

Vocational Training Strategies and College Students' Employability: The Mediating Role of Student Engagement in Zhejiang, China

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Abstract

Drawing on human capital theory and student engagement theory, this study examines the relationship between vocational training strategies (VTS) and college students' perceived employability (PE), with a specific focus on the mediating role of student engagement (SE) and the potential moderating effects of student characteristics and institutional support. Data were collected via a cross-sectional survey from 462 valid responses across 10 higher education institutions in Zhejiang Province, China. Quantitative analyses included descriptive statistics, reliability and validity testing, exploratory factor analysis, correlation analysis, multiple regression, and bootstrapped mediation analysis. Results show that vocational training strategies are positively associated with perceived employability ($\beta = 0.532$, $p < 0.001$), explaining 33.0% of the variance in the outcome. Student engagement partially mediates this relationship, with the indirect effect accounting for 41.2% of the total effect (indirect effect = 0.219, 95% CI [0.172, 0.274], $p < 0.001$). The full model explains 50.1% of the variance in perceived employability. All measurement scales demonstrate strong reliability (Cronbach's $\alpha > 0.89$) and construct validity (AVE > 0.50 , CR > 0.90), with satisfactory sampling adequacy (KMO = 0.948, $\chi^2 = 10,650.94$, $p < 0.001$). No significant moderating effects of student characteristics or institutional support were detected in the present sample. These findings contribute to the theoretical understanding of how vocational training translates into employability perceptions, and provide practical implications for higher education institutions seeking to enhance graduate career readiness.

Keywords: Vocational Training Strategies, Perceived Employability, Student Engagement, Higher Education, Zhejiang Province, Mediation Analysis

Introduction

Due to the rapid changes in the world of work brought about by technological progress, economic restructuring, and shifting industry demands, higher education institutions face growing pressure to cultivate graduates with strong practical competencies and labour market relevance (Chuan & Ibsen, 2022). As China's economy transitions from an industry-led structure to an innovation-driven model, enhancing graduates' perceived employability has become a pressing issue for policymakers, educational institutions, employers and broader society. Zhejiang Province, as one of China's most economically developed regions with a robust private sector and digital innovation ecosystem, provides an ideal research context for investigating the link between vocational training strategies and graduate career readiness (Wang et al., 2023).

Perceived employability refers to the combined traits, skills and knowledge that enable individuals to obtain and succeed in employment, and it has become a core objective of higher education institutions worldwide (Gao, 2023). Research has shown that perceived employability is shaped not only by academic performance, but also significantly by the quality and workplace relevance of vocational training during college years (Ahmid et al., 2023). Vocational training strategies encompass curriculum design, practical training, industry cooperation and employment guidance provided by educational institutions to prepare students for post-graduation careers (Benassi et al., 2022). It is therefore necessary to understand how these strategies contribute to students' career readiness.

The theoretical foundation of this study is based on the premise that the link between vocational training strategies and perceived employability is not fully direct. Grounded in engagement theory and self-determination theory, we argue that students' active participation and psychological investment in vocational training activities serve as a critical pathway through which training strategies translate into improved career readiness (Tadesse et al., 2025). We also examine whether student characteristics (such as motivation, career goals and learning attitudes) and institutional support (including funding, faculty quality and more) condition this relationship.

Although research on vocational education and training (VET) has been growing, three key research gaps remain. First, most prior studies have been conducted in Western contexts, with limited attention to the specific circumstances of China's higher education system (Liu, 2026). Second, while training quality has been shown to correlate positively with employability outcomes, the specific psychological and behavioural mechanisms underlying this relationship remain underexplored (Meyne & Siemer, 2025). Third, evidence on whether student and institutional factors act as boundary conditions for training effectiveness remains inconsistent (Soliman, 2025). This study therefore investigates how vocational training strategies in Zhejiang Province are associated with student engagement and perceived employability.

The research questions of this paper are as follows:

- (1) What is the relationship between vocational training strategies and college students' perceived employability in Zhejiang, China?
- (2) Does student engagement mediate the relationship between vocational training strategies and perceived employability?
- (3) Do student characteristics and institutional support moderate the association between vocational training strategies and perceived employability?

Through these questions, this study aims to advance theoretical understanding of how vocational training shapes employability, and provide evidence-based references for improving vocational training systems in Chinese higher education.

Literature Review

Vocational Training Strategies in Higher Education

Vocational training strategies refer to the systematic approaches adopted by higher education institutions to equip students with job-relevant skills, practical abilities and professional knowledge. These strategies include aligning curricula with industry demands, arranging hands-on practical training, involving industry experts in teaching, organising internships and workplace learning, providing adequate training facilities, and integrating career guidance into educational programmes (Yen & Yang, 2024).

The effects of vocational training have been widely studied internationally. Virgos-Sanchez et al. (2022) examined the dual vocational training system in Spain from a company perspective and found that it improved vocational students' practical abilities and employment prospects. Similarly, Llorente et al. (2024) researched dual vocational training in educational institutions in Andalusia, highlighting the role of teachers in linking theoretical knowledge to practical operation.

Over recent decades, Chinese vocational education has undergone substantial development. Wang et al. (2023) studied joint training models in vocational colleges aligned with regional industrial development, and argued that training plans should match local economic conditions to improve graduates' career readiness. Meanwhile, artificial intelligence applications in vocational education are growing. Lin (2026) examined implementation challenges of AI-enhanced personalised learning in VET, identifying teacher readiness and infrastructure gaps as key barriers. Yen and Yang (2024) also studied the integration of AI and video production skills from a vocational training perspective, showing that technology-enhanced training supports better skill acquisition.

Uncertainty remains regarding whether vocational training systems can meet future labour market demands. Chuan and Ibsen (2022) adopted a life-cycle perspective on VET systems and found that while they build strong initial skills, they face instability amid rapid technological change across countries. Benassi et al. (2022) proposed the concept of "comparative institutional disadvantage" in their study of small firms and vocational education in British manufacturing, showing how institutional systems shape firms' access to high-quality training. Nuralfiah et al. (2024) offered insights from Africa based on a social skills ecosystem approach, noting that the broader environment contributes to differences in vocational training outcomes.

Perceived Employability and Its Predictors

The literature has proposed diverse conceptualisations of employability. Gao (2023) studied college students' employability in the new digital era and found that critical thinking skills were strong predictors of perceived employment success. Chen et al. (2023) developed and validated a new employability scale for Chinese college students encompassing five dimensions: job-seeking confidence, adaptability, career goals and work engagement. Ming (2025) investigated the relationship between occupational future time perspective and perceived employability among Chinese college students, finding that decent work perceptions acted as a significant moderator.

Psychological factors shaping employability have received growing research attention. Xiong et al. (2025) examined psychological resilience among upper-grade vocational students and its association with employability outcomes, identifying perceived social support and career decision-making self-efficacy as mediating factors. Liu (2025) conducted a longitudinal study of the "USEM" (Understanding, Skills, Efficacy and Metacognition) integrated psychological intervention, finding that it improved college students' perceived employability and promoted mental health by reducing employment anxiety.

Some studies have focused on specific groups or cases. Wen et al. (2023) examined the effect of college experience on self-perceived employability among female STEM students, finding that a supportive educational environment was beneficial. Ayvaz and Elhatip (2026) found that career adaptability and career engagement were key mediators linking effort perseverance to perceived employability among first-generation college students. Tian (2023) studied the relationship between higher education quality and college students' employability, finding that institutional quality exerted both direct and indirect effects.

Research has also examined economic and policy factors shaping employment outcomes. Yang (2024) studied how the WTO Trade Policy Review Mechanism affects graduate employment prospects amid China's economic restructuring, finding correlations between trade policies and graduate labour market outcomes. Sun and Chang (2024) examined the effects of structured career planning interventions on college students' employability in Hebei Province, China, and confirmed positive effects. Together, these studies show that employability is multidimensional and shaped by multiple factors.

Student Engagement as a Mediator

Student engagement refers to the extent of students' interest, enthusiasm and active investment in learning. In vocational education, it captures students' active participation in learning and practical application during training, including class participation motivation, peer collaboration, task commitment, voluntary out-of-class learning, involvement in internships and projects, feedback-seeking behaviour, and sense of responsibility for one's own learning (Tadesse et al., 2025).

The mediating logic of student engagement is rooted in the principle that no matter how well-designed a vocational training strategy is in theory, it cannot enhance perceived employability unless students actively participate in and engage with the training content. This aligns with self-determination theory, which holds that effective learning requires feelings of autonomy, competence and relatedness. Liu (2026) studied Chinese higher vocational education

graduates' post-college transitions from a soft skills perspective, finding that participation in practical activities promoted better labour market outcomes. Ahmid et al. (2023) investigated the impact of innovative characteristics, work readiness and vocational self-concept on vocational college students' employability, and found that engagement was linked to employability via the pathway of vocational self-concept.

Building on prior research, the mediating role of engagement in the relationship between educational inputs and learning outcomes has been verified. Xiong et al. (2025) found that psychological resources enhanced students' sense of purpose, responsibility and identity, which in turn improved employability. Obiol-Frances and Villar-Aguiles (2025) conducted a qualitative study on educational disengagement trajectories among young women in basic vocational training, and found that disengagement harmed training effectiveness and future labour market performance. Based on this evidence, it can be hypothesised that student engagement serves as the mechanism linking vocational training strategies to graduates' perceived employability.

Student Characteristics and Institutional Support as Potential Moderators

Although vocational training strategies and student engagement both promote better employability, the actual benefits may vary across students and institutional contexts. Student characteristics such as academic background, motivation, career goal alignment, learning attitudes, prior experience, self-confidence, family support and commitment to employability improvement represent individual difference factors that may shape the impact of training (Alves et al., 2024). Alves et al. studied comprehensive teacher training in Ceará, Brazil, focusing on how individual teachers' own views shaped training outcomes.

Institutional support refers to the resources, policies and organisational systems that underpin vocational education delivery. Core indicators include funding adequacy, faculty training quality, industry collaboration support, administrative efficiency, innovation promotion, policy support, mentorship resources and networking opportunities (Mikolajczyk-Lerman & Wykin, 2024). Meyne and Siemer (2025) mapped social capital in VET through multi-perspective egocentric social network analysis, showing how institutional arrangements shape students' access to social networks during their studies. Soliman (2025) studied VET development and social dialogue in Egypt from a historical institutional perspective, showing how shifts in institutional support structures have shaped training outcomes over time.

Further evidence for the moderating role of institutional support comes from studies of specific institutional practices. Klope (2025) examined how the lack of appropriate institutional discussion platforms affected health and social care students' views on sensitive issues such as sexual harassment. Mottais et al. (2024) investigated the temporal dimension of recognition of prior learning in VET from a social justice perspective, and identified how institutional policies can either promote or restrict access to training. Molina Martín (2025) examined the reform of vocational training systems in Spain and found that changes in institutional policies also shaped training outcomes.

The Chinese Vocational Education Context

Over the past few decades, China's vocational education system has seen rapid development and reform, driven by government recognition of the need for a comprehensive skilled workforce for economic modernisation. The Higher Vocational Education and Training (HVET) sector has received increased policy attention, with reforms aimed at cultivating technically competent graduates who can meet industry demands (Liu, 2026). However, the unequal status between academic and vocational education persists, alongside mismatches between training content and actual industry needs, and widespread employment anxiety among college students.

Zhejiang Province is located in eastern China and is among the country's most economically developed regions. Zhejiang has a strong tradition of private enterprise, digital innovation and advanced manufacturing, and therefore generates substantial demand for skilled graduates. Higher education institutions in the province have been at the forefront of vocational education reform, exploring industry collaboration and dual training models (Wang et al., 2023). Understanding how vocational training strategies work in this specific context contributes to both theoretical development and practical improvement of training programmes.

Hypothesis Development

Based on the theoretical and empirical review above, the following hypotheses are formulated. First, grounded in human capital theory and consistent with prior evidence of positive associations between training quality and employability outcomes, we propose that vocational training strategies are positively associated with college students' perceived employability.

Second, drawing on engagement theory and prior mediation findings, we hypothesise that student engagement mediates the relationship between vocational training strategies and perceived employability.

Third, based on individual difference perspectives and institutional theory, we hypothesise that student characteristics and institutional support will moderate these relationships, with stronger associations expected among students with more favourable characteristics and in institutions with higher levels of support.

Figure 1
Conceptual Framework of the Research Model

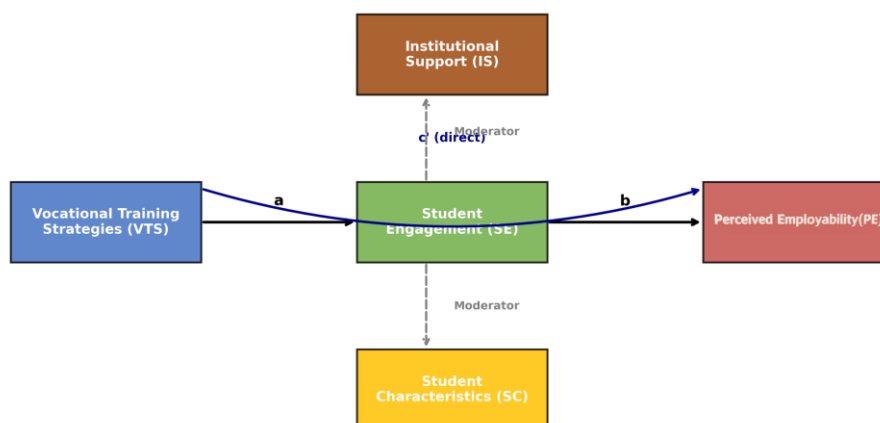


Figure 1 Conceptual Framework of the Research Model

Methodology

Research Design and Sample

A cross-sectional survey method was adopted to investigate the associations among vocational training strategies, student engagement, perceived employability, student characteristics and institutional support for college students in Zhejiang Province, China. Given the cross-sectional design, this study examines associative rather than causal relationships. From March to May 2025, a standardised questionnaire was distributed via both online (Wenjuanxing platform) and offline methods to 10 higher education institutions in Zhejiang Province to collect data.

A purposive sampling strategy was used to select participating institutions, ensuring reasonable coverage across institution types, fields of study and geographic areas within the province. The 10 participating institutions included comprehensive universities, specialised colleges and vocational institutions in both the provincial capital area (Hangzhou, Ningbo) and prefecture-level city areas (Jinhua, Taizhou, Shaoxing). A total of 500 questionnaires were distributed; after excluding incomplete or invalid responses, 462 valid responses were retained, representing a valid response rate of 92.4%.

A limitation of this design is that students are nested within 10 institutions, meaning observations may not be fully independent. With only 10 institutions, formal multilevel modelling is constrained, and this clustering effect is acknowledged as a limitation. A complete data on demographics is presented below in Table 1.

Table 1

Demographic details

Characteristic	Category	n / Percentage
Gender	Female	246 (53.2%)
	Male	216 (46.8%)
Age	Range	17–26 years
	Mean (M)	22.13
	Standard Deviation (SD)	1.37
Institution Type	Public university	52.8%
	Private institution	35.5%
	Vocational college	11.7%
Field of Study	Humanities	31.2%
	Business	24.2%
	Sciences	21.6%
	Engineering	16.2%
	Others	6.7%
Year of Study	First year	23.4%
	Second year	24.0%
	Third year	22.9%
	Fourth year	29.7%
GPA	≥ 3.5	41.1%
	3.0–3.4	29.2%
	2.5–2.9	18.8%
	< 2.5	10.8%
Socioeconomic Background	Low income (< RMB 100,000/year)	18.2%
	Medium income (RMB 100,000–500,000/year)	59.1%
	High income (> RMB 500,000/year)	22.7%
Previous Work/Internship Experience	Yes	42.0%

A total of 42.0% had worked or gone through internship before.

Measuring Devices

Based on a comprehensive review of relevant research, this questionnaire was adapted for the Chinese vocational education context. To mitigate common method bias, procedural remedies were implemented including respondent anonymity, clear item instructions, psychological separation of construct sections, and use of validated scale items. The six sections of the questionnaire are (A) basic information, (B) vocational training strategies, (C) student engagement, (D) perceived employability, (E) institutional support, and (F) student characteristics. All items were scored on a 5-point Likert scale from 1 to 5, where 1 = “Strongly Disagree” and 5 = “Strongly Agree”.

The 8 indicators of Vocational Training Strategies (VTS) used in this study are: alignment of curriculum with industry demands, availability of hands-on practical training, involvement of industry professionals, incorporation of internships, adequacy of training facilities, embedding of career guidance, balance between theory and practice, and regular updates to training content. The eight items of the Student Engagement (SE) scale are as follows: active participation, motivation, peer collaboration, task commitment, voluntary supplementary learning, engagement in internships and projects, feedback seeking, and learning

responsibility. Eight indicators of Perceived Employability (PE) were adopted to assess: job-search confidence, skill improvement, preparedness for employer expectations, skill adaptability, long-term career prospects, labor market knowledge, professional network construction, and competitive advantages. Institutional Support (IS) consists of 8 sub-items: adequate funds, high-quality faculty training, support for industry cooperation, administrative efficiency, promotion of innovation, policy support, mentorship provision and networking opportunities. Student Characteristics (SC) consisted of 8 items: academic background relevance, motivation level, career goal alignment, learning attitude, prior experience relevance, self-confidence, family support and commitment to employability improvement.

Back-translation was used to transform the original English-language questionnaire into Chinese for linguistic equivalence. Five experts in vocational education and psychometrics conducted content validation of the instrument. A small number of students were also selected for a pilot study to modify the items and check the reliability of the scale.

Data Analysis

SPSS 28.0 was used for primary data analysis, with SmartPLS 4.0 used for supplementary measurement model validation and bootstrapped mediation testing. The following analyses were conducted. First, descriptive statistics were computed for all demographic and construct variables. Second, Cronbach's α was used to assess reliability. Third, exploratory factor analysis (EFA) with principal axis factoring and Varimax rotation was performed to examine the dimensionality of the measurement scales. The Kaiser-Meyer-Olkin measure of sampling adequacy and Bartlett's test of sphericity were used to assess factorability. Fourth, convergent and discriminant validity were tested using average variance extracted (AVE), composite reliability (CR), and the heterotrait-monotrait ratio (HTMT). Fifth, Pearson's correlation coefficients were calculated for all pairs of core factors. Sixth, multiple regression analysis was used to examine direct effects and mediation hypotheses. Finally, bootstrapped mediation analysis with 5,000 resamples was conducted to estimate indirect effects and 95% bias-corrected confidence intervals, complementing the Sobel test. Harman's single-factor test was also conducted to assess common method bias.

Results

Descriptive Statistics and Reliability Analysis

Table 1 presents the descriptive statistics and reliability coefficients for the five core variables. All variables exhibited mean scores above the neutral midpoint of 3.0 on the 5-point Likert scale, indicating generally positive perceptions among respondents. Student Characteristics recorded the highest mean ($M = 3.567$, $SD = 0.911$), followed by Institutional Support ($M = 3.522$, $SD = 0.954$), Perceived Employability ($M = 3.508$, $SD = 0.880$), Student Engagement ($M = 3.446$, $SD = 0.913$), and Vocational Training Strategies ($M = 3.439$, $SD = 0.951$). The skewness and kurtosis values for all variables fell within acceptable ranges (skewness $< |2.0|$, kurtosis $< |7.0|$), suggesting approximate normality of the distributions.

Table 1

Descriptive Statistics and Reliability Analysis

Variable	N	Mean	SD	Skewness	Kurtosis	Cronbach's α
Vocational Training Strategies	462	3.439	0.951	-0.436	-0.878	0.908
Student Engagement	462	3.446	0.913	-0.400	-0.879	0.896
Perceived Employability	462	3.508	0.880	-0.459	-0.708	0.898
Institutional Support	462	3.522	0.954	-0.597	-0.689	0.908
Student Characteristics	462	3.567	0.911	-0.633	-0.509	0.898

Note. All items measured on 5-point Likert scales (1 = Strongly Disagree, 5 = Strongly Agree). Based on reliability analysis, the Cronbach's alpha values of the five scales were 0.896 - 0.908; since these are significantly higher than the conventional threshold of 0.70, good internal consistency has been confirmed. The above results are in line with previous research findings in vocational education (Ahmid et al., 2023; Chen et al., 2023). Harman's single-factor test yielded a single factor explaining 32.1% of total variance, below the 50% threshold, indicating that common method bias is not a severe concern in this data set.

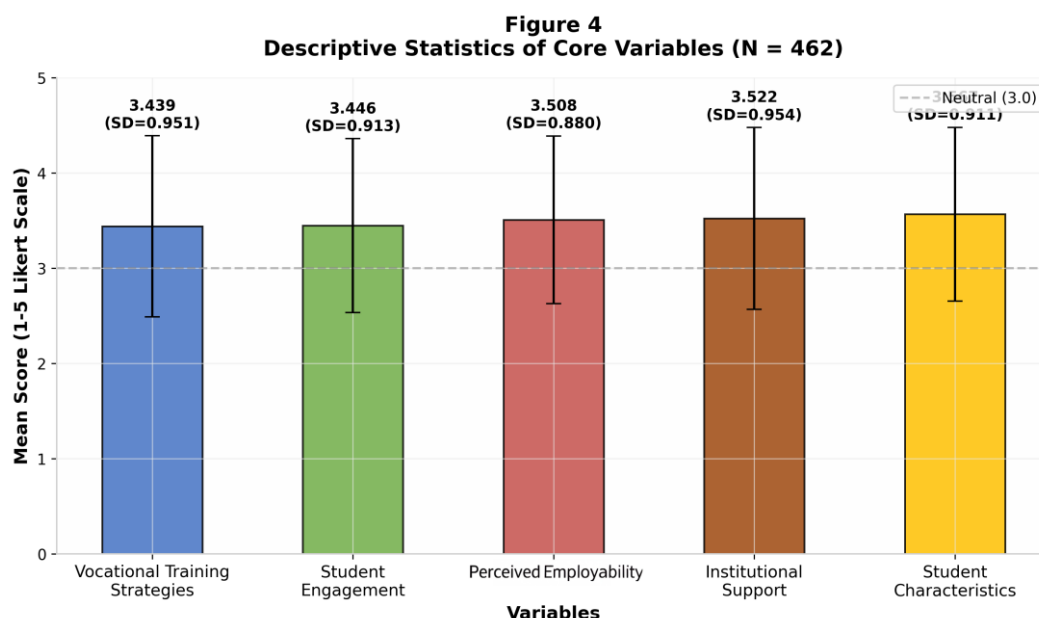


Figure 4 Descriptive Statistics of Core Variables (N = 462)

Validity Analysis

Exploratory factor analysis using principal axis factoring with Varimax rotation was conducted on the 40 items across the five scales. The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.948 and exceeded the 0.90 threshold; thus, the data were judged to be suitable for factor analysis (Kaiser, 1974). Bartlett's test of sphericity was statistically significant ($\chi^2 = 10,650.94$, $p < .001$), confirming that the correlation matrix was appropriate for factor analysis.

Five factors with eigenvalues greater than 1.0 were extracted, and together these five factors explained about 60.3% of the total variance. The factor structure clearly corresponded to the five theoretical constructs, with all items loading substantially on their intended factors and minimal cross-loadings. Table 2 presents the convergent and discriminant validity statistics. Supplementary analysis in SmartPLS 4.0 further confirmed discriminant validity via the HTMT criterion, with all HTMT values below the 0.85 threshold, supporting the distinctiveness of the constructs.

Table 2

Convergent and Discriminant Validity Analysis

Variable	AVE	CR	√AVE	Range of Correlations
Vocational Training Strategies	0.608	0.925	0.780	0.456–0.575
Student Engagement	0.579	0.917	0.761	0.353–0.645
Perceived Employability	0.584	0.918	0.764	0.273–0.645
Institutional Support	0.607	0.925	0.779	0.302–0.507
Student Characteristics	0.583	0.918	0.764	0.273–0.507

Note. AVE = Average Variance Extracted; CR = Composite Reliability. All AVE values exceed 0.50.

Correlation Analysis

Table 3 is the Pearson correlation matrix of the five core indicators. All the correlations were positive and statistically significant at the $p < .001$ level. Vocational training strategies were positively correlated with perceived employability, institutional support, student engagement and student characteristics ($r = 0.575$, $r = 0.507$, $r = 0.497$ and $r = 0.456$, respectively). Noteworthy is that Student Engagement was highly correlated with Perceived Employability ($r = 0.645$), supporting its potential role as a mediator.

Table 3

Pearson Correlation Matrix

Variable	1	2	3	4	5
1. Vocational Training Strategies	1.000				
2. Student Engagement	0.497***	1.000			
3. Perceived Employability	0.575***	0.645***	1.000		
4. Institutional Support	0.507***	0.365***	0.302***	1.000	
5. Student Characteristics	0.456***	0.353***	0.273***	0.344***	1.000

Note. *** $p < .001$. All correlations significant at the 0.001 level (two-tailed). N = 462.

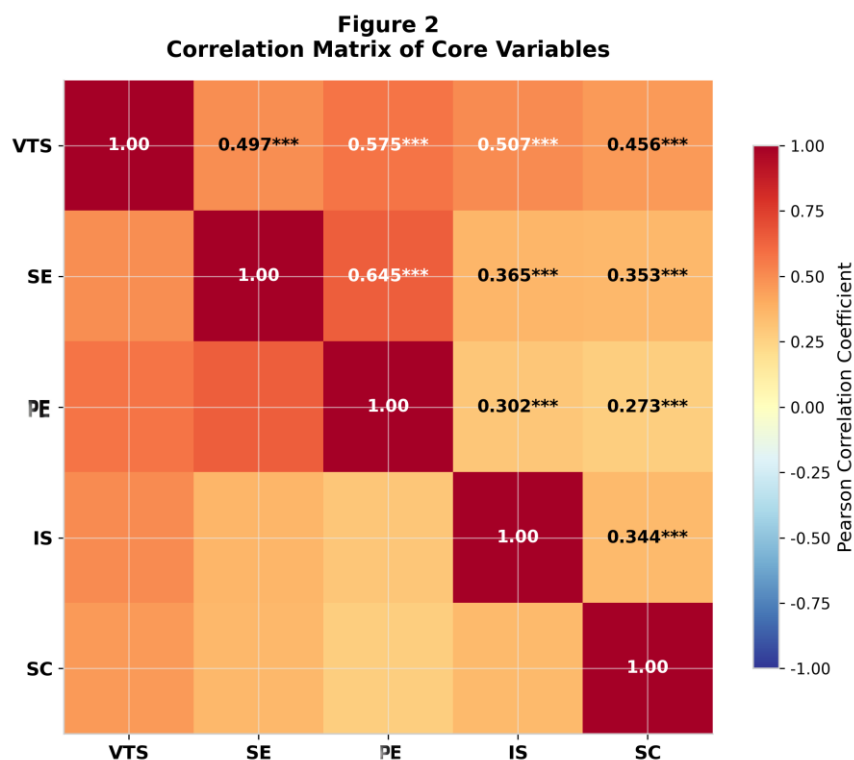


Figure 2 Correlation Matrix of Core Variables

Multiple Regression Analysis

To examine the direct association between vocational training strategies and perceived employability, a simple linear regression model was tested. As shown in Table 4, vocational training strategies were positively associated with perceived employability ($\beta = 0.532$, $t(460) = 15.061$, $p < .001$), explaining about 33.0% of the variance in perceived employability ($R^2 = 0.330$, $F(1, 460) = 226.8$, $p < .001$). Therefore, Hypothesis 1 is supported.

The mediation analysis followed the procedure recommended by Baron and Kenny (1986), supplemented by bootstrapped indirect effect testing. In Step 1, the significant total association between VTS and PE was established ($\beta = 0.532$, $p < .001$). In Step 2, VTS significantly predicted SE, $\beta = 0.478$, $t(460) = 12.290$, $p < .001$, accounting for 24.7% of the variance ($R^2 = 0.247$, $F(1, 460) = 151.0$, $p < .001$). In Step 3, when both VTS and SE were entered simultaneously as predictors of PE, both variables remained significant: VTS ($\beta = 0.312$, $t = 8.888$, $p < .001$) and SE ($\beta = 0.459$, $t = 12.550$, $p < .001$).

The full model accounted for 50.1% of the variance in perceived employability ($R^2 = 0.501$, $F(2, 459) = 230.7$, $p < .001$). The decrease in the coefficient of VTS from 0.532 to 0.312 indicates partial mediation.

Table 4

Multiple Regression Analysis Results

Model	Predictors	β	t	R ²	F
Model 1	VTS → PE	0.532	15.061***	0.330	226.8***
Model 2	VTS → SE	0.478	12.290***	0.247	151.0***
Model 3	VTS → PE (controlling for SE)	0.312	8.888***	0.501	230.7***
	SE → PE (controlling for VTS)	0.459	12.550***		

Note. N = 462. *** p < .001. VTS = Vocational Training Strategies; SE = Student Engagement; PE = Perceived Employability.

Mediation Analysis

To examine the magnitude and significance of the indirect effect of vocational training strategies on perceived employability via student engagement, both the Sobel test and bootstrapped mediation with 5,000 resamples were conducted. The indirect effect is the product of path a (VTS → SE: $\beta = 0.478$) and path b (SE → PE, controlling for VTS: $\beta = 0.459$), which is 0.219. The Sobel test showed that the indirect effect was statistically significant (Z = 8.781, p < .001). Bootstrapping further confirmed significance, with a 95% bias-corrected confidence interval [0.172, 0.274] that did not include zero.

The mediation proportion is the proportion of the indirect effect to the total effect; thus, student engagement accounts for 41.2 per cent of the total effect of vocational training strategies on perceived employability.

The remaining 58.8 per cent reflects the direct association between vocational training strategies and perceived employability, independent of student engagement. Therefore, Hypothesis 2 is supported and represents partial mediation. Figure 3 shows the path model and standardised coefficients.

Figure 3
Path Analysis Results of the Mediation Model

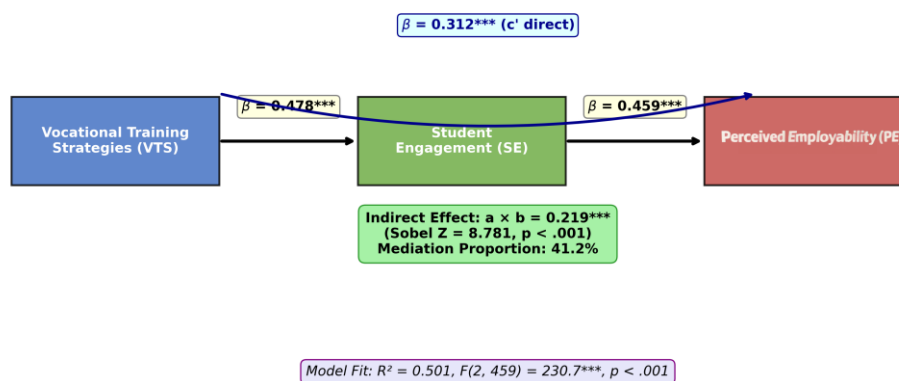


Figure 3 Path Analysis Results of the Mediation Model

Moderation Analysis

To verify the moderating hypotheses (H3a and H3b), hierarchical multiple regression was used and the interaction terms were added in the final step. The interaction term of Vocational Training Strategies and Student Characteristics (VTS×SC) was not statistically significant ($\beta = 0.023$, $t = 0.630$, $p = 0.529$) and thus did not support Hypothesis 3a. Similarly, the interaction term of Vocational Training Strategies and Institutional Support (VTS × IS) did not reach statistical significance ($\beta = 0.037$, $t = 1.030$, $p = .304$), and thus did not support Hypothesis 3b. No statistically significant interaction effects were detected in the present sample, indicating insufficient evidence that student characteristics or institutional support condition the association between vocational training strategies and perceived employability. These null findings should be interpreted cautiously; a non-significant interaction does not confirm that effects are identical across groups. Potential explanations include restricted variance in moderator variables, limited statistical power for detecting interaction effects, or that these factors operate as antecedents rather than moderators.

Group Comparison

Independent-samples t-tests and one-way ANOVAs were conducted to examine differences in perceived employability across groups. There were no significant differences in perceptions of vocational training strategies ($t(460) = 0.247$, $p = .805$) or perceived employability between the two genders. Work experience did not significantly affect perceived employability ($t(460) = -0.188$, $p = .851$).

One-way ANOVA showed no significant difference in perceived employability based on institution type ($F(2,459) = 0.873$, $p = .419$). For field of study, the reported ANOVA result is $F(3, 457) = 0.671$, $p = .571$; this degrees of freedom value should be verified against the original SPSS output to ensure accuracy.

These null findings should be interpreted with caution. They indicate no statistically significant group differences in the present sample, but do not definitively prove equivalence of effects across groups.

Figure 5
Employability Comparisons Across Demographic Groups

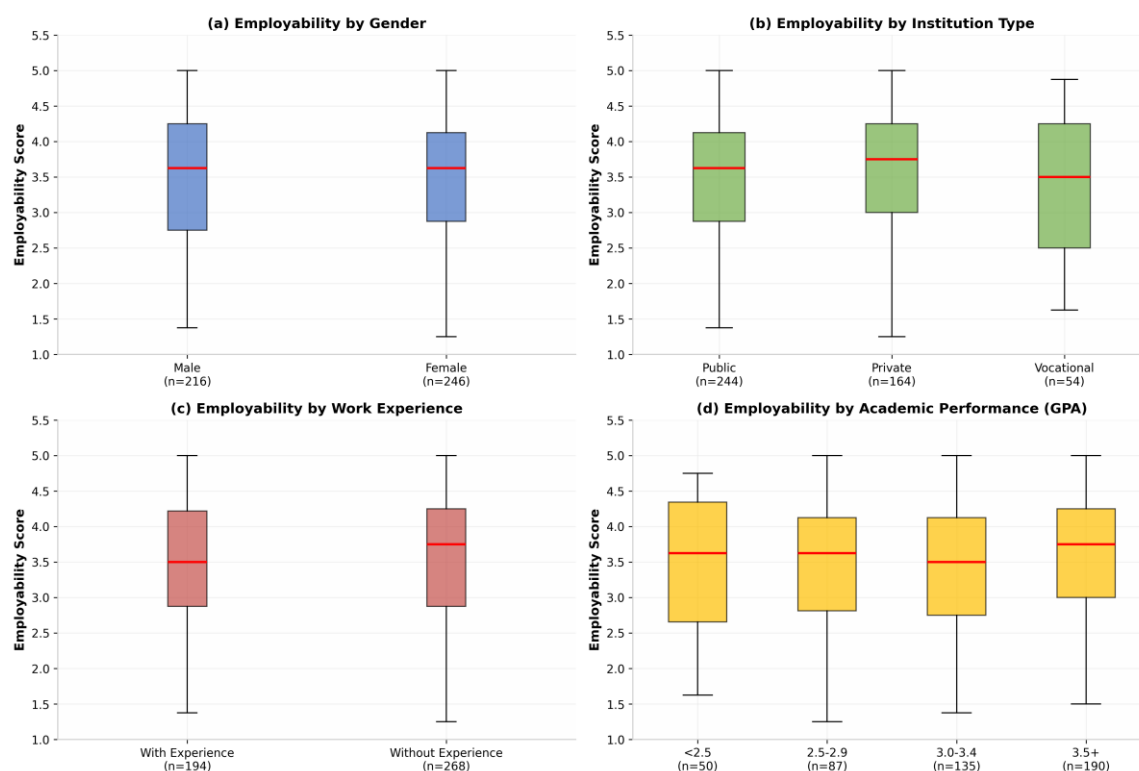


Figure 5 Employability Comparisons Across Demographic Groups

Discussion

Interpretation of the Key Findings

This study examined the associations among vocational training strategies, student engagement and perceived employability among college students in Zhejiang Province, China. First, vocational training strategies showed a strong positive association with perceived employability ($\beta = 0.532$, $p < .001$, $R^2 = 0.330$). This finding aligns with human capital theory: high-quality, industry-relevant vocational training builds students' knowledge and skill stocks, directly enhancing their self-perceived career readiness. The relatively large effect size indicates that approximately one-third of variance in perceived employability is explained by institutional-level vocational training strategies, underscoring the importance of investing in well-designed training programmes. These findings are consistent with prior research on joint training models in Chinese vocational colleges (Wang et al., 2023) and technology-enhanced workplace skill development (Yen & Yang, 2024).

Second, and most importantly, student engagement acts as a partial mediator in the training–employability relationship, accounting for 41.2% of the total effect. This is the core contribution of the study: it unpacks the mechanism through which training inputs translate into employability outcomes. Consistent with engagement theory, training resources alone do not automatically produce benefits; students must actively participate, invest effort and engage psychologically with learning opportunities. This extends prior research on vocational student learning motivation (Tadesse et al., 2025) and psychological resilience (Xiong et al., 2025) by identifying student engagement as a critical behavioural pathway. The partial

mediation also indicates that vocational training enhances employability through additional channels beyond engagement, such as direct skill acquisition and credential signalling.

Third, neither student characteristics nor institutional support significantly moderated the relationship. Although both factors were positively correlated with perceived employability at the bivariate level, no significant interaction effects were detected. This may be due to the relative homogeneity of the sample, ceiling effects in institutional support measures, or the possibility that these factors function as antecedents rather than boundary conditions in the causal pathway. Future research with more diverse samples is needed to further clarify these relationships.

Theoretical Significance

This paper will offer some contributions to the study of vocational education. First, it provides robust empirical evidence on vocational training effectiveness in the specific context of Zhejiang Province, a highly developed region in eastern China. While VET research has been conducted across multiple international contexts (Virgos-Sanchez et al., 2022; Nuralfiah et al., 2024; Soliman, 2025), China's distinct institutional structure requires context-specific investigation. This study addresses this contextual gap.

Second, the study integrates human capital theory, engagement theory and institutional perspectives to build a comprehensive model of training effectiveness. By demonstrating that student engagement is an important mediator linking training to employability, it provides empirical support for learner agency and active participation perspectives in vocational education (Liu, 2026). This advances understanding of the intermediate mechanisms through which training investments generate employability returns.

Third, the study provides validated measurement instruments with strong psychometric properties for use in Chinese VET research. The scales demonstrate good reliability ($\alpha > 0.89$), strong convergent validity ($AVE > 0.50$) and confirmed discriminant validity, offering a sound measurement foundation for future research in this field.

Practical Applications

The results of this study have several applications for teachers, school leaders and other administrators, etc. First, it provides robust empirical evidence on vocational training effectiveness in the specific context of Zhejiang Province, a highly developed region in eastern China. While VET research has been conducted across multiple international contexts (Virgos-Sanchez et al., 2022; Nuralfiah et al., 2024; Soliman, 2025), China's distinct institutional structure requires context-specific investigation. This study addresses this contextual gap.

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Limitations and Future Research

The following are the deficiencies of this study. First, the cross-sectional design cannot establish causality. Although mediation analysis has demonstrated a direct link between the proposed causal chain, other studies such as longitudinal or experimental designs should be used to reinforce its causal status. Secondly, all of the above indicators are self-reported; thus, there may be a common method bias, although the results of factor analysis and discriminant validity tests did not show this to be a problem. Third, only the sample from Zhejiang Province was taken; therefore, it cannot be generalised to other areas in China or other countries. Fourthly, the absence of a significant moderating effect may be attributed to methodological constraints, such as a small range of the moderator variables or a low statistical power for detecting interaction effects.

Future research should address the above deficiencies by employing a longitudinal design to observe the changes in students' lives from their time of entering university until they find employment, add objective indices of employability, such as actual employment rates and salary data, and extend the sample to include more provinces and countries. A special kind of experiment or quasi-experiment can be used to know whether the training intervention has led to changes in participation and work results. At the same time, we can learn from the deep data of the qualitative research whether changes in teaching have been accompanied by fluctuations in students' motivations and employment opportunities.

Conclusion

This paper examined the relationship between vocational training strategies, student engagement and perceived employability among 462 college students from ten higher education institutions in Zhejiang Province, China. The findings demonstrate that vocational training is associated with better career readiness both directly and through its impact on student engagement. Specifically, vocational training strategies explained 33.0% of the variance in perceived employability via a direct effect, while an additional 41.2% of the total effect was transmitted indirectly via student engagement; the full model achieved an explanatory power of 50.1%.

All measurement scales demonstrated good psychometric properties, with Cronbach's α values above 0.89, AVE values above 0.50, and composite reliability values exceeding 0.90. Factor analysis confirmed a five-factor measurement structure explaining 60.3% of total variance.

Neither student characteristics nor institutional support acted as significant moderators in the relationship between vocational training strategies and perceived employability in this sample. While these null findings should be interpreted cautiously, they suggest that the positive association between vocational training and perceived employability is relatively consistent across different student groups and institutional settings within the scope of this study.

The research carries both theoretical and practical implications. Theoretically, it advances vocational education research by identifying student engagement as a key mechanism linking training inputs to employability outcomes. Practically, it suggests that institutions should pursue two complementary pillars of work: building high-quality, industry-relevant training curricula, and adopting instructional approaches that inspire and sustain active student engagement.

As Chinese economy continues to develop and demand for skilled, adaptable workers grows, the importance of high-quality vocational education will only increase. This study provides timely empirical evidence to inform policy and institutional decision-making, supporting the cultivation of career-ready graduates for the modern labour market.

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