mechanisms, resolving the over-reliance on single questionnaire data in existing literature and offering a replicable mixed-method framework.

It validates Zimmerman's three-stage SRL model for vocational students and identifies forethought planning as a critical weak point for targeted intervention.

4.3 Practical Recommendations

College administrators: Embed SRL training into talent cultivation schemes; implement weekly training planning and reflection logs; build formal peer skill groups to foster positive learning contagion; optimize assessment systems to cut cumulative exam anxiety.

Vocational teachers: Balance technical guidance with motivational support (career guidance, task autonomy and positive feedback); explicitly teach planning/reflection strategies; utilize student cadres as peer learning leaders and provide differentiated tutoring for undisciplined students.

Students: Proactively seek teacher strategy guidance and join peer learning groups; start with short-term study goals to gradually improve independent planning capacity instead of last-minute cramming.

4.4 Study Limitations

Limited external validity: Samples only cover two Qujing vocational colleges with an overwhelming proportion of freshmen, unable to represent regional or grade-level variation nationwide.

Cross-sectional data cannot confirm strict causal relationships; bidirectional reciprocal effects between SRL and perceived support may exist.

All data rely on self-reports, susceptible to social desirability bias despite no severe common method bias detected.

Small qualitative interview sample restricts deep analysis of subgroup discrepancies between technical and service majors.

4.5 Future Research Directions

Expand multi-region, grade-balanced samples to enhance external validity and analyze developmental trends.

Adopt longitudinal tracking to clarify the dynamic co-evolution of social support, motivation and SRL and draw causal conclusions.

Add mediators/moderators such as academic self-efficacy, vocational identity, family socioeconomic status and digital literacy to expand the theoretical model and explore boundary conditions.

Carry out intervention experiments (randomized controlled trials) for peer learning communities and teacher motivational training to generate practical evidence for SRL improvement.

Combine self-reported scales with objective behavioral records (training platform logs, teacher evaluation scores) to reduce single-source data bias and improve result objectivity.

5. Conclusion

This study adopted an explanatory sequential mixed-method design to explore how teacher support and peer support shape vocational college students' self-regulated learning (SRL), alongside the mediating function of learning motivation. Integrated quantitative SEM results and qualitative interview themes yield four core conclusions.

First, the surveyed vocational students reported medium-high scores on teacher support, peer support, and learning motivation, yet their overall SRL levels were the lowest among all measured constructs, with forethought planning

being the most obvious weak point. Standardised, teacher-centred training schedules leave little room for students to independently set learning goals, which gradually erodes their initiative to make long-term study plans. In terms of motivation, learners are mostly driven by career prospects, while persistent assessment pressure generates mild to severe learning anxiety that may lead to learning avoidance. Consistent with the interview data, unified training arrangements and identical class management rules narrow gaps caused by gender, grade and major, resulting in non-significant group differences across these demographic indicators. Only student cadres scored notably higher on peer support, motivation and SRL, as their role brings extra supervision responsibility and more frequent peer communication, strengthening self-discipline.

Second, both teacher support and peer support exert significant positive direct effects on SRL, yet teacher support's direct predictive power ($\beta=0.428$) is far stronger. Vocational teachers focus on step-by-step skill demonstrations and real-time error correction; this hands-on scaffolding directly optimises students' in-class operation and post-training reflective strategies. Peer support works through workshop information exchange, mutual error checking and joint practice, delivering supplementary horizontal learning guidance. The two types of support form a layered learning aid system that previous single-factor research often overlooked.

Third, learning motivation acts as a partial mediator in both paths, but the mediating effect differs drastically: peer support accounts for 41.6% of total effects via motivation, while the figure for teacher support stands at merely 8.7%. Rooted in self-determination theory, peer companionship and collective study atmosphere satisfy students' sense of belonging, creating normative learning contagion that sparks internal motivation and then transforms into self-regulated behaviours. In contrast, most vocational teachers prioritise technical instruction over emotional encouragement and autonomous learning guidance. They rarely

communicate students' inner willingness to learn, so their influence hardly transmits through motivational channels and mainly relies on direct skill training guidance. Two distinct functional paths are thus identified: teacher-led skill cultivation, and peer-driven motivation activation, both indispensable for advancing students' SRL capacity.

Fourth, this research carries clear theoretical and practical value. The dual-support model enriches localized SRL research within Chinese vocational training contexts and verifies the applicability of self-determination and social cognitive theories for vocational learners. The mixed-method approach also offers a replicable research paradigm that avoids the one-sided limits of pure questionnaire data. For practice, colleges should embed regular planning and reflection tasks into training curricula and build formal peer learning groups. Instructors need to balance skill teaching with motivational guidance by offering optional training tasks and explicit self-regulation strategy demonstrations. Students are advised to join peer study teams and develop

short-term planning habits to cut last-minute cramming.

This study has several inherent limitations. Samples only cover two vocational schools in Qujing and feature an overwhelming share of first-year students, restricting cross-regional and cross-grade generalisability. Cross-sectional data cannot confirm strict causal relations, and all measurements depend on self-reported scales with potential subjective bias. The small interview sample also restricts in-depth subgroup comparison between technical and service majors. Future work can expand multi-region, balanced grade samples, adopt longitudinal tracking to capture dynamic variable changes, add mediators or moderators such as vocational identity and family socioeconomic status, and launch intervention trials of peer learning or teacher motivational training. Combining platform operation logs and teacher ratings with questionnaires will also improve data objectivity, offering more solid evidence to boost vocational students' self-regulated learning.

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This manuscript is extracted and revised from the author's doctoral dissertation submitted to Rangsit University. No part of this paper has been submitted or published in other journals before this submission. All questionnaire and interview data collected in this research are authentic and original, without data fabrication, tampering or plagiarism. There are no potential conflicts of interest between the author and any relevant institutions or individuals.