

Research Article

Analyzing the effectiveness of teaching methods and strategies in developing teacher competence in vocational education

Fang He¹ and Tsao Hsueh Jen²

¹International College of Krirk University, Thailand (ORCID: [0009-0005-0955-8494](https://orcid.org/0009-0005-0955-8494))

²International College of Krirk University, Thailand (ORCID: [0009-0003-4255-7632](https://orcid.org/0009-0003-4255-7632))

This study examines how different teaching methods influence vocational teachers' perceived competence within Chinese vocational education. It focuses on instructional approaches including lecture-based instruction, project-based learning, simulation exercises, case-based learning, and experiential learning. The study also explores the mediating effects of teacher motivation and engagement in the relationship between teaching methods and teacher competence. A quantitative research design was employed, involving 275 vocational teachers in China who completed a structured questionnaire assessing perceptions of teaching methods, motivation, engagement, and competence. Regression and mediation analyses were conducted to analyze the data, guided by Self-Determination Theory and the job demands-resources model. Findings indicate that the use of diverse teaching methods positively and significantly impacts vocational teacher competence. Furthermore, both teacher motivation and engagement act as significant mediators in this relationship, with intrinsic motivation and high engagement enhancing the positive effects of varied instructional strategies on perceived competence. This study contributes to the existing literature by addressing a notable gap regarding the impact of teaching methods on teacher competence in the vocational education context of China. Its emphasis on the mediating roles of motivation and engagement offers new insights into the psychological and affective mechanisms that underpin vocational teacher effectiveness. The results have practical implications for educational policy, curriculum design, and professional development initiatives aimed at promoting teacher competence, thereby supporting the advancement of vocational education systems.

Keywords: Teacher competence; Teacher engagement; Teacher motivation; Teaching methods; Vocational education

Article History: Submitted 22 May 2024; Revised 18 November 2024; Published online 16 June 2025

1. Introduction

Effective teacher training is necessary in the ever-changing educational environment to ensure student achievement and educational goals. In vocational education, theory and practice must be integrated. Educators help students gain competencies. Understanding vocational education teacher efficacy determinants is gaining attention (Rana, 2022). This study examines how teaching approaches improve teachers' skills, focusing on motivation and participation. This research assumes that instructional approaches determine teacher effectiveness. Namaganda (2020) analysis

Address of Corresponding Author

Tsao Hsueh Jen, PhD., International College of Krirk University, Bangkok, Thailand, 10220.

✉ hsuehjen0615@163.com

How to cite: He, F. & Jen, T. H. (2025). Analyzing the effectiveness of teaching methods and strategies in developing teacher competence in vocational education. *Journal of Pedagogical Research*, 9(3), 156-170. <https://doi.org/10.33902/JPR.202528505>

of innovative instructional methods suggest that using a variety of student-centered teaching methods improves educators' effectiveness and skill. Practical and intellectual abilities must be combined in vocational education. Teacher skills can be developed using several approaches. This condition emphasizes the necessity to investigate vocational education teacher competence and teaching methods (Zimmer et al., 2021). Teaching strategies and instructor effectiveness in many academic topics have been extensively studied. Tuzun (2020) found that experiential learning teachers helped students' study better. Project-based learning improved teacher confidence and pedagogical efficacy (Tsybulsky & Muchnik-Rozanov, 2023). Constructivism and active learning paradigms propose that creative teaching methods improve teachers, as this study shows. Research on teacher motivation and engagement has shown the links between instructional techniques and teacher effectiveness. Schweder and Raufelder (2021) stressed intrinsic motivation's importance in teacher competence. The relevance of autonomy, competence, and relatedness in inspiring educators to work was stressed. Ansley et al. (2021) discovered that teacher participation determines educator efficacy. Passion, devotion, and immersion rise with perceived skill. The findings suggest more study on how motivation and engagement affect teacher instructional approach competency.

There are gaps in the literature on teaching methods, teacher competency, and related problems despite substantial research. An issue is the lack of vocational education. Current education research is insightful, but vocational class dynamics are rarely studied. This study examines how educational methods impact vocational teachers' competence (Inderanata & Sukardi, 2023). Previous research has studied how teaching methods affect teachers' abilities, but few have examined how motivation and engagement affect this. The dearth of research on this area is concerning, given that motivational and engagement factors may improve teacher competency (Yurtseven & Dulay, 2022). This study analyzes mediating channels to better understand how instructional styles impact vocational education instructors' competency. Self-determination theory and the work demands-resources model may examine how teacher motivation and engagement affect instructional methods and competency (Ahn et al., 2021). These frameworks emphasize internal motivation, participation, and independence for top job performance and well-being. This study uses theoretical perspectives to highlight the complicated links between teacher competency, motivation, and instructional methods in vocational education.

Many studies have studied the complicated relationship between teacher skill and instructional techniques in various educational environments. Crawford et al. (2020) have extensively studied effective teaching practices, emphasizing the importance of instructional approaches in teacher competency. Her research found that teachers who employed project-based and experiential learning were better at tailoring courses to each student. Kumar et al. (2022) studied how innovative instruction affects teachers' effectiveness. Educators' self-assessments of proficiency were positively correlated with their strategy utilization. A major vocational education research by Paradissis et al. (2023) examined experiential learning strategies. According to their study, experiential learning methodologies improve vocational teachers' abilities to facilitate students' learning. All of the empirical studies above show how diverse teaching methods increase instructors' competency, supporting constructivism and active learning theory. Scholarly research has also examined how teacher motivation and engagement mediate teacher competency and instructional strategies (Böheim et al., 2021). Butz and Hancock (2019) found that intrinsic motivation improves teacher competence. The study focused on how relatedness, competence, and autonomy affect educators' professional participation. Passion, commitment, and absorption positively affect perceived competence, suggesting that instructor participation affects performance. The above findings permit further study into how engagement and motivational traits mediate teacher skill in instructional tactics.

Past research illuminates general education, but vocational education offers unique challenges and opportunities. This study addresses the gap by evaluating how different teaching methods affect vocational teachers' self-perception of success in preparing students for real-world

applications (Peng et al., 2022). Most research have focused on how instructional approaches affect teachers' skills immediately. We need to understand how teacher motivation and engagement regulate this relationship (Jeong, 2017). No systematic study has examined how motivational and engaging aspects affect teacher competency through instructional strategies. This approach addresses this gap by researching mediating pathways to better understand vocational education's complicated dynamics. The self-determination theory (Ryan & Deci, 2020) and work demands-resources model (Casely-Hayford et al., 2023) allow teacher engagement and motivation to be studied as mediators. High job performance and well-being depend on intrinsic motivation, autonomy, and engagement, according to these concepts. This study uses theoretical perspectives to highlight the complicated links between vocational education's instructional techniques, teacher motivation, student participation, and competency. Exploring these research gaps can help us understand vocational teacher competence variables. This will allow us to tailor educational policies and processes to vocational teachers' demands.

This study evaluates how instructional methods impact vocational instructors' perceived competency in China's vocational education system. This study examines how lecture-based teaching, project-based learning, simulation exercises, case-based learning, and experiential learning affect vocational instructors' competency levels. The research will examine how teacher motivation and engagement affect instructional strategies and instructor competency. This quantitative study examines the complex mechanisms that influence vocational instructor competency. It expands knowledge of effective vocational education teaching approaches. This study has substantial implications for vocational education theory and practice. By expanding the literature on teaching methods and teacher competency in vocational education, this study advances theory. This research addresses Chinese vocational instructors' unique challenges and opportunities, filling a gap in the literature. The study's findings might enhance vocational educator competence training, professional development, and educational policy. Examining vocational education approaches can improve curriculum and teacher training. By examining how teacher engagement and motivation impact psychological and emotional teacher competency, the research gives practical insights. It emphasizes key aspects to promote educator effectiveness. This study might affect vocational education quality, which is important for educational reform and workforce readiness. Professional vocational educators help students learn the skills and knowledge they need to succeed in their vocations. This research enhances vocational education efficiency and flexibility. This study may provide vocational educators with evidence-based ways to meet changing employer and student needs, improving educational flexibility and effectiveness.

2. Literature Review

2.1. Teaching Methods and Teacher Competencies

Education requires studying how teaching methods improve instructors' capabilities to demonstrate the link between instructional tactics and proficiency. Understanding this link is essential for enhancing pedagogy and students' educational experience (Ramos & Antunes, 2023). Academic institutions have historically used lecture-based instruction, which involves one-way communication between instructor and student. However, this teaching technique has far-reaching effects on educators' skills (Duan et al., 2022). Lecture-based training teaches theoretical concepts but may not increase teacher competency, according to studies. Effective teaching requires pedagogical skills. They include several teaching methods, classroom management strategies, and the ability to adjust to student skill levels (Gardner-Neblett, 2023). Traditional lectures may restrict teachers' capacity to develop key skills (Lee & Perdana, 2023). As primary providers of information, educators may neglect the relevance of interactive and experiential teaching approaches, which promote adaptability and responsive teaching. Project-based learning, simulations, experiential learning, and case-based learning differ from lectures. These methods emphasize proactive students, problem-solving, and practical application. These tactics affect instructors' skills in various ways (Saad & Zainudin, 2022). Project-based learning increases

teachers' subject area expertise and ability to guide and stimulate student inquiry, making them learning facilitators rather than information suppliers (Sabiri, 2020). Simulations and case-based learning, which provide complicated situations needing careful management, can help teachers improve classroom management. Teachers may address students' needs using experiential learning, which emphasizes applying knowledge and doing actual work (Qiu et al., 2024). Creating an inclusive and adaptable educational environment requires educators to adapt their teaching approaches to different learning styles and individual traits. Different teaching approaches impact instructors' assessment and evaluation skills. Iteratively creating realistic assessments based on real-life events helps educators construct complex evaluation approaches that go beyond standard testing (Mulyadi et al., 2022). Teaching methods can affect a teacher's communication and interpersonal skills, which are essential. Collaborative projects, interactive simulations, and case-based discussions require effective instructor-student and participant communication. These strategies can help teachers explain complicated topics, spark meaningful classroom conversations, and handle diverse perspectives.

H1: Teaching methods have a significant impact on teacher competence.

2.2. Teacher Motivation as a Mediator

In educational research, teacher motivation mediates between teaching methods and talents, providing a complete view of effective teaching. Instructors' motivation to participate, change, and improve their abilities determines how well instructional tactics improve teacher competencies (Njenga, 2023). Understanding how instructional strategies affect various aspects of teacher competency requires recognizing the major impact of teacher motivation on this scenario (Belda-Medina, 2022). Traditional lectures have been evaluated alongside interactive methods including project-based learning, case-based learning, experiential education, and simulation exercises. These tactics differ, but they all affect teachers' skills (Calavia et al., 2021). The driving force links instructional methods to the numerous skills instructors require. SDT states that teacher motivation influences instructional decisions, professional growth, and teaching quality. Autonomy, competence, and relatedness of intrinsic motivation drive educators to go beyond normal tasks and anticipated results, creating job excitement. When assessing its mediating role, teacher motivation must be considered in relation to classroom teaching (Huo, 2023). Lecture-based training is popular but may demotivate educators. The repetitious nature of one-way information exchange may reduce instructors' autonomy and opportunities to exhibit creative teaching approaches (Lauermann & Berger, 2021). Motivation is key to teachers seeking professional growth by harnessing their innate drive to enhance teaching approaches. Participatory teaching methods including project-based learning, experiential learning, and simulation exercises may motivate teachers (Nair, 2020). Educators are empowered to construct and implement instructional approaches, which aligns with SDT's emphasis on autonomy-supportive environments that allow teachers control and mastery (Ryan & Deci, 2020). Interactive projects or hands-on exercises may boost instructors' confidence and motivate them to keep learning and meet students' evolving needs. Additionally, SDT's social component of relatedness emphasizes the necessity for collaboration and partnerships (Cao & AlKubaisy, 2022). Case-based learning and other strategies that promote collaboration, participation, and shared learning can help build a supportive community of practice. In such environments, common dedication to student advancement and excellence and personal ambitions motivates teachers. Teaching motivation helps transfer skills like adaptability to student needs. Providing an adaptive and inviting learning environment requires meeting the unique requirements of a diverse student body. Project-based learning lets teachers accommodate varied learning styles. Incentives encourage teachers to adapt their methods to student demands (Mulyadi et al., 2022). Advances in teaching methods alter instructors' abilities, which are formed by motivational factors affecting instructional decisions. Teacher motivation as a mediator shows how SDT autonomy, competence,

and relatedness are linked to teachers' various talents (Ahn et al., 2021). The symbiotic link between instructional tactics and intrinsic motivation affects educators' professional abilities.

H2: Teacher motivation mediates the relationship between teaching methods and teacher competencies.

2.3. Teacher Engagement as Mediator

Studying teacher involvement as a relationship between teaching approaches and abilities expands educational research on successful teaching practices. This study examines the complicated link between teaching methods and instructor enthusiasm, devotion, and involvement. Teacher engagement as a mediator illuminates the complex ways in which instructional techniques affect the numerous abilities educators need to meet today's educational challenges (Xu & Luo, 2024). Many years of research have explored the impact of project-based learning, simulation exercises, experiential learning, and case-based learning on teacher capacities (Zhou & Rose, 2021). However, understanding teacher engagement's mediating role shows a constantly evolving instructional process. Ngo (2019) describes teacher engagement as enthusiasm, devotion, and full immersion in teaching methods. It relates educators' instructional choices to successful teaching abilities. Traditional lecture-based instruction is popular, but teacher participation might be low. A one-way system where the teacher largely provides knowledge may hinder active participation (Caldwell, 2020). Teacher participation helps instructors find professional growth and instructional creativity while avoiding boredom. Participatory teaching strategies boost teacher engagement. As instructors collaborate on complicated projects, they inspire students and motivate them. Simulation exercises and case-based learning provide a dynamic environment that motivates teachers to actively participate in learning, which increases student engagement beyond standard teaching methods (Insorio et al., 2021; Toquero et al., 2021). Practical application and hands-on exercises engage students and strengthen teachers' commitment to improve real-world educational skills. Teacher engagement mediates classroom management (Zhou & Rose, 2021). Successful learning environment management requires strong teacher involvement, including the implementation of recognized approaches and the ability to adapt to classroom dynamics. Simulations and project-based learning foster student involvement and cooperation, improving instructor classroom management (Cao & AlKubaisy, 2022). Teachers must mediate to satisfy pupils' needs. Project-based learning encourages instructors to actively engage with students' diverse learning styles, abilities, and challenges. Increased engagement in this topic fosters abilities that go beyond traditional approaches and include adaptable, student-centered solutions for complete and successful education (Khamsuk & Whanchit, 2021). Teachers' social involvement depends on their interpersonal and communication abilities. Active participation extends beyond solo activities and is supported by case-based learning and other teaching strategies that promote peer exploration, collaboration, and learning (Hoel & Tønnessen, 2019). Instructors may better convey the material, conduct relevant classroom debates, and manage varied learning community opinions via dynamic interactions.

H3: Teacher engagement mediates the relationship between teaching methods and teacher competencies.

3. Methodology

3.1. Research Design

This study utilized a quantitative research design to analyze the effectiveness of various teaching methods and strategies in developing teacher competence in vocational education, with a particular focus on the mediating role of teacher motivation and engagement. The quantitative approach allowed for the systematic collection and analysis of numerical data to test the hypothesized relationships between the variables. A cross-sectional survey method was employed, which involved distributing questionnaires to gather data from vocational teachers. This design

was selected to facilitate the examination of the associations between teaching methods, teacher motivation, engagement, and teacher competencies at a single point in time.

3.2. Population

Population of the study were teachers of China's vocational education. The population includes vocational teachers from rural and urban higher education institutions and other academic subjects. The study of vocational instructors sought to identify the abilities needed in vocational education, which emphasizes practical skills and real-world knowledge. By include instructors with diverse abilities and professional backgrounds, the outcomes are more relevant to Chinese vocational education. For this study, 450 questionnaires were sent to vocational instructors across China. The sample size was based on the statistical power needed to find significant correlations between variables. The distributed surveys yielded 275 complete responses, a 61% response rate. Quantitative analysis and statistical conclusions are possible with 275 samples. Geographic location, teaching experience, and topic specialism were considered to ensure that the surveys reflected a wide population of vocational instructors. A large sample size can be used to examine how teaching methods affect teacher competency. This study also included Chinese vocational education variations. Several standard metrics assessed teacher motivation, engagement, teaching methods, and competency in the survey.

3.3. Data Collection

The questionnaire collected qualitative and quantitative data to better understand complicated interactions. The study team implemented quality control methods to ensure data integrity. The study used stratified random sampling to choose a representative and varied sample of Chinese vocational teachers. Stratification divided the population by topic specialty, teaching experience, and location. A random sample was then taken from each stratum proportional to its population size. This technique captured vocational teaching community variances and improved the study's external validity by capturing vocational education context variability. Stratified random sampling revealed vocational teaching subgroup tendencies and trends. This methodological decision ensured that the findings could be generalized throughout the population and within specific strata, providing a more nuanced picture of how teaching methods affect teacher ability. A standardized questionnaire was given to chosen vocational teachers. The questionnaire has several parts to measure crucial factors. The first component collected demographic data such topic specialty, teaching experience, and location. Validated measures for teacher motivation, teacher competency, teacher engagement, and teacher engagement were incorporated in subsequent parts. The questionnaire used a Likert scale to assess replies, providing measurable data for statistical analysis.

3.4. Data Analysis

SPSS was used to analyze structured questionnaire data. SPSS is a popular quantitative data analysis software program including descriptive and inferential statistical techniques. Data trends and variations were summarized using descriptive statistics such mean scores, standard deviations, and frequency distributions. Descriptive studies showed sample characteristics, response distribution, and early insights into variable correlations. Regression analysis examined the direct effect of teaching methods on teacher competency, whereas mediation analysis, using SPSS's PROCESS macro, examined the mediating function of teacher motivation and engagement.

4. Results

Teacher engagement, motivation, teaching methods, and competencies are described in Table 1. These measures ranged from 1 to 5, with teacher competencies reaching 6. The mean teacher involvement score is 3.45, indicating moderate involvement among the 275 instructors polled. teacher involvement scores range from 1 to 5, with a standard deviation of 0.863, indicating a scattered distribution. Teacher motivation averages 3.41, indicating moderate participant

motivation. The narrow standard deviation of 0.843 implies motivation ratings are more clustered than teacher engagement. Teaching methods, with a mean score of 3.44 and a standard deviation of 0.891, show moderate use of varied teaching methods in the cohort. Teaching techniques vary according to the ratings, which range from 1 to 5. Note that Teacher competence, scored on a scale of 1 to 6, have a mean score of 3.68, suggesting modest teacher skills. The sampled group's teacher competency perceptions vary more due to the bigger standard deviation of 1.022.

Table 1
Descriptive Statistics

	<i>N</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Mean</i>	<i>Std. Deviation</i>
Teacher Engagement	275	1	5	3.45	0.863
Teacher Motivation	275	1	5	3.41	0.843
Teaching Methods	275	1	5	3.44	0.891
Teacher Competencies	275	1	5	3.68	1.022

Skewness and kurtosis values judge the normalcy of teacher engagement, teacher motivation, teaching methods, and teacher competencies in Table 2. Skewness indicates distribution asymmetry, whereas kurtosis measures peaking. A little negative skewness of -0.431 shows a slight divergence from a fully symmetric distribution for teacher engagement. Kurtosis of 0.056 suggests a near-normal distribution with a modest peak. Teacher motivation also has a slightly negatively skewed distribution (-0.491) and a kurtosis of 0.602, indicating a symmetrical distribution. Teaching methods has a weak leftward skewness of -0.518 and a moderately peaked distribution of 0.390. A small negative skewness of -0.247 and a kurtosis of 0.096 show a distribution approaching normalcy for Teacher Competencies.

Table 2
Normality Assessment

	<i>Skewness</i>	<i>Kurtosis</i>
Teacher Engagement	-0.431	0.056
Teacher Motivation	-0.491	0.602
Teaching Methods	-0.518	0.390
Teacher Competencies	-0.247	0.096

Table 3 shows the variables' correlation analysis findings. The correlation coefficients show how strongly and how directionally variables are related. Teacher involvement and teacher motivation have a notable positive association ($r = 0.716$, $p < .01$), showing that when instructors report increasing levels of involvement, their motivation also rises. This shows that these two dimensions of teacher participation in education may be interdependent. Teaching methods has a substantial positive link with teacher motivation ($r = 0.591$, $p < .01$) and teacher engagement ($r = 0.690$, $p < .01$). These data imply that engaged and motivated teachers use a variety of teaching strategies. Moreover, teacher competencies positively correlate with teacher engagement ($r = 0.567$, $p < .01$), motivation ($r = 0.552$, $p < .01$), and teaching methods ($r = 0.481$, $p < .01$). The results suggest that when instructors feel more competent, they are more engaged, motivated, and use more instructional strategies.

Table 3
Correlation Analysis

	<i>TE</i>	<i>TMO</i>	<i>TM</i>	<i>TC</i>
Teacher Engagement [TE]	1			
Teacher Motivation [TMO]	.716**	1		
Teaching Methods [TM]	.591**	.690**	1	
Teacher Competencies [TC]	.567**	.552**	.481**	1

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

Table 4 shows Cronbach's Alpha. Internal consistency is measured by Cronbach's Alpha, which measures item similarity within each variable. Cronbach's Alpha of .878 indicates strong internal consistency for teacher engagement items. This shows that teacher engagement items consistently assess a shared concept, boosting measurement instrument credibility. Teacher motivation's Cronbach's Alpha of .897 indicates strong internal consistency. This suggests that teacher motivation items are coherent, boosting the instruments' reliability and validity in measuring the concept. Teaching methods' Cronbach's Alpha of .808 indicates good internal consistency. This feature of teacher conduct is reliably measured by the instrument's consistent teaching technique items. Teacher competencies have .849 Cronbach's Alpha, showing good item internal consistency. This shows that teacher competency components measure a unified concept, strengthening the measurement instrument.

Table 4
Cronbach's Alpha

	<i>Cronbach's Alpha</i>
Teacher Engagement	.878
Teacher Motivation	.897
Teaching Methods	.808
Teacher Competencies	.849

Table 5 shows item outer loadings within each variable. Outer loadings show how strongly

Table 5
Outer Loading

<i>Variables</i>	<i>Items</i>	<i>Outer Loading</i>
Teaching Methods	TM1	0.555
	TM2	0.760
	TM3	0.784
	TM4	0.657
	TM5	0.480
	TM6	0.632
	TM7	0.631
	TM8	0.746
	TM9	0.724
	TM10	0.715
Teacher Competencies	TC1	0.732
	TC2	0.775
	TC3	0.623
	TC4	0.560
	TC5	0.558
	TC6	0.730
	TC7	0.788
	TC8	0.791
Teacher Motivation	TMO1	0.692
	TMO2	0.718
	TMO3	0.566
	TMO4	0.699
	TMO5	0.608
	TMO6	0.639
Teacher Engagement	TE1	0.654
	TE2	0.514
	TE3	0.561
	TE4	0.628
	TE5	0.623
	TE6	0.511

each item is related to its construct in a measurement model. The outside loadings for Teaching Methods range from 0.480 to 0.784, indicating that each item contributes considerably to the measurement. Notably, components TM2, TM3, TM8, and TM9 have outer loadings above 0.7, indicating significant Teaching Methods construct associations. The Teacher Competencies variable has outside loadings of 0.558 to 0.791 for all items. TC7 and TC8 have the largest outside loadings, showing they greatly contribute to Teacher Competencies assessment. Teacher Motivation elements have relevant outer loadings from 0.566 to 0.718, with TMO4 being the greatest. This shows that the items capture Teacher Motivation. Teacher Engagement outer loadings range from 0.511 to 0.654, showing that each item strongly contributes to the assessment. TE1 and TE4 have the biggest exterior loadings, however all components contribute.

A straight route analysis of teaching methods and teacher competencies is shown in Table 6. The Beta coefficient, SD, *t*-value, and *p*-value show the predicted relationship's strength and significance. A large beta value of 0.791 supports the hypothesis (H1) that teaching methods affect teacher competencies. A positive and statistically significant relationship exists between the variables. The high *t*-value of 15.734 and very low *p*-value of <.001 show that teaching methods do not affect teacher competencies by coincidence. Here, the statistical significance of the link substantially supports H1, hence the hypothesis is accepted. The strong beta coefficient suggests that teaching methods improve teacher competencies significantly.

Table 6
Direct Path Analysis

<i>Hypotheses</i>	<i>Relationship</i>	<i>Beta</i>	<i>SD</i>	<i>t</i>	<i>p</i>	<i>Decision</i>
H1	TM → TC	0.791	0.050	15.734	<.001	Accepted

Teaching method, teacher engagement, teacher motivation, and teacher competencies are the subjects of a mediation analysis, which is presented in Table 7. Beta coefficient, standard deviation [SD], *t*-value, and *p*-value reveal suggested paths. Teaching methods and teacher competencies are proposed as a mediation pathway through teacher motivation. The Beta coefficient is 0.135, the standard deviation is .072, and the *t*-value is 8.118, resulting in a highly significant *p*-value of <.001. The data confirm H2, showing that Teacher Motivation mediates the connection between Teaching Methods and Teacher Competencies. Hypothesis 3 (H3) proposes a mediation pathway between teaching methods and teacher competencies through teacher engagement. The Beta coefficient is 0.173, the standard deviation is 0.063, and the *t*-value is 2.623, yielding a significant *p*-value of .009. H3 is accepted, indicating that teacher engagement mediates teaching methods and teacher competencies.

Table 7
Mediation Analysis

<i>Hypotheses</i>	<i>Relationship</i>	<i>Beta</i>	<i>SD</i>	<i>t</i>	<i>p</i>	<i>Decision</i>
H2	TM → TMO → TC	0.135	0.072	8.118	.000	Accepted
H3	TM → TE → TC	0.173	0.063	2.623	.009	Accepted

5. Discussion

The results of this study shed light on the problematic dynamics that exist between teacher competency and teaching methods in the context of vocational education. Consistent with the extant research Ramos and Antunes (2023), the results validate the significant and affirmative impact of instructional techniques on the competency of teachers. The strong link between the use of various educational methods and an increase in perceived teacher competence is shown between Teaching Methods and Teacher Competence. This is consistent with the statement made by (Lee & Perdana, 2023). that teachers who possess a flexible and diverse educational repertoire are better equipped to meet the diverse demands of their pupils in the workplace. The study's findings support the necessity of eschewing traditional lecture-based instruction in favor of more

engaging and participatory approaches (Duan et al., 2022). The positive link indicates that teachers are considerably more likely to believe in their own abilities as teachers when they incorporate mission-based total learning, simulated physical activities, case-based total learning, and experiential learning into their teaching methods. This aligns with the constructivist framework, which emphasizes the value of active learning reports in developing teacher competency (Gardner-Neblett, 2023). The ramifications for career education are significant, highlighting the need for innovative teaching strategies and the integration of real-world applications to develop a more capable pool of career educators.

H2 examines how teacher motivation mediates the relationship between instructional approaches and teacher competency. This idea supports the Self-Determination Theory [SDT] (Ryan & Deci, 2000), which states that intrinsic motivation—autonomy, competence, and relatedness—influences teachers' self-perceptions. Mediation research findings show complicated connections between instructional tactics, teacher motivation, and teacher competency. Instructor motivation mediates the relationship between coaching strategies and trainer skill, with 38% of the impact. This supports Pelikan et al.'s (2021) findings that intrinsic motivation improves performance and competence. Teaching strategies boost instructors' intrinsic motivation, giving them autonomy, competence, and educational system connection. Thus, they perceive their instructional competency faster (Njenga, 2023). Mediation shows how inherent motivation in vocational teachers may change things. It implies that the learning method's motivational components help improve teacher competence beyond specific skills learned through different teaching methods (Caldwell, 2020). This supports research that show motivation is crucial to educators' professional growth and coaching report quality.

This research helps us understand vocational education dynamics by investigating the intricate relationships between instructional techniques, teacher involvement, and teacher competences. The third hypothesis (H3) stated that teacher engagement mediates the connection between teacher competencies and teaching method. The widely held idea is that engagement—energy, commitment, and absorption—is vital to teachers' ability in navigating the educational terrain (Tadesse & Derza, 2020; Xu & Luo, 2024). The mediation evaluation illuminates the varied ways coaching strategies affect teaching abilities. According to the statistically significant mediation effect, the relationship between teaching methods and instructor skills is influenced by trainer engagement for overall impact. This result is consistent with recent research (Zhou & Rose, 2021) that emphasizes the value of teacher engagement in promoting successful teaching practices and a successful in the teaching method. The results of the study highlight how engaging students may have a transforming effect if teachers use a variety of teaching strategies. Teachers are likely to have higher levels of commitment, energy, and engagement in their teaching when they actively participate in venture-based learning, simulation exercises, project-based learning, and experiential mastery (Caldwell, 2020). Conversely, this increased involvement makes a significant contribution to the development of teachers' talents. The notion that innovative and interactive teaching strategies foster a sense of immersion and commitment among vocational educators is supported by the strong correlation found between Teaching Methods and Teacher Engagement (Zhao & Ko, 2020). The influence of mediation highlights how teacher involvement may work as a catalyst to convert the benefits of different coaching styles into increased teacher abilities. Teachers who are more invested in their teaching approaches are more equipped to handle college students' varied needs, adjust to changing learning environments, and hone their interpersonal and communication skills (Uğurlu & Evran Acar, 2025; Yang & Chang, 2024). The results add to the larger conversation on effective teaching strategies in career education. They stress the need to develop educational environments that encourage teacher participation in addition to competence-building instructional tactics (Nkaizirwa et al., 2022). In this sense, professional development initiatives and institutional support that promote engagement-enhancing behaviors are essential. Furthermore, the study emphasizes how important it is for educational administrators and

policymakers to understand how teaching strategies, teacher involvement, and trainer abilities are all interconnected in creating a robust and adaptable learning environment.

6. Conclusion

There are intricate links between teaching methods, teacher motivation, engagement, and skills in vocational education. This study contributes to scholarly debate and affects politicians, educators, and groups working to improve vocational education. Pedagogical innovation in vocational education is crucial because teaching methods affect teacher competencies. The research emphasizes the necessity of combining traditional teaching methods with experiential, case-based, project-based, and simulation activities. Instructors can gain competence, flexibility, and competency to meet the different demands of job-ready students. Through teacher engagement and motivation, new information is gained. The data show that instructors judge students' performance based on internal desire and participation as well as real skills from diverse teaching methods. Create an atmosphere that motivates instructors to improve their long-term skills. Authorities and academic institutions could consider incorporating instructor motivation and engagement support systems. The research reveals that teacher engagement moderates the relationship between teaching methods and teacher skills. Creation of learning settings that support innovative teaching methods and integrate instructors in their professional tasks is crucial. Effective professional development programs and institutional policies must recognize the connection of teaching methods, teacher engagement, and teacher abilities. The study suggests that vocational education institutions should provide ongoing professional development for teachers to promote multiple teaching methods. Create supportive and motivating settings to enhance internal motivation and teacher participation.

7. Theoretical and Practical Implications

Theoretical implications of this research help us grasp vocational education's difficulties. Jonassen's 1991 theory of student-centered and experiential learning suggests that diverse teaching methods improve teacher capabilities. Providing instructors with a variety of tools to satisfy students' needs promotes teacher proficiency in vocational contexts. This promotes constructivism, which emphasizes active and engaged learning for educators and students. This study shows how teacher motivation mediates between teaching methods and abilities, improving Self-Determination Theory. The findings show that intrinsic motivation—based on autonomy, competence, and relatedness—affects instructors' perceived competency. This aligns with the SDT's emphasis on intrinsic motivation for maximum performance and well-being. Self-Determination Theory in vocational education illuminates teacher competency development psychology. This study shows how teacher engagement links teaching methods and teacher competencies, contributing to current ideas on teacher engagement. Actively engaged instructors are more likely to invest in professional development, adapt to their responsibilities, and use excellent teaching methods. This study examines how teacher participation in vocational education affects teacher skills and well-being.

The study's recommendations for lawmakers, organizations, and educators aim to improve vocational education. Professional development programs that promote many teaching methods are important, according to study. To prepare instructors to use innovative teaching methods, higher education institutions should fund seminars, training, and assistance. Teachers must stay current on instructional methods to fulfill vocational students' needs. Teacher motivation is a mediating component, therefore vocational instructors require intrinsic motivation. Education authorities should promote creative teaching methods to boost teacher autonomy and competency. Allowing instructors to collaborate on decisions and recognize their contributions to the learning environment may enhance intrinsic motivation. A teacher's skills can be improved by practical methods to encourage students. The study identifies teacher engagement as a critical mediator, emphasizing the need for true teacher commitment. Institutions should encourage mentoring

programs, collaborative curriculum design, and incentives for outstanding teaching to increase teacher engagement. Realistic solutions to resource constraints and job stresses that impact teacher engagement can help vocational educators enhance their abilities. Academic institutions should consider complete support systems that boost intrinsic motivation and engagement. This comprehensive strategy stresses the interconnectivity of these areas and aims to encourage and engage instructors. Rewarding teachers for their accomplishments, fostering a positive school environment, and giving professional development opportunities can enhance intrinsic motivation and engagement.

8. Limitations and Future Research

Though limited, this research has provided significant insights. Research focused on Chinese vocational instructors in an educational and cultural environment. This study may not apply to educational circumstances with diverse sociocultural foundations owing to regional and cultural differences. Next study should repeat the connections in different circumstances to confirm their importance and applicability. Cross-cultural comparisons would reveal how teaching methods, motivation, and teacher engagement impact teachers' skills in different educational settings. Second, the poll relies on self-reported data. Self-reports are used in educational research, although social desirability and memory mistakes might skew them. Participants' comments may adhere to conventions rather than honestly conveying their experiences. Mixed-methods research combining quantitative survey data with qualitative interview or classroom observations may be beneficial. With this method, the complex dynamics linking teaching styles and teacher competencies would be better understood and triangulated. Teaching methods included case-based learning, simulations, and lectures. These methods are common in vocational education. While teaching methods and environment can also affect teacher abilities, these strategies are often applied in vocational settings. To get a deeper understanding of the variables influencing vocational education teacher development, future research should examine a wider range of teaching methods and contextual factors. It is also unable to determine causal correlations between the variables because of the cross-sectional nature of the study. To get a better understanding of these interactions, longitudinal studies that monitor the development of teacher abilities over time in response to different teaching methods and motivational factors may be beneficial. Studies that track instructors on their complex paths toward professional development might be helpful in better understanding the long-term effects of various instructional strategies. The study also examined the ways in which teaching motivation and teacher abilities were mediated by teacher engagement and motivation. Despite the significance of these parameters, no other possible mediators were included in this investigation. Future studies should investigate relevant organizational, social, and psychological elements in order to broaden the existing investigation of the link between teaching methods and teacher competency. In order to implement focused interventions and improve the professional development of vocational education instructors, we must first comprehend the working processes.

Author contributions: Xue Yuan Bo was responsible for the project's conceptualization, data collection, analysis, and manuscript preparation. Ooi Boon Keat supervised the project and provided guidance throughout.

Declaration of interest: The authors declared that there were no potential conflicts of interest.

Data availability: The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Ethical statement: This study received ethical approval from Management and Science University (MSU) on 18 June 2024 with the reference code: EA-L1-01-SESS-2024-06-0001. All participants provided informed consent before taking part in the research.

Funding: No funding source is reported for this study.

References

- Ahn, I., Chiu, M. M., & Patrick, H. (2021). Connecting teacher and student motivation: Student-perceived teacher need-supportive practices and student need satisfaction. *Contemporary Educational Psychology*, 64, 101950. <https://doi.org/10.1016/j.cedpsych.2021.101950>
- Ansley, B. M., Houchins, D. E., Varjas, K., Roach, A., Patterson, D., & Hendrick, R. (2021). The impact of an online stress intervention on burnout and teacher efficacy. *Teaching and Teacher Education*, 98, 103251. <https://doi.org/10.1016/j.tate.2020.103251>
- Belda-Medina, J. (2022). Promoting inclusiveness, creativity and critical thinking through digital storytelling among EFL teacher candidates. *International Journal of Inclusive Education*, 26(2), 109–123. <https://doi.org/10.1080/13603116.2021.2011440>
- Böheim, R., Schnitzler, K., Gröschner, A., Weil, M., Knogler, M., Schindler, A.-K., Alles, M., & Seidel, T. (2021). How changes in teachers' dialogic discourse practice relate to changes in students' activation, motivation and cognitive engagement. *Learning, Culture and Social Interaction*, 28, 100450. <https://doi.org/10.1016/j.lcsi.2020.100450>
- Butz, J. V., & Hancock, S. A. (2019). Using Stories to Encourage Optimal Physical Development. In *Educating the Young Child* (Vol. 16, pp. 227–249). Springer. https://doi.org/10.1007/978-3-030-19266-2_12
- Calavia, M. B., Blanco, T., & Casas, R. (2021). Fostering creativity as a problem-solving competence through design: Think-Create-Learn, a tool for teachers. *Thinking Skills and Creativity*, 39, 100761. <https://doi.org/10.1016/j.tsc.2020.100761>
- Caldwell, M. (2020). An investigation into the perceptions of Japanese University educators on the use of ICT in an EFL tertiary setting. *CALL-EJ*, 21(2), 1–16.
- Cao, Y., & AlKubaisy, Z. M. (2022). Integration of computer-based technology in smart environment in an EFL structures. *Smart Structures and Systems*, 29(3), 375–387. <https://doi.org/10.12989/sss.2022.29.2.375>
- Casely-Hayford, J., Johansson, S., Dutt, K. G., Kwak, L., & Toropova, A. (2023). The role of job demands and resources for teacher job satisfaction: insights from five European countries. In R. J. Tierney, F. Rizvi, & K. Ercikan (Eds.), *International Encyclopedia of Education* (pp. 213–231). Elsevier. <https://doi.org/10.1016/B978-0-12-818630-5.04082-3>
- Crawford, E. O., Higgins, H. J., & Hilburn, J. (2020). Using a global competence model in an instructional design course before social studies methods: A developmental approach to global teacher education. *The Journal of Social Studies Research*, 44(4), 367–381. <https://doi.org/10.1016/j.jssr.2020.04.002>
- Duan, G., Jia, L., & Chen, H. (2022). The role of English as a foreign language teachers' technological pedagogical content knowledge on english as a foreign language students' achievement. *Frontiers in Psychology*, 13, 946081. <https://doi.org/10.3389/fpsyg.2022.946081>
- Gardner-Neblett, N. (2023). How essential is teaching narrative skills to young children? profiles of beliefs about narrative instruction among early childhood teachers. *Early Childhood Education Journal*, 51(3), 531–544. <https://doi.org/10.1007/s10643-022-01322-5>
- Hoel, T., & Tønnessen, E. S. (2019). Organizing shared digital reading in groups: optimizing the affordances of text and medium. *AERA Open*, 5(4). <https://doi.org/10.1177/2332858419883822>
- Huo, J. (2023). Vocational-technical teachers' mindfulness: Does it matter for teachers' well-being and motivation? *Heliyon*, 9(6), e17184. <https://doi.org/10.1016/j.heliyon.2023.e17184>
- Inderanata, R. N., & Sukardi, T. (2023). Investigation study of integrated vocational guidance on work readiness of mechanical engineering vocational school students. *Heliyon*, 9(2), e13333. <https://doi.org/10.1016/j.heliyon.2023.e13333>
- Insorio, A. O. (2021). From the perspective of the students: Reporting counselor educators' teaching practices. *International Journal of Didactical Studies*, 2(1), 101453. <https://doi.org/10.3390/IJODS.2021266616>
- Jeong, K.-O. (2017). Preparing EFL student teachers with new technologies in the Korean context. *Computer Assisted Language Learning*, 30(6), 488–509. <https://doi.org/10.1080/09588221.2017.1321554>
- Khamsuk, A., & Whanchit, W. (2021). Storytelling: An alternative home delivery of english vocabulary for preschoolers during COVID-19's lockdown in southern Thailand. *South African Journal of Childhood Education*, 11(1). <https://doi.org/10.4102/SAJCE.V11I1.897>
- Kumar, M., Kyriakopoulos, G. L., Jesús Belmonte-Ureña, L., Jokhan, A., Chand, A. A., Singh, V., & Mamun, K. A. (2022). Increased digital resource consumption in higher educational institutions and the artificial intelligence role in informing decisions related to student performance. *Sustainability*, 14(4), 2377. <https://doi.org/10.3390/SU14042377>

- Lauermann, F., & Berger, J.-L. (2021). Linking teacher self-efficacy and responsibility with teachers' self-reported and student-reported motivating styles and student engagement. *Learning and Instruction*, 76, 101441. <https://doi.org/10.1016/j.learninstruc.2020.101441>
- Lee, W. E., & Perdana, A. (2023). Reprint of: Effects of experiential service learning in improving community engagement perception, sustainability awareness, and data analytics competency. *Journal of Accounting Education*, 63, 100846. <https://doi.org/10.1016/j.jaccedu.2023.100846>
- Mulyadi, D., Aimah, S., Arifani, Y., & Singh, C. K. S. (2022). Boosting EFL learners' listening comprehension through a developed mobile learning application: effectiveness and practicality. *Applied Research on English Language*, 11(3), 37–56. <https://doi.org/10.22108/ARE.2022.130726.1785>
- Nair, P. R. (2020). Increasing employability of indian engineering graduates through experiential learning programs and competitive programming: case study. *Procedia Computer Science*, 172, 831–837. <https://doi.org/10.1016/j.procs.2020.05.119>
- Namaganda, A. (2020). Continuing professional development as transformational learning: A case study. *The Journal of Academic Librarianship*, 46(3), 102152. <https://doi.org/10.1016/j.acalib.2020.102152>
- Ngo, N. (2019). Understanding the impact of listening strategy instruction on listening strategy use from a socio-cultural perspective. *System*, 81, 63–77. <https://doi.org/10.1016/j.system.2019.01.002>
- Njenga, M. (2023). Continuing professional development of vocational teachers in Kenya: Motivations, practices and teacher profiles. *International Journal of Educational Research Open*, 5, 100282. <https://doi.org/10.1016/j.ijedro.2023.100282>
- Nkaizirwa, J. P., Swai, C. Z., Hugo, A. K., Mahenge, C. A., & Komba, P. S. (2022). Data on pre-service teachers' experience of project activities based on the teacher education support project in Tanzania. *Data in Brief*, 42, 108214. <https://doi.org/10.1016/j.dib.2022.108214>
- Paradissis, C., De Guzman, K. R., Barras, M., La Caze, A., Winckel, K., Taufatofua, N., & Falconer, N. (2023). Experiences and learnings of pharmacists, students, and clinical assistants working collaboratively in a COVID-19 vaccination clinic: a qualitative study. *Exploratory Research in Clinical and Social Pharmacy*, 9, 100241. <https://doi.org/10.1016/j.rcsop.2023.100241>
- Pelikan, E. R., Lüftenegger, M., Holzer, J., Korlat, S., Spiel, C., & Schober, B. (2021). Learning during COVID-19: the role of self-regulated learning, motivation, and procrastination for perceived competence. *Zeitschrift Fur Erziehungswissenschaft*, 24(2), 393–418. <https://doi.org/10.1007/S11618-021-01002-X/FIGURES/3>
- Peng, X., Sun, X., & He, Z. (2022). Influence Mechanism of Teacher Support and Parent Support on the Academic Achievement of Secondary Vocational Students. *Frontiers in Psychology*, 13, 1698. <https://doi.org/10.3389/FPSYG.2022.863740/BIBTEX>
- Qiu, X., Zhang, T., & Dong, S. (2024). Self-regulated strategy instruction: Insights from ESP teachers at a Chinese university and vocational college. *System*, 120, 103188. <https://doi.org/10.1016/j.system.2023.103188>
- Ramos, P., & Antunes, P. (2023). P26 - Micromundo: Science Communication Teaching To Improve Communication Skills Among Health Students: Presenter(s): Margarida Braga, FMUP, Portugal. *Patient Education and Counseling*, 109, 52–53. <https://doi.org/10.1016/j.pec.2022.10.127>
- Rana, S. (2022). Exploring the student perspectives on the barriers of online learning during the COVID-19 pandemic: a qualitative study using interpretative phenomenological analysis. *Journal of Applied Research in Higher Education*, 14(4), 1554–1566. <https://doi.org/10.1108/JARHE-02-2021-0075/FULL/HTML>
- Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. *Contemporary Educational Psychology*, 61, 101860. <https://doi.org/10.1016/j.cedpsych.2020.101860>
- Saad, A., & Zainudin, S. (2022). A review of Project-Based Learning (PBL) and Computational Thinking (CT) in teaching and learning. *Learning and Motivation*, 78, 101802. <https://doi.org/10.1016/j.lmot.2022.101802>
- Sabiri, K. A. (2020). ICT in EFL teaching and learning: A systematic literature review. *Contemporary Educational Technology*, 11(2), 177–195. <https://doi.org/10.30935/cet.665350>
- Schweder, S., & Raufelder, D. (2021). Needs satisfaction and motivation among adolescent boys and girls during self-directed learning intervention. *Journal of Adolescence*, 88, 1–13.
- Tadesse, L., & Derza, D. (2020). An investigation of school based continuous professional development: Perception, practices and challenges. *Journal of Pedagogical Sociology and Psychology*, 2(1), 11–24. <https://doi.org/10.33902/JPSP.2020.31>
- Toquero, C. M. D., Sonsona, D. A., & Talidong, K. J. B. (2021). Game-based learning: Reinforcing a paradigm transition on pedagogy amid COVID-19 to complement emergency online education. *International Journal*

- of *Didactical Studies*, 2(2), 10458. <https://doi.org/10.33902/IJODS.2021269730>
- Tsybulsky, D., & Muchnik-Rozanov, Y. (2023). The contribution of a project-based learning course, designed as a pedagogy of practice, to the development of preservice teachers' professional identity. *Teaching and Teacher Education*, 124, 104020. <https://doi.org/10.1016/j.tate.2023.104020>
- Tuzun, U. (2020). Introduction to systems engineering and sustainability PART I: Student-centred learning for chemical and biological engineers. *Education for Chemical Engineers*, 31, 85-93. <https://doi.org/10.1016/j.ece.2020.04.004>
- Uğurlu, F., & Evran Acar, F. (2025). A reliability and validity study of professional development models tendency scale. *Journal of Pedagogical Research*, 9(1), 390-406. <https://doi.org/10.33902/JPR.202531609>
- Xu, J., & Luo, K. (2024). Immersing learners in English listening classroom: does self-regulated learning instruction make a difference? *Applied Linguistics Review*, 15(1), 219-240. <https://doi.org/10.1515/applirev-2021-0171>
- Yang, X., & Chang, Y.-C. (2024). The effects of perceived distributed leadership on teacher professional development among primary school teachers: The mediating role of teacher professional learning community. *Journal of Pedagogical Research*, 8(4), 163-177. <https://doi.org/10.33902/JPR.202429304>
- Yurtseven, N., & Dulay, S. (2022). Career adaptability and academic motivation as predictors of student teachers' attitudes towards the profession: A mixed methods study. *Journal of Pedagogical Research*, 6(3), 53-71. <https://doi.org/10.33902/JPR.202214428>
- Zhao, Y., & Ko, J. (2020). How do teaching quality and pedagogical practice enhance vocational student engagement? A mixed-method classroom observation approach. *International Journal of Educational Management*, 34(6), 987-1000. <https://doi.org/10.1108/IJEM-11-2019-0393>
- Zhou, S., & Rose, H. (2021). Self-regulated listening of students at transition from high school to an English medium instruction (EMI) transnational university in China. *System*, 103, 102644. <https://doi.org/10.1016/j.system.2021.102644>
- Zimmer, W. K., McTigue, E. M., & Matsuda, N. (2021). Development and validation of the teachers' digital learning identity survey. *International Journal of Educational Research*, 105, 101717. <https://doi.org/10.1016/j.ijer.2020.101717>