Community and Social Development Journal : CSDJ
Vol 27 No 2 May – August 2026 : e279352 : TCI 1

A Causal Model of Professional Key Competencies of Higher Vocational Students

Laiyang Zhang and Phanthida Laophuangsak*
Faculty of Education Administration, South-East Asia University, Thailand
E-mail: shuuu444@outlook.com and phunthidal@sau.ac.th*
*Corresponding author
(Received: 7 March 2025, Revised: 29 May 2026, Accepted: 30 May 2026)
https://doi.org/10.57260/csdj.2026.279352

Abstract

This study aims to construct a causal model of professional key competencies for higher vocational students by examining the influence of personal, family, school, and social factors. Using a quantitative approach, data were collected through a structured questionnaire from 427 higher vocational students selected by systematic random sampling from six institutions in Jiangsu, Anhui, and Henan provinces, China. Content validity was verified by five experts using the Index of Item-Objective Congruence (IOC), and internal-consistency reliability was confirmed (Cronbach's $\alpha = 0.809–0.936$). Structural Equation Modeling (SEM) was employed to analyze causal relationships. The hypothesized model fit the empirical data well ($\chi^2/df = 1.831$, CFI = 0.909, TLI = 0.903, RMSEA = 0.044, SRMR = 0.057). The findings reveal that personal factors, including self-efficacy, learning motivation, and career planning, exert the most significant direct impact on competency development. Family, school, and social factors influence professional competencies indirectly, primarily through their effect on personal factors. Institutional support, curriculum design, and industry collaboration were identified as key areas requiring enhancement. The study highlights the importance of a multi-faceted approach to competency cultivation, integrating personal motivation, family support, structured educational programs, and strong industry partnerships. Recommendations are provided for students, families, educators, and policymakers to enhance vocational education outcomes. The study contributes an empirically validated causal model demonstrating that personal factors are the central mediator through which family, school, and social factors shape the professional key competencies of higher vocational students, providing an evidence-based foundation for vocational education reform in China.

Keywords: Professional key competencies, Higher vocational education, Influencing factors, Causal model

Copyright © 2026 Community and Social Development Journal
This is an open access article distributed under the terms of the CC BY 4.0 license.

Introduction

The rapid advancement of technology and the rise of the knowledge economy have significantly transformed the global labor market, necessitating a shift in vocational education to meet new industry demands. Traditional vocational education models, which primarily focus on technical skills training, are increasingly insufficient in preparing students for the complexities of modern workplaces (OECD, 2018). The integration of professional key competencies—including problem-solving, adaptability, and communication skills has become crucial in vocational education to ensure graduates can effectively transition into the workforce (Rychen & Salganik, 2003).

China's vocational education system has undergone substantial reforms to address these challenges. Policies such as the National Vocational Education Reform Implementation Plan emphasize the need for competency-based education and stronger industry partnerships. However, research suggests that despite these policy efforts, gaps persist between vocational graduates' competencies and employer expectations, particularly in areas such as independent learning, career planning, and workplace adaptability. The cultivation of professional key competencies is influenced by multiple factors, including personal attributes, family background, school education, and broader social influences. The social-ecological system theory (Bronfenbrenner, 1979) provides a useful framework for examining how these factors interact to shape student competency development. Additionally, career development theories (Super, 1953; Greenhaus et al., 2010) highlight the evolving nature of professional competencies across different life and career stages. Given the importance of these competencies for employability and career progression, it is imperative to understand their development process and influencing factors. This study seeks to address these gaps by constructing a causal model of professional key competencies for higher vocational students, integrating insights from various theoretical frameworks and empirical research. By identifying the key determinants of competency development, this study aims to provide targeted recommendations for improving vocational education outcomes.

Although prior studies have examined how family, school, and social environments relate to vocational competencies, three gaps remain. First, these influences have largely been studied in isolation rather than within a single integrated causal model. Second, the mediating role of personal factors how family, school, and social conditions are translated into competencies through students' own cognition, motivation, and self-efficacy has rarely been modelled explicitly. Third, model-based evidence from China's higher vocational sector remains limited. The present study addresses these gaps by specifying and empirically testing a causal model in which personal factors mediate the effects of family, school, and social factors on professional key competencies, clarifying both the direct and the indirect pathways of competency development.

Objectives

1. To develop and validate a causal model of the factors influencing the professional key competencies of higher vocational students in China, examining the direct effects of family, school, and social factors and their indirect effects through personal factors.
2. To examine the mediating role of personal factors in the relationships between family, school, and social factors and professional key competencies, and to derive recommendations for enhancing students' competency development.

Copyright © 2026 Community and Social Development Journal
This is an open access article distributed under the terms of the CC BY 4.0 license.

Literature Review

Research Theory

Career Development Theory (CDT) , provides a foundational framework for understanding how individuals acquire and refine professional competencies over time. Super (1953) proposed that career development occurs through a series of stages—growth, exploration, establishment, maintenance, and decline—each marked by specific developmental tasks and competency requirements. This theory has been widely applied in vocational education research to analyze how students' skills and professional attributes evolve as they transition from education to employment (Super, 1980; Greenhaus et al., 2010). More recent studies have expanded upon CDT by integrating socio-cognitive and environmental factors, recognizing that career growth is influenced by both individual agency and external conditions (Savickas, 2002; Lent, Brown, & Hackett, 2000). In the context of this study, CDT provides a theoretical lens for examining how higher vocational students develop professional competencies throughout their educational journey. The theory underscores the importance of fostering adaptability, problem-solving skills, and career planning in vocational training. By applying CDT, this research explores how personal, family, school, and social factors interact to shape students' career readiness, emphasizing the need for a structured and progressive competency cultivation model tailored to vocational students' career trajectories.

Social Ecosystem Theory (SET), introduced by Bronfenbrenner (1979), posits that individual development is shaped by interactions within multiple environmental systems, including the microsystem (family, school), mesosystem (interactions between microsystems), exosystem (external influences such as policies and industry standards), and macrosystem (cultural and societal values). This theory has been extensively applied in educational research to explore how students' learning and competency development are influenced by their broader socio-educational environment (Bronfenbrenner & Morris, 2006; Tudge et al., 2009). In vocational education, scholars have used SET to examine how institutional structures, family background, and industry expectations collectively impact student performance and employability outcomes (Eccles, 2009; Siraj & Huang, 2020). This study employs SET to analyze the multi-layered influences on higher vocational students' professional competency development. The theory aids in understanding how family encouragement, school curriculum design, and social perceptions of vocational education create an ecosystem that either supports or constrains students' competency acquisition. By applying SET, this research highlights the necessity of a holistic approach that integrates family, educational institutions, and industry collaboration to foster well-rounded vocational graduates.

Social Cognition Theory (SCT), developed by Bandura (1986), asserts that individuals acquire and refine their skills through observational learning, social interactions, and cognitive processes. The theory emphasizes reciprocal determinism, wherein personal factors, behavioral patterns, and environmental influences continuously shape competency development (Bandura, 1998). SCT has been widely applied in educational psychology to explain self-efficacy, motivation, and skill acquisition, particularly in vocational and professional training contexts (Zimmerman, 2000; Schunk & DiBenedetto, 2021). Empirical studies have demonstrated that students with high self-efficacy and strong social learning experiences are more likely to develop professional competencies aligned with workplace expectations (Lent et al., 2019). In this study, SCT is utilized to examine the role of self-efficacy, learning motivation, and behavioral modeling in vocational competency development. The theory provides insight into how students internalize industry expectations through school training, internships, and mentorship. By incorporating SCT, this research underscores the importance of experiential learning, student engagement, and industry exposure in cultivating professional key competencies for higher vocational students.2.2 Definition of Core Concepts

Copyright © 2026 Community and Social Development Journal
This is an open access article distributed under the terms of the CC BY 4.0 license.

Variables Concept

Professional key competencies, refer to the essential knowledge, skills, and attributes that enable individuals to perform effectively in their professional roles. The OECD (2005) defines key competencies as those that contribute to successful participation in the labor market, social inclusion, and lifelong learning. In vocational education, key competencies have been conceptualized through various frameworks, such as the European Qualifications Framework (EQF) and 21st-century skills models, which emphasize cognitive, technical, and social-emotional skills (Binkley et al., 2012; Voogt & Roblin, 2012). Research indicates that the integration of professional competencies in vocational curricula enhances students' employability and adaptability in dynamic labor markets (Rychen & Salganik, 2003). In this study, professional key competencies for higher vocational students are categorized into three dimensions: cultural foundation, independent development, and social participation. These encompass attributes such as problem-solving, communication, teamwork, and ethical awareness, which are critical for workforce readiness. The study aims to construct a causal model that examines how personal, family, school, and social factors influence the development of these competencies, providing an evidence-based approach to improving vocational education.

Family factors, play a crucial role in shaping students' educational aspirations, motivation, and career competencies. Studies suggest that parental education levels, socioeconomic status, and parental support significantly impact students' academic and vocational development (Eccles, 2009; Wang & Eccles, 2013). Research also highlights that family encouragement and career discussions positively influence students' self-efficacy and career decision-making (Garg et al., 2002; Lent et al., 2019). In contrast, a lack of parental involvement or negative perceptions of vocational education may hinder students' skill development and career planning (Dietrich & Kracke, 2009). This study categorizes family factors into three dimensions: parental educational awareness, family behavior, and home environment. These aspects collectively influence students' professional key competencies by shaping their learning attitudes and career expectations. The study investigates how family support functions as a direct and indirect influence on vocational students' competency development, emphasizing the need for stronger parental engagement in vocational training.

School Factors, as the primary environment for students to acquire professional competencies. Research suggests that curriculum quality, teaching methods, and institutional policies significantly impact students' skill development (Baartman & de Bruijn, 2011; Mulder, 2017). Effective vocational education programs integrate both theoretical instruction and hands-on training, allowing students to bridge the gap between academic knowledge and workplace demands (Tynjala, 2008; Billett, 2011). Studies also emphasize the role of teacher competency and instructional strategies in fostering students' professional growth. In this study, school factors are classified into three key dimensions: teaching philosophy, curriculum design, and teacher quality. These factors collectively determine how effectively vocational institutions prepare students for the labor market. The study explores how curriculum innovation, teaching effectiveness, and school-industry collaboration influence students' competency acquisition, highlighting the need for educational institutions to align their training models with industry demands.

Social factors, such as industry demands, government policies, and cultural attitudes toward vocational education significantly affect competency development. Research indicates that social perceptions of vocational education impact students' enrollment choices and career trajectories (Powell & Solga, 2011). Additionally, industry involvement in vocational training, such as apprenticeships and internships, enhances students' real-world skills and employability. Government policies also play a vital role in shaping vocational education quality by providing funding, setting competency standards, and fostering school-industry partnerships (Hanushek

Copyright © 2026 Community and Social Development Journal
This is an open access article distributed under the terms of the CC BY 4.0 license.

et al., 2017).In this study, social factors are analyzed through three key dimensions: social culture, industry expectations, and policy support. These factors influence how vocational students perceive their career prospects and acquire necessary competencies. The study examines how external stakeholders, including policymakers and employers, contribute to the development of vocational education, advocating for stronger collaboration between educational institutions and industries to better align training with labor market needs.

Research Hypotheses

Family factors, including parental education awareness, home environment, and parental support, significantly impacts students' personal development, which in turn influences their professional key competencies. Research indicates that family factors shape students' learning attitudes, motivation, and self-efficacy, all of which contribute to their career readiness (Eccles, 1999; Fan & Chen, 2001). Parents with higher educational expectations and engagement in their children's academic and career planning tend to foster students with stronger professional adaptability (Heckman, 2006). This suggests that family influences do not act alone but operate through personal factors, shaping students' competencies indirectly. Thus, this study hypothesizes is:

H1: Family factors are indirect affecting to professional key competencies of higher vocational students through Personal factors.

Educational institutions play a vital role in shaping students' professional competencies by providing structured learning environments, skill training, and career guidance. Studies have found that well-designed curricula, engaging teaching methodologies, and a focus on competency-based education enhance students' motivation and self-efficacy, leading to stronger professional skills (Biggs & Tang, 2011; Trowler, 2010). Furthermore, school support services, including mentoring and career counseling, contribute to students' professional identity development. Given that personal factors serve as mediators between external influences and competency acquisition, this study hypothesizes is:

H2: School factors are indirect affecting to professional key competencies of higher vocational students through Personal factors.

The broader socio-economic environment, including industry needs, government policies, and public perceptions of vocational education, affects students' professional growth. Research has shown that positive societal attitudes toward vocational education can enhance students' confidence in their career paths, thereby strengthening their skill development (Billett, 2011). However, societal stigma against vocational education often leads to decreased student motivation and self-efficacy, negatively affecting competency formation. Since personal factors are closely tied to professional development, this study hypothesizes is:

H3: Social factors are indirect affecting to professional key competencies of higher vocational students through Personal factors.

Personal factors, including self-efficacy, career planning, and intrinsic motivation, are central to professional competency development. According to Bandura's (1986) Social Cognitive Theory, individuals with higher self-efficacy are more likely to engage in learning behaviors that enhance professional skills (Lent, Brown, & Hackett, 1994). Career development research also suggests that students with clear career goals and proactive learning strategies tend to exhibit stronger adaptability and employability (Savickas, 2002). Therefore, this study hypothesizes is:

H4: Personal factors are direct affecting to professional key competencies of higher vocational students.

Apart from their indirect effects, family factors also directly shape students' professional competencies. Research has shown that parental involvement in education, emotional support, and career discussions contribute significantly to students' career

Copyright © 2026 Community and Social Development Journal
This is an open access article distributed under the terms of the CC BY 4.0 license.

aspirations and work readiness (Steinberg, 2001; He, 2016). Moreover, studies indicate that family socioeconomic status affects students' exposure to career opportunities and networking, further influencing their competency acquisition. Based on these findings. Therefore, this study hypothesizes is:

H5: Family factors are direct affecting to professional key competencies of higher vocational students.

Educational institutions contribute significantly to competency development by providing technical training, industry exposure, and soft skill development. Prior research has emphasized that vocational schools with strong industry linkages, competency-based curricula, and practical learning environments produce graduates with higher employability skills. Additionally, teaching quality and faculty expertise play a critical role in competency acquisition, as students learn best when instruction is aligned with industry standards (Trowler, 2010). Therefore, this study hypothesizes is:

H6: School factors are direct affecting to professional key competencies of higher vocational students.

Government policies, labor market demands, and industry expectations significantly affect vocational education outcomes. Research has demonstrated that policies promoting work-integrated learning and apprenticeship programs enhance students' practical skills and employability. Moreover, industry-academia collaboration plays a crucial role in competency formation by exposing students to real-world challenges and professional expectations (Boud & Solomon, 2001). Therefore, this study hypothesizes is:

H7: Social factors are direct affecting to professional key competencies of higher vocational students.

Conceptual Framework

The Predictor variables (independent variables) of this study are; 1) Family factors (family education awareness, family behavior, family environment); 2) School factors (teaching philosophy, teaching arrangement, teacher quality); 3) Social factors (social culture, corporate requirements, national policy). The mediator variable of this study is personal factors (personal cognition, learning motivation, self-efficacy) The Criterion variable (dependent variables) of this study is professional key competencies. (cultural foundation, independent development, social participation),structure the research framework as depicted in Figure 1.

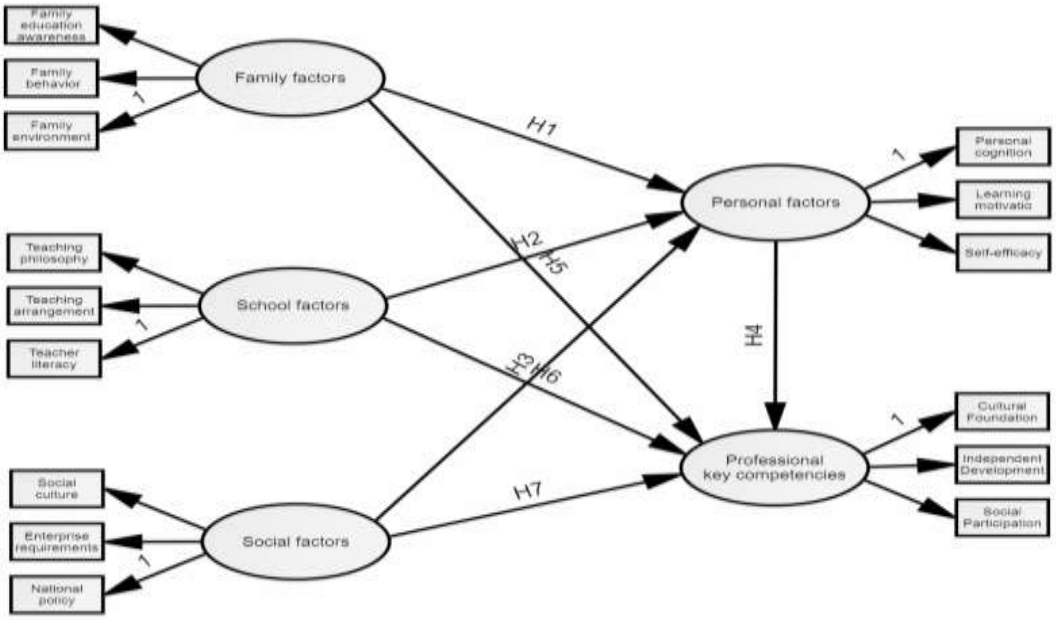


Figure 1 Conceptual Framework

Copyright © 2026 Community and Social Development Journal
This is an open access article distributed under the terms of the CC BY 4.0 license.

Methodology

Research Design

This research design used a quantitative research method. It examined the rola of personal factors as a mediator variable. The independent variables are family factors, school factprs, social factors, and the dependent variable is professional key competencies.

Sample and Procedure

The samples of this study are students from 6 higher vocational schools in Jiangsu, Anhui and Henan provinces. These three provinces were purposively selected to represent higher vocational education in eastern and central China; the study therefore targets this defined regional population and does not claim to be representative of the whole of China. The required sample size was determined a priori for structural equation modeling using Soper's a priori SEM sample-size calculator (anticipated medium effect size, statistical power = .80, $\alpha = .05$) and cross-checked against Kline's recommendation of at least 20 cases per estimated parameter; both criteria confirmed that the achieved sample of 427 was adequate. From July to September 2023, a questionnaire survey was conducted on 6 higher vocational schools. Respondents were drawn by systematic random sampling: from a sampling frame of 4,270 enrolled students, a sampling interval of 10 was applied (4,270 ÷ 427), and every tenth student was selected following a random start, yielding the final sample of 427.

Instruments

Questionnaire survey was used in this study to collect data. The questionnaire design adopted five-level Likert scale with several observation dimensions for each variable and 3-6 five-level rating scale format for each observation dimension to further explain and describe.

Professional key competence (PKC)

The latent variable of professional key competence (PKC) has three observational dimensions, namely, cultural foundation (6 observed variables), independent development (6 observed variables), and social participation (6 observed variables), with a total of 18 observable variables.

Personal factor (PF)

The latent variable of personal factor (PF) has three observational dimensions, namely, personal cognition (4 observational variables), learning motivation (4 observational variables), and self-efficacy (6 observational variables), with a total of 12 observable variables.

Family factor (FF)

The latent variable of family factor (FF) has three observational dimensions, namely, family education awareness (3 observational variables), family behavior (3 observational variables), and family environment (3 observational variables), with a total of 9 observable variables.

School factor (SCF)

The latent variable of school factor (SCF) has three observational dimensions, namely, teaching concept (3 observational variables), teaching arrangement (4 observational variables), and teacher literacy (5 observational variables), with a total of 12 observable variables.

Copyright © 2026 Community and Social Development Journal
This is an open access article distributed under the terms of the CC BY 4.0 license.

Social factor (SOF)

The latent variable of Social factor (SOF) has three observed dimensions, namely social culture (3 observed variables), enterprise requirements (3 observed variables), and national policy (3 observed variables), with a total of 9 observable variables.

These projects were evaluated using a five-point Likert rating scale, and five experts were invited to perform an index of objective congruence (IOC) test to verify content validity. All retained items obtained IOC values at or above the 0.50 acceptance criterion, confirming the content validity of the questionnaire. In terms of reliability verification, in the formal questionnaire survey, this study conducted three tests, with samples of 60 people each time, and revised the question expression and quantity of observed variables. The results of the third test show that Cronbach's alpha coefficient (α) of major key ability, personal factor, family factor, school factor, and social factor were 0.936, 0.897, 0.809, 0.923, and 0.860, respectively, all greater than 0.7. KMO values were as follows: 0.852, 0.842, 0.705, 0.840, 0.754, All are greater than 0.6. further confirming that the questionnaire has excellent reliability in measuring these factors, making it suitable for subsequent statistical analysis and research.

Data Analysis

This research utilizes jamovi 2.3.28 statistics software for composite-based structural equation modeling to estimate parameters. To examine the causal relationships between professional key competencies and influencing factors among higher vocational students, this study employed Structural Equation Modeling (SEM) as the primary analytical method. The analysis followed a multi-step approach. First, descriptive statistics and Pearson's correlation analysis were conducted to explore the relationships among personal, family, school, and social factors. Next, confirmatory factor analysis (CFA) was performed to evaluate the reliability and validity of the measurement model, assessing factor loadings, Cronbach's alpha (>0.70), composite reliability (CR >0.70), and average variance extracted (AVE >0.50) to ensure construct validity. Additionally, discriminant validity was tested using the Heterotrait-Monotrait Ratio (HTMT <0.85) criterion. The structural model evaluation included the examination of path coefficients ($p < 0.05$), R^2 values, and effect sizes (Cohen's f^2) to determine the significance and explanatory power of the model. Model fit was assessed using standard fit indices, including χ^2/df (<3), CFI (>0.90), TLI (>0.90), RMSEA (<0.06), and SRMR (<0.08). These analytical steps ensured the robustness and validity of the proposed model, providing empirical support for the hypothesized relationships.

Results

Descriptive Analysis

Descriptive analysis provides an overview of demographic characteristics and key variables in the study. The data were collected from 427 vocational students from six colleges and universities in Anhui, Henan and Jiangsu provinces. Among the samples, 231 (54.1%) were boys, 196 (45.9%) were girls, 174 were "under 18" (40.75%) and 171 were "19-20" (40.05%), and the major was "Information Technology". 84 students (19.67%), with the largest number of students in the first and second years (241 students (56.44%). Descriptive statistics of core variables (personal factors, family factors, school factors, social factors, and professional key competencies) including mean, standard deviation, skewness, and kurtosis were calculated to assess the normality of the data. The results show that the mean value of each observed variable ranges from 3.47 to 3.93, and the standard deviation ranges from 0.995 to 1.28. The Skewness of observable variables of the constructed equation model ranges from -1.06 to -0.411, no more than ±2, and the Kurtosis ranges from -0.505 to 0.665. Not more than ±7. It can be assumed that the data has a normal distribution. The VIF value is used to analyze

Copyright © 2026 Community and Social Development Journal
This is an open access article distributed under the terms of the CC BY 4.0 license.

the relationship between the observed variables of the structural equation model with 60 variables, and it is found that the value is between 2.06 and 3.79, no more than 10, indicating that there is no multicollinearity problem in the model.

Structural Equation Modeling Analysis

To examine the causal relationships between personal, family, school, and social factors and their impact on professional key competencies of higher vocational students, Structural Equation Modeling (SEM) was employed. This method allows for the simultaneous estimation of multiple relationships between latent variables while accounting for measurement errors. The analysis followed a two-step approach, including the measurement model assessment and structural model evaluation.

Measurement Model Assessment

Overall Model Testing

It was found that the SRMR values of professional key competencies, personal factors, family factors, school factors and social factors were 0.049, 0.043, 0.065, 0.052 and 0.063, less than 0.08, indicating an acceptable model,as shown in Table 1.

Table 1 The overall test of measurement models

Fit Index	criterion	PCK	PF	FF	SCF	SOF
χ^2	-	267	91.1	98.0	109	64.3
df	-	132	51	34	51	24
χ^2/df	< 3	2.022	1.786	2.882	2.137	2.679
CFI	> .90	0.973	0.986	0.956	0.980	0.980
TLI	> .90	0.968	0.982	0.934	0.974	0.970
SRMR	< .08	0.042	0.031	0.045	0.036	0.032
RMSEA	< .07	0.049	0.043	0.065	0.052	0.063

Copyright © 2026 Community and Social Development Journal
This is an open access article distributed under the terms of the CC BY 4.0 license.

Community and Social Development Journal : CSDJ
Vol 27 No 2 May – August 2026 : e279352 : TCI 1

Measurement Model Testing

Table 2 Measurement models of latent variables

Latent variables	Observed variables	β	R 2	α	ω	AVE
PF	P1	0.817	0.667	0.861	0.863	0.613
	P2	0.784	0.615			
	P3	0.774	0.599			
	P4	0.745	0.555			
	P5	0.856	0.732			
	P6	0.768	0.59			
	P7	0.776	0.602			
	P8	0.787	0.62			
	P9	0.845	0.714			
	P10	0.774	0.599			
	P11	0.782	0.611			
	P12	0.818	0.669			
FF	F1	0.823	0.677	0.828	0.834	0.628
	F2	0.773	0.597			
	F3	0.77	0.594			
	F4	0.767	0.589			
	F5	0.757	0.573			
	F6	0.743	0.552			
	F7	0.846	0.716			
	F8	0.782	0.612			
	F9	0.71	0.504			
SCF	S1	0.84	0.706	0.833	0.841	0.642
	S2	0.783	0.613			
	S3	0.762	0.581			
	S4	0.816	0.665			
	S5	0.725	0.525			
	S6	0.753	0.567			
	S7	0.8	0.64			
	S8	0.863	0.745			
	S9	0.79	0.624			
	S10	0.776	0.601			
	S11	0.784	0.614			
	S12	0.772	0.596			
SOF	SO1	0.839	0.704	0.859	0.861	0.676
	SO2	0.818	0.669			
	SO3	0.804	0.647			
	SO4	0.881	0.776			
	SO5	0.792	0.627			
	SO6	0.797	0.634			
	SO7	0.797	0.636			
	SO8	0.749	0.561			
	SO9	0.763	0.582			
PKC	CC1	0.86	0.739	0.908	0.91	0.631
	CC2	0.757	0.573			
	CC3	0.8	0.639			
	CC4	0.757	0.573			
	CC5	0.795	0.632			
	CC6	0.77	0.592			
	CC7	0.858	0.736			
	CC8	0.769	0.591			
	CC9	0.738	0.545			
	CC10	0.825	0.68			
	CC11	0.786	0.618			
	CC12	0.811	0.657			
	CC13	0.838	0.702			
	CC14	0.76	0.578			
	CC15	0.759	0.576			
	CC16	0.742	0.551			
	CC17	0.773	0.598			
	CC18	0.782	0.611			

Copyright © 2026 Community and Social Development Journal
This is an open access article distributed under the terms of the CC BY 4.0 license.

Reliability. Each observed variable of latent variables PKC, PF, FF, SCFand SOF has factor loadings ranging from 0.71 to 0.881, exceeding 0.5. Cronbach's alpha (α) ranges from 0.828 to 0.908, indicating high reliability for all latent variables in the model, as shown in Table 2.

Convergent Validity: Factor loadings for all observed variables ranged from 0.710 to 0.881, all above 0.70, and the Average Variance Extracted (AVE) values from 0.613 to 0.676, all exceeded the 0.50 criterion, confirming convergent validity.

Discriminant validity. The Heterotrait-Monotrait (HTMT) ratio values were below 0.85, supporting discriminant validity and demonstrating that the constructs were distinct from one another, as shown in Table 3.

Table 3 Heterotrait-monotrait (HTMT) ratio of correlations

Latent variables	FF	SCF	SOF	PKC	PF
FF	1				
SCF	0.283	1			
SOF	0.302	0.297	1		
PKC	0.286	0.296	0.302	1	
PF	0.31	0.321	0.303	0.343	1

Structural Model Evaluation

The structural model was assessed using model fit indices and path analysis to verify the research hypotheses.

Model Fit Indices. The revised SEM model 2 shows an acceptable fit with the following values: χ^2/df = 1.831 (acceptable if <3),CFI = 0.909, TLI =0.903(acceptable if >0.90),RMSEA = 0.044 (acceptable if <0.07),SRMR = 0.057(acceptable if <0.08), These results indicate that the hypothesized model provides a good fit to the observed data, as shown in Table 4.

Table 4 Model conformity assessment

Fit Index	criterion	Model 1	Model 2
χ^2	-	5943	3028
df	-	1700	1653
χ^2/df	< 3	3.495	1.831
CFI	> .90	0.719	0.909
TLI	> .90	0.708	0.903
SRMR	< .08	0.061	0.057
RMSEA	< .07	0.076	0.044

Path Coefficients and Hypothesis Testing. The structural model tested the direct and indirect effects of independent variables on professional key competencies. The standardized path coefficients and significance levels are summarized as Figure 2:

Copyright © 2026 Community and Social Development Journal
This is an open access article distributed under the terms of the CC BY 4.0 license.

Community and Social Development Journal : CSDJ
Vol 27 No 2 May – August 2026 : e279352 : TCI 1

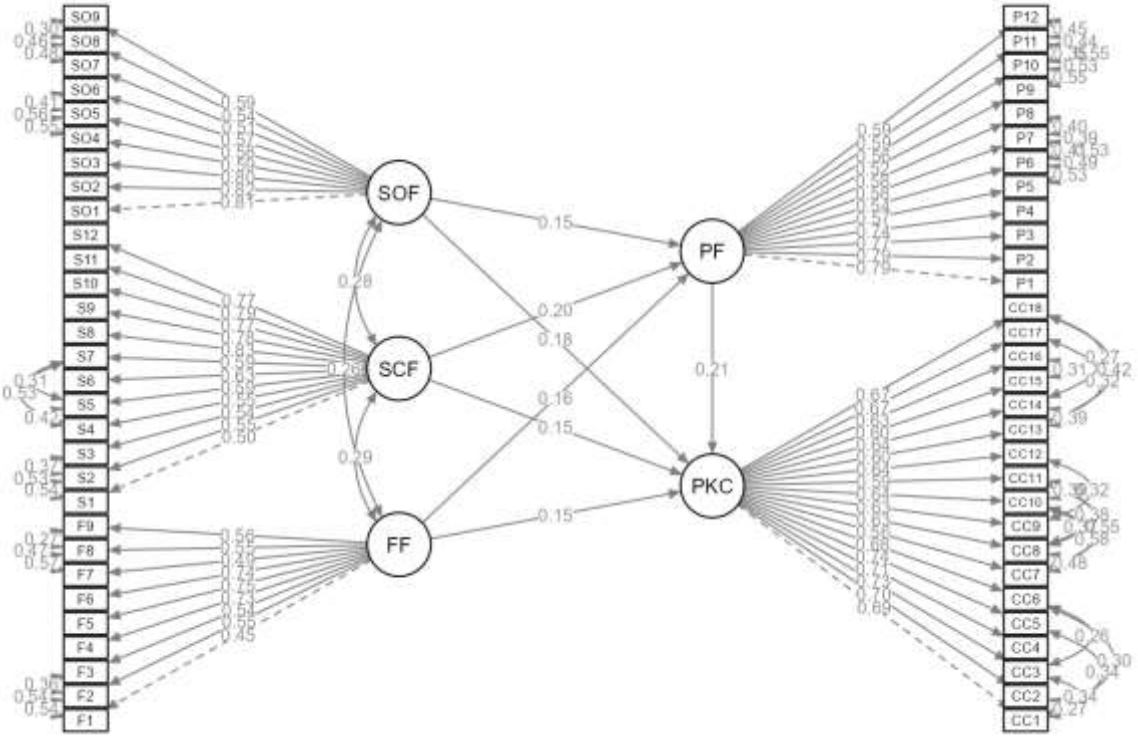


Figure 2 Causal Factors Model of professional key competencies of higher vocational students

Family factors Latent Variables (FF) Positively influence the underlying Personal factors Latent Variables (PF) Statistically significant at the level of 0.05 with a total influence of 0.16.

School factors Latent Variables (SCF) Positively influence the underlying Personal factors Latent Variables (PF) Statistically significant at the level of 0.05 with a total influence of 0.20.

Social factors Latent Variables (SOF) Positively influence the underlying Personal factors Latent Variables (PF) Statistically significant at the level of 0.05 with a total influence of 0.15.

Personal factors Latent Variables (PF) Positively influence the underlying Professional key competencies Latent Variables (PKC) Statistically significant at the level of 0.05 with a total influence of 0.21.

Family factors Latent Variables (FF) Positively influence the underlying Professional key competencies Latent Variables (PKC) Statistically significant at the level of 0.05 with a total influence of 0.15.

School factors Latent Variables (SCF) Positively influence the underlying Professional key competencies Latent Variables (PKC) Statistically significant at the level of 0.05 with a total influence of 0.15.

Social factors Latent Variables (SOF) Positively influence the underlying Professional key competencies Latent Variables (PKC) Statistically significant at the level of 0.05 with a total influence of 0.18.

Copyright © 2026 Community and Social Development Journal
This is an open access article distributed under the terms of the CC BY 4.0 license.

Discussions

This study aimed to explore the causal relationships among personal, family, school, and social factors influencing the professional key competencies of higher vocational students. By employing Structural Equation Modeling (SEM), this research identified the direct and indirect effects of these variables, providing insights for vocational education reform.

Findings indicate that personal factors, including self-efficacy, learning motivation, and career planning, exert the most significant direct impact on professional key competencies. This aligns with Bandura's Social Cognition Theory, which emphasizes that individuals' beliefs about their abilities influence their learning and career trajectories (Bandura, 1998). Previous research also supports the notion that students with high self-motivation and career self-efficacy tend to develop stronger professional competencies (Deci & Ryan, 2000). The results underscore the importance of fostering student autonomy, goal-setting skills, and resilience in vocational training programs.

The finding that personal factors are the strongest predictor, and the channel through which family, school, and social factors operate, is theoretically coherent. Personal characteristics such as cognition, motivation, and self-efficacy are the most proximal determinants of competence, whereas family, school, and social conditions are more distal; their influence is therefore largely realised after being internalised as students' own beliefs and goals. This mediating pattern is consistent with the reciprocal determinism of Social Cognitive Theory (Bandura, 1986) and with the nested systems of Social Ecosystem Theory (Bronfenbrenner, 1979), in which macro- and meso-level environments act on the individual through the microsystem. In the Chinese higher vocational context, where social perceptions of vocational education and strong family expectations are especially salient, this result helps explain why interventions aimed solely at curricula or policy often underperform unless they also strengthen students' motivation and self-efficacy. The relatively modest standardised coefficients (total effects of about 0.15–0.21) are comparable to those reported in prior Chinese and international competency studies, where contextual factors typically exert small-to-moderate, largely indirect effects; this convergence supports rather than weakens the credibility of the model.

Family, school, and social factors were found to exert indirect effects on professional key competencies, primarily by influencing personal factors. Parental encouragement and a positive home environment significantly contributed to students' confidence and career aspirations, reinforcing existing studies on the role of family support in shaping educational outcomes. School-related variables, including curriculum design, teaching quality, and institutional policies, played a crucial role in fostering a learning environment conducive to competency development. These findings suggest that vocational institutions should prioritize competency-based curricula, teacher training programs, and student-centered learning methodologies. Social factors, including societal perceptions of vocational education, industry expectations, and policy support, had moderate yet significant effects on student development. Enhancing public recognition of vocational education and strengthening policy frameworks that promote vocational training alignment with labor market needs are essential for improving student outcomes.

The results highlight the importance of integrating vocational training with industry needs. School-based interventions, including work-based learning, internships, and mentorship programs, were identified as key mechanisms for enhancing professional key competencies. Prior research suggests that vocational education models that incorporate real-world industry experiences significantly improve students' job readiness and professional competencies. This

Copyright © 2026 Community and Social Development Journal
This is an open access article distributed under the terms of the CC BY 4.0 license.

calls for closer partnerships between vocational institutions and industries to ensure alignment between educational outcomes and labor market demands.

Practical Implications

The findings offer valuable implications for students, educators, policymakers, and industry stakeholders.

For Students: Self-directed learning, career planning, and continuous professional development should be emphasized to enhance employability and career adaptability.

For Families: Parents play a crucial role in supporting students' career choices and fostering a positive attitude toward vocational education. Encouraging career awareness and professional aspirations at an early stage can significantly impact students' motivation.

For Schools: Vocational institutions should integrate competency-based curricula, enhance teacher training programs, and strengthen collaborations with industry partners to create a dynamic and effective learning environment.

For Policymakers: The development of policies that promote vocational training alignment with labor market needs, increased investment in vocational education, and incentives for industry-academic partnerships should be prioritized.

Conclusion and suggestions

This study provides empirical evidence on the factors influencing the professional key competencies of higher vocational students. By emphasizing the role of personal motivation, strengthening institutional support, and fostering closer industry linkages, vocational education can better equip students with the skills and competencies necessary for success in an increasingly competitive labor market. The integration of personal, family, school, and social influences highlights the necessity of a holistic approach to competency cultivation. Future research and policy initiatives should continue to refine vocational education strategies to ensure that students are adequately prepared to meet the evolving demands of the workforce.

Limitations and Future Research Directions

Despite its contributions, this study has certain limitations. The research sample was drawn from six vocational institutions in three provinces, which may limit the generalizability of the findings. Future studies should expand the sample to include a broader range of institutions and regional contexts. Additionally, the study relied on cross-sectional data, which provides a snapshot of competency development but does not capture long-term trends. Longitudinal research designs could offer deeper insights into how competencies evolve over time. Finally, while this study focused on general professional competencies, further research could explore industry-specific competency frameworks to tailor vocational education programs more effectively to different sectors.

New knowledge and the effects on society and communities

The principal new knowledge generated by this study is an empirically validated causal model of the professional key competencies of higher vocational students in China, in which personal factorspersonal cognition, learning motivation, and self-efficacy serve as the central mediator that transmits the influence of family, school, and social factors. Whereas previous research has tended to examine these influences separately, this study demonstrates that they operate largely indirectly, becoming effective only after they are internalised as students' own

Copyright © 2026 Community and Social Development Journal
This is an open access article distributed under the terms of the CC BY 4.0 license.

motivation and beliefs. This reframes competency development as a process driven from the learner outward, and clarifies both the direct and the indirect pathways through which the surrounding environment shapes competence.

For society and communities, these findings carry several practical effects. At the level of the wider society, they provide policymakers with evidence that raising the quality of vocational graduates depends not only on curricula and funding but also on cultivating learners' motivation and self-efficacy and on improving public attitudes toward vocational education; policy that strengthens these mediating conditions is therefore likely to yield a more capable workforce and better person-job matching in the labour market. At the community and institutional level, vocational colleges and employers can use the model to target their efforts more efficiently through mentoring, career guidance, work-based learning, and school–industry collaboration that build students' confidence and self-direction rather than transmitting technical content alone. At the level of families, the results affirm the value of parental encouragement and a supportive home environment in shaping career aspirations, giving families a concrete role in their children's competency development. Collectively, the model offers an evidence-based foundation that students, families, educators, and policymakers in China's vocational education communities can apply to improve graduate employability and, in turn, local economic and social development.

Acknowledgments

The authors would like to express their sincere gratitude to the International Institute of Educational Management, Southeast Asia University, and to the Faculty of Education Administration for their academic support throughout this research. The authors are also grateful to the five experts who reviewed the research instrument for their valuable suggestions, and to the administrators of the participating higher vocational institutions for facilitating data collection.

References

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice-Hall.

Bandura, A. (1998). *Exploration of self-efficacy: The exercise of control*. W. H. Freeman.

Baartman, L. K. J., & de Bruijn, E. (2011). Integrating knowledge, skills, and attitudes: Conceptualising learning processes towards vocational competence. *Educational Research Review*, *6*(2), 125-134. https://doi.org/10.1016/j.edurev.2011.03.001

Biggs, J., & Tang, C. (2011). *Teaching for quality learning at university: What the student does.* McGraw-Hill Education.

Billett, S. (2011). *Vocational education: Purposes, traditions, and prospects*. Springer.

Binkley, M., Erstad, O., Herman, J., Raizen, S., Ripley, M., Miller-Ricci, M. et al. (2012). Defining Twenty-First Century Skills. In *Assessment and Teaching of 21st Century Skills.* Dordrecht: Springer.

Boud, D., & Solomon, N. (2001). *Work-based learning: A new higher education? McGraw-Hill Education.* Buckingham: SRHE and Open University Press.

Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design.* Harvard University Press.

Copyright © 2026 Community and Social Development Journal
This is an open access article distributed under the terms of the CC BY 4.0 license.

Bronfenbrenner, U., & Morris, P. A. (2006). The bioecological model of human development. *Handbook of Child Psychology,* 1, 793-828. https://doi.org/10.1002/9780470147658.chpsy0114

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*(4), 227-268. https://doi.org/10.1207/S15327965PLI1104_01

Dietrich, J., & Kracke, B. (2009). Career-Specific Parental Behaviors in Adolescents' Development. *Journal of Vocational Behavior, 75*(2)*,* 109-119. https://doi.org/10.1016/j.jvb.2009.03.005

Eccles, J. S. (1999). The development of children ages 6 to 14. T*he Future of Children, 9*(2), 30-44. https://pubmed.ncbi.nlm.nih.gov/10646256/

Eccles, J. (2009). Who Am I and What Am I Going to Do with My Life? Personal and Collective Identities as Motivators of Action. *Educational Psychologist, 44,* 78-89. https://doi.org/10.1080/00461520902832368

Fan, W., & Chen, M. (2001). Parental involvement and students' academic achievement: A meta-analysis. *Educational Psychology Review, 13*, 1-22. https://doi.org/10.1023/A:1009048817385

Garg, R., Kauppi, C., Lewko, J., & Urajnik, D. (2002). A structural model of educational aspirations. *Journal of Career Development, 29*(2), 87-108. https://doi.org/10.1177/089484530202900202

Greenhaus, J. H., Callanan, G. A., & Godshalk, V. M. (2010). *Career management.* Sage Publications.

Hanushek, E. A., Schwerdt, G., Woessmann, L., & Zhang, L. (2017). General education, vocational education, and labor-market outcomes over the lifecycle. *The Journal of Human Resources, 52*(1), 48-87. https://doi.org/10.3368/jhr.52.1.0415-7074R

Heckman, J. J. (2006). Skill formation and the economics of investing in disadvantaged children. *Science, 312*(5782), 1900-1902. https://doi.org/10.1126/science.1128898

Lent, R. W., Brown, S. D., & Hackett, G. (1994). Toward a unifying social cognitive theory of career and academic interest, choice, and performance. *Journal of Vocational Behavior, 45*(1), 79-122. https://doi.org/10.1006/jvbe.1994.1027

Lent, R. W., Brown, S. D., & Hackett, G. (2000). Contextual supports and barriers to career choice: A social cognitive analysis. *Journal of Counseling Psychology, 47*(1), 36-49. https://doi.org/10.1037/0022-0167.47.1.36

Lent, R. W., Ezeofor, I., Morrison, M. A., Penn, L. T., & Ireland, G. W. (2019). Applying the social cognitive model of career self-management to career exploration and decision-making. *Journal of Vocational Behavior, 112*, 1-12. https://doi.org/10.1016/j.jvb.2019.03.005

Mulder, M. (2017). *Competence-based vocational and professional education: A global overview*. Springer International Publishing.

OECD. (2005). *The definition and selection of key competencies: Executive summary.* OECD Publishing.

OECD. (2018). *Future of education and skills 2030: The future we want.* OECD Publishing.

Powell, J. J., & Solga, H. (2011). Why are higher education participation rates in Germany so low? Institutional barriers to higher education expansion. *Journal of Education and work, 24*(1), 49-68. https://doi.org/10.1080/13639080.2010.534445

Rychen, D. S., & Salganik, L. H. (2003*). Key Competencies for a Successful Life and Well-Functioning Society*. Hogrefe & Huber, Gottingen.

Savickas, M. L. (2002). Career Construction. In D. Brown (Ed.), *Career Choice and Development* (Vol. 149, p. 205). Jossey-Bass.

Copyright © 2026 Community and Social Development Journal
This is an open access article distributed under the terms of the CC BY 4.0 license.

Schunk, D. H., & DiBenedetto, M. K. (2021). Self-Efficacy and Human Motivation. *Advances in Motivation Science*, *8*, 153-179. https://doi.org/10.1016/bs.adms.2020.10.001

Siraj, I., & Huang, R. (2020). Operationalizing Bronfenbrenner's PPCT model in researching human development: Commentary on Xia, Li and Tudge. *Human Development, 64*(1), 21–25. https://doi.org/10.1159/000508341

Super, D. E. (1953). A theory of vocational development. *American Psychologist, 8*(5), 185-190. https://doi.org/10.1037/H0056046

Super, D. E. (1980). A Life-Span, Life-Space Approach to Career Development. *Journal of Vocational Behavior, 16,* 282-298. https://doi.org/10.1016/0001-8791(80)90056-1

Trowler, V. (2010). *Students Engagement Literature Review*. The Higher Education Academy.

Tudge, J. R., Mokrova, I., Hatfield, B. E., & Karnik, R. B. (2009). Uses and misuses of Bronfenbrenner's bioecological theory of human development. *Journal of Family Theory & Review, 1*(4), 198-210. https://doi.org/10.1111/j.1756-2589.2009.00026.x

Tynjala, P. (2008). Perspectives into Learning at the Workplace. *Educational Research Review, 3*, 130-154. https://doi.org/10.1016/j.edurev.2007.12.001

Voogt, J., & Roblin, N. P. (2012). A Comparative Analysis of International Frameworks for 21st Century Competences: Implications for National Curriculum Policies. *Journal of Curriculum Studies, 44*(3), 299-321. https://doi.org/10.1080/00220272.2012.668938

Wang, M. T., & Eccles, J. S. (2013). School Context, Achievement Motivation, and Academic Engagement: A Longitudinal Study of School Engagement Using a Multidimensional Perspective. *Learning and Instruction, 28*, 12-23. https://doi.org/10.1016/j.learninstruc.2013.04.002

Zimmerman, B. J. (2000). *Attaining Self-Regulation: A Social Cognitive Perspective*. San Diego, CA: Academic Press.

Copyright © 2026 Community and Social Development Journal
This is an open access article distributed under the terms of the CC BY 4.0 license.