Factors Influencing Guangzhou Vocational College Education on Teachers' Professional Competence under the Information and Communication Technology

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Abstract

Professional competence in providing student learning is an essential prerequisite for success in school and beyond. Teachers play a crucial role in students' development by providing knowledge and skills. When focusing on teachers' professional competencies in student learning, their experiences as self-regulated learners and their competencies as agents of teaching-learning are essential. Given that teachers play a crucial role in supporting students' development, there is a need to understand better which particular competencies teachers support in teaching instruction in classes and, following this, students' development of skill and training learning. The number of respondents for this study was 393 Guangzhou vocational college teachers. The results of this study show that teachers' professional competence in student career development would be impacted by their professional identity, organizational identity, and learning strategy through Information and Communication Technology.
Keywords: *Vocational College Education, Teachers' Professional Competence, Information and Communication Technology*

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INTRODUCTION

China's Ministry of Industry and Information Technology (2022) projected a significant shortage of skilled workers in critical manufacturing by 2025. This demand for skilled workers is coming as economic transformation and industrial upgrading require higher quality vocational education and training students. Therefore, it has become imperative to cultivate highly trained technical workers with comprehensive professional competence. China's schooling model relies heavily on vocational colleges and schools; Professional course teachers play a critical role in determining the quality of technical and skilled workers (Zhang & Zhao., 2016). Therefore, it is crucial to have a comprehensive understanding of the level of development and factors that influence the teachers' professional competence in VCS professional courses, as well as having reliable and valid tools to assess vocational education and training (VET) teachers' professional competence. Using scientifically sound methods in educational statistics and psychometrics is essential for accurately measuring vocational competence and professional identity (Zhang et al., 2022). One such tool is the Competence Measurement (COMET). This project uses a rigorous psycho-diagnostic method to diagnose vocational education students' professional competence development and commitment across international settings (Zhao & Huang., 2019). These assessments of teacher professional competence can be the key to training the required number of skilled workers for the manufacturing sector, especially in the new technology era. Achieving

sustainable economic development relies on cultivating a talent pool of technical workers with comprehensive professional competence.

This study aims to investigate the professional competence of teachers in vocational colleges and schools in light of Information and Communication Technology. The study has two main objectives:

1. To understand how teachers' professional identity, organizational identity, and learning strategy influence their professional competence during Information and Communication Technology..
2. To suggest practical solutions for vocational colleges and schools to improve their teachers' teaching and professional competence and thus develop a talent pool for the technological manufacturing job market.

To achieve these objectives, the study will examine the effect of three independent variables (teachers' professional identity, organizational identity, and learning strategy) on the dependent variable, teachers' professional competence.

THEORETICAL FOUNDATION

Competence Motivation Theory

Competence motivation theory emphasizes that individuals are inclined to engage in activities that help them develop or demonstrate their skills (Sapta et al., 2022). Whenever someone successfully performs a challenging task and receives praise from their family or peers, they begin to believe in their competence in that specific achievement field, be it physical, cognitive, or social. This belief in their ability to control their performance in that domain fills them with a sense of pride and happiness, which, in turn, maintains or increases their motivation to improve their skills further. Successful employees who attempt new tasks or skills and receive positive reinforcement develop a self-reward system and mastery goals (Berliana., 2018). Such a system can positively impact their confidence in the long run. People who perceive themselves as highly competent in one area are likelier to put in more effort and persist with challenging tasks. Individuals with higher self-worth and self-esteem are more likely to experience positive impacts in various areas of their lives, including employment relationships (Esthi et al., 2020). Therefore, competence motivation theory plays a vital role in shaping individuals' behavior, attitudes, and success in various aspects of life. According to competence motivation theory, people tend to gravitate towards activities in which they feel competent. In other words, individuals are more inclined to engage in tasks they believe they can perform well. This theory is especially relevant in physical activity, where people may feel intimidated or discouraged if they perceive themselves as lacking physical ability. Therefore, creating an environment enhances people's beliefs in their physical capabilities and motivates them to participate in physical activity and strive for better performance (Badrianto & Ekhsan., 2019). Providing an environment that fosters competence makes people more likely to engage in different activities that can positively impact their mentality and well-being.

Career Motivation Theory

Career motivation is a crucial concept that highlights the importance of individual differences in shaping one's career resilience, identity, and perspective. This idea was first introduced by London (1983) and provides a framework to help us understand how situational factors impact career decisions and behaviors. Career motivation is a multifaceted construct that is internal to the person and is influenced by their situation, including their personality, values, interests, and experiences. It is reflected in the individual's choices and actions related to their job or profession (Eliyana & Ma'arif., 2019). Several variables associated with career motivation are

grouped into domains encompassing various dimensions. These dimensions include the individual's goals, self-efficacy, perceived barriers, and support systems. Each trait linked to career motivation corresponds to situational characteristics and a career decision or behavior, such as job satisfaction, career advancement, or work-life balance (Arkhipova et al., 2019). By utilizing motivation theories, management teams can determine the most effective way to achieve business objectives and work towards desired outcomes. For instance, managers can tailor their approaches to enhance engagement, productivity, and retention by understanding the different motivational factors that drive their employees. Motivation theories can also help managers support employees more efficiently, improving workplace morale, productivity, and profits (Purnomo et al., 2020). Ultimately, a better understanding of career motivation can benefit both individuals and organizations in achieving their goals and promoting career development.

Cognitive Learning Theory

Cognitive learning theories propose that learners acquire knowledge best when actively engaging in problem-solving activities. This approach emphasizes thinking skills over memorization. It promotes active learning over passive learning (Ikromovna., 2022). Active learning involves students in meaningful tasks requiring them to apply their thinking skills, while passive learning involves simply memorizing information. Cognitive learning enables students to acquire knowledge actively, allowing them to maximize their mental ability. It consists of using cognitive strategies that make it easier for students to connect new information with existing knowledge, thus enhancing their retention and memory capacity (Zhoc et al., 2019). By adopting a 'thinking approach' to learning, students can promote their cognitive development and learn to use their brains more effectively. Cognitive learning entails the students' active and constructive involvement in educational practices, leading to long-lasting engagement in the learning process and improved thinking, learning, and memory abilities (Loes & Pascarella., 2015). This approach does not involve repetition or memorization but instead focuses on meaningful learning, how to learn, and creating proper understanding.

Terms

1. Professional competence in social work is a multifaceted concept encompassing knowledge, skills, and values. It involves integrating these three components and is evident in the performance of complex practice behaviors that emanate from critical thinking and intentional use of self in practice (Barrick., 2019). The knowledge required for social work practice continuously evolves, necessitating lifelong learning to maintain continuing competency. This can be supported through clinical supervision, formal and informal continuing education, and ongoing professional development (Dudung., 2018). The Professional Competence Knowledge Hub aims to improve social work practice by enhancing teaching and professional development. This study will focus on developing teachers' professional competencies through new technology, crucial to training student talents for their career development. By promoting excellence in teaching and professional development, the Professional Competence Knowledge Hub seeks to ensure that social workers have the necessary skills and knowledge to provide high-quality services to those they serve (Guzanov et al., 2016).

2. Professional Identity is a crucial aspect of an individual's professional journey. It refers to the degree to which individuals identify themselves as members of a particular profession and their sense of oneness with that profession (Tomer & Mishra., 2015). For instance, a person who identifies as an engineer has a strong sense of belonging to the engineering community. Professional identity formation involves aligning one's roles, responsibilities, values, and ethical standards with the practices accepted by their profession. This process is complex and challenging, as it requires balancing personal identity with professional identity. When

forming a professional identity, individuals must adhere to their profession's ethical standards and adopt their community's values and practices (Goltz & Smith., 2014). This not only helps them develop a sense of belonging but also provides them with a clear understanding of the expectations of their profession, a critical factor in their professional success. Professional identity is essential to an individual's professional development and contributes to success in their chosen field. It helps individuals establish their place in the professional community and fosters a sense of pride and commitment to their profession (Porter & Wilton., 2019).

3. Organizational identity is a crucial aspect of any organization. It refers to a set of statements that members perceive as central, distinctive, and long-lasting. These statements help define the organization's unique character, values, and overall identity (Wang & Lin., 2019). Organizational identity plays a significant role in shaping the behavior of both leaders and members in various aspects of an organization, such as decision-making, communication, and culture. This article reviews current theoretical and empirical literature to better understand the relationship between organizational identity, organizational development, and change (Kim & Beehr., 2018). Integrating several research directions aims to provide a more comprehensive view of this relationship. The article also discusses possible implications and directions for developing teacher professional competence in vocational college education under the Information and Communication Technology for Talent Establishment (Zhang et al., 2019). Overall, understanding organizational identity is crucial for the success of any organization. It helps leaders and members align their behaviors with their values and goals, leading to better decision-making and a more robust organizational culture.

4. Learning strategies are methods and techniques that students use to improve acquiring and retaining knowledge and course concepts (Zhao & Wu., 2022). The ultimate goal of these strategies is to enable students to retrieve this information from memory and apply it effectively. Learning strategies encompass a range of skills students use to comprehend various tasks. Choosing the appropriate technique to complete assignments or meet specific learning objectives is facilitated by doing so. These strategies can include memory improvement techniques, better study habits, or effective test-taking strategies. In conclusion, learning strategies will be crucial for students preparing for career development as they strive to match the demand for skilled professionals in the job market (Deng et al., 2022).

HYPOTHESIS

The Impact of Professional Identity on Professional Competence

Professional competence refers to a teacher's ability to effectively manage the teaching and learning process. This involves solid classroom management skills, subject matter expertise, teaching strategies, and using various teaching media to facilitate learning (Wang & Du., 2014). These skills are highly technical and directly impact a teacher's overall performance. Additionally, a competent teacher should be able to create innovative teaching materials that provide students with a more comprehensive understanding of the subject matter. They should also be able to engage in reflective practice, continuously developing their professional skills (Ahonen et al., 2014). Lastly, utilizing Information and Communication Technology (ICT) in teaching and self-development is crucial, as it enables teachers to guide their students towards achieving the competency standards required for job market development, as set out in the National Education Standards.

H1. Professional identity does not significantly impact teachers' professional competence under Information and Communication Technology.

The Impact of Organizational Identity on Professional Competence

Teachers possess a professional identity encompassing the individual and professional values, beliefs, and cultural experiences they have amassed from their childhood and daily lives (Zhang et al., 2016). By reflecting on these experiences, teachers can gain a deeper understanding of themselves, which in turn helps them comprehend others with greater empathy and understanding. Schools often adopt new approaches and innovations to meet increased accountability measures and evaluation systems. These changes require teachers to assume novel roles and responsibilities, acquire new knowledge and skills, and reconfigure their relationships with peers and administrators (Crocetti et al., 2014). By embracing these changes, teachers can develop their professional identity and uphold their commitment to providing quality education to their students.

H2. Organizational identity does not significantly impact teachers' professional competence under Information and Communication Technology.

The Impact of Learning Strategy on Professional Competence

An adept teacher is an excellent communicator who interacts effectively with students, colleagues, and parents (Arlen et al., 2020). They understand that communication is vital in education and use it to their advantage while developing learning plans and strategies. A competent teacher has the skill to listen actively and speak articulately, and they know how to use these skills appropriately. They can build strong relationships with their students by using their communication abilities, which helps create a positive learning environment (Hattie et al., 2020). Additionally, teachers can effectively use information and communication technology to enhance and promote their teaching methods and improve the learning experience for their students in adopting the job market.

H3. Learning strategy does not significantly impact teachers' professional competence under Information and Communication Technology.

CONCEPTUAL FRAMEWORK

Learning strategy research has shown that effective learning often involves using multiple strategies. In this study, a learning strategy refers to the specific behaviors and actions of Vocational and College teachers to improve their individual and organizational competence in workplace learning (Canrinus et al., 2019). For these teachers, gaining practical knowledge is closely tied to actual work experience, and the support provided by schools and companies is essential in selecting and using learning strategies to improve their professional and organizational identities (Zhang & Zhao., 2018). Professional competence strategies are a practical process that helps teachers achieve a cognitive goal, and they are crucial to problem- solving skills and technical focus, which are the driving forces behind developing professional competence (Lee et al., 2015). Developing problem-solving skills is the original motivation for professional competence development through lifelong learning.
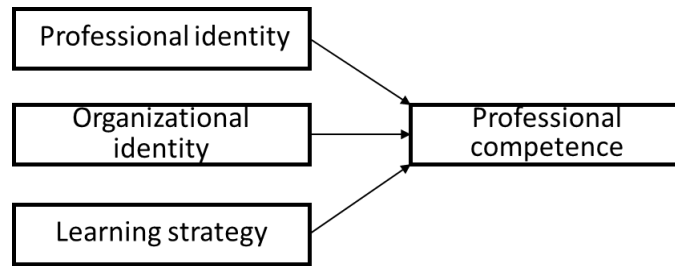
Figure 1. The Conceptual Framework

RESEARCH METHODS

Population and Sample

The research focused on a group of teachers from Guangzhou, China. Their main objective was to improve their professional competence in Information and Communication Technology through learning and identity development. For this study, a sample of 393 teachers was randomly selected from Guizhou in February 2024 and analyzed using the WeChat Survey Platform.

The minimum research sample size for this study was determined using a widely accepted formula for analysis (Etikan & Babatope, 2019).

- The margin of error (confidence interval) – 95%
- Standard deviation 0.5
- 95% - Z Score = 1.96
- $(1.96)^2$ x 0.5(0.5) / $(0.05)^2$
- (3.8416 x 0.25) / 0.0025
- 0.9604 / 0.0025 = 384.16
- 384 respondents would be needed for this study based on a confidence level of 95%

Correlation Analysis

Correlation analysis is commonly used to investigate the degree of correlation between variables. The Pearson correlation coefficient is used to test the correlation. The value of the correlation coefficient, denoted as r, indicates the strength of the correlation between variables, while the P-value indicates the correlation's significance level.

Table 1. Correlation Coefficient Classification

Correlation coefficient r	Degree of relevance
$|r| = 1$	Totally correlated
$0.70 \leq |r| < 0.99$	Highly correlated
$0.40 \leq |r| < 0.69$	Moderately correlated
$0.10 \leq |r| < 0.39$	Low correlation
$|r| < 0.10$	Weak or unrelated

Regression Analysis

Regression analysis is a powerful statistical technique used to explore and analyze the relationship between multiple independent variables of a hypothesis and a set of dependent variables. It is a widely used method to identify and study the correlation between two or more variables and understand the strength of their relationship. Regression analysis is essential in many fields, including economics, social sciences, healthcare, and engineering. The technique helps to

measure the strength of the relationship between variables and predict future relationships between them. It is done by creating a mathematical model that best fits the data, and this model is used to estimate the values of the dependent variable based on the given values of the independent variables. Regression analysis provides valuable insights into the cause-and-effect relationships between variables, which can help make informed decisions. This study used SPSS 23.0, a popular statistical software program, to perform various statistical tests, including the correlation coefficient of determination and multiple linear regression. These tests were used to investigate the study's hypotheses and provide meaningful insights into the relationships between the variables under consideration.

RESULT AND DISCUSSION

Correlation Analysis of of Professional Identity and Professional Competence

The correlation coefficient r between professional identity and professional competency is 0.883, and P=0.003 is less than 0.01. Thus, it shows that professional identity is significantly correlated with professional competency.

Table 2. Correlation Analysis Results Between Professional Identity And Professional Competence

	Professional Identity
Professional Competence Sig. (1-tailed)	1
Professional Identity Sig. (2-tailed)	.883** (.003)

Correlation Analysis of Organizational Identity and Professional Competence

The correlation coefficient r between organizational identity and professional competence is 0.846, and P=0.005 is less than 0.01. Thus, it shows that professional identity is significantly correlated with professional competency.

Table 3. Correlation Analysis Results Between Organizational Identity And Professional Competence

	Occupational environment
Professional Competence Sig. (1-tailed)	1
Professional Identity Sig. (2-tailed)	.846* (.005)

Correlation Analysis of Employee Motivation and Job Performance

The correlation coefficient r between learning strategy and professional competency is 0.813, and P=0.002 is less than 0.01. Thus, it shows that learning strategy is significantly correlated with professional competency.

Table 4. Correlation Analysis Results Between Learning Strategy And Professional Competency

	Learning Strategy
Professional Competency Sig. (1-tailed)	1
Professional Strategy Sig. (2-tailed)	.813* (.002)

Regression Analysis of Various Variables on Professional Competency

The summary of the statistical model is as follows: the correlation coefficient R is 0.929, the coefficient of determination R^2 is 0.932, and the adjusted R^2 is 0.947. This indicates that the model can explain 94.7% of the degree of association between professional identity, organizational identity, learning strategy, and professional competence. Additionally, the Durbin-Watson test resulted in 2.115, approximately equal to 2, indicating no serial correlation problem and the residuals are independent.

Table 5. Summary of the regression analysis model of constructs and professional competency

Model	R	R ^{2}	Adjust R Square	Standard estimate error	Durbin-Watson
1	0.929a	0.932	0.947	0.88934	2.115

The results of the single-factor analysis indicate significant differences between the independent and dependent variables. This means a considerable effect exists between professional identity, organizational identity, learning strategy, and professional competence. The regression sum of squares is 5198.235, indicating that the independent variable explains the dependent variable's variation. The residual sum is 266.311, indicating the unexplained variation of the dependent variable. Additionally, the significance value of 0.000 is less than the significance level of 0.01, further supporting the significant differences in the study.

Table 6. ANOVA

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5198.235	3	3892.312	6112.247**	.000c
	Residual	266.311	389	.668		
	Total	5464.546d	392			

** $p \leq .01$

a. Dependent variable: Professional competency
b. Predictor variables: professional identity, organizational identity, and learning strategy

Table 7. Multiple Linear Regression Analysis Test

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	3.228	1.226		3.442	.015

Professional identity	.512*	.021	.548	2.115	.020
Organizational identity	.225*	.017	.247	1.368	.013
Learning strategy	.463*	.029	.475	3.693	.018

*p≤0.05
a. Dependent Variable: Professional competency
b. Predictor variables: Professional identity, organizational identity, and learning strategy

The regression equation of the multiple linear regression analysis

$$Y = \alpha + \beta X1 + \beta X2 + \beta X3 + e$$

$$Y = 3.228 + 0.512\ X1 + 0.225\ X2 + 0.463\ X3$$

Description:
Y = Professional competency
α = Constant
X1 = Professional identity
X2 = Organizational identity
X3 = Learning strategy
e = Error
β1 = First Regression Coefficient Number
β2 = Second Regression Coefficient Number
β3 = Third Regression Coefficient Number

After adding constants to the inequality, the coefficient table shows professional identity, organizational identity, learning strategy, and professional competence. These levels are significantly influenced.

Interpretation of Research Results
Vocational colleges and schoolteachers play a crucial role in enhancing the professional competence of vocational students by improving their professional training and development through the use of Information and Community Technology. The relationship between the independent variables of professional identity, organizational identity, and learning strategy and the dependent variable of professional competence is a mechanism teachers use to improve their students' job market prospects.

The Effect of Professional Identity on Professional Competence
The result of testing the first hypothesis indicates that professional identity significantly impacts the professional competency of vocational college teachers learning supports and attitudes based on the standard regression coefficient of the professional identity is 0.512, t=2.115, and the significance level is 0.02<0.05. It shows that professional identity significantly impacts professional competence.

H1. Professional identity significantly impacts teachers' professional competence under Information and Communication Technology.

The Effect of Organizational Identity on Professional Competence
The result of testing the second hypothesis indicates that organizational identity significantly impacts the professional competency of vocational college teachers learning supports and attitudes based on the standard regression coefficient of emotional level is 0.225, t=1.368, and the significance

level is 0.013<0.05. It shows that organizational identity significantly impacts professional competence.

H2. Organizational identity significantly impacts teachers' professional competence under Information and Communication Technology.

The Effect of Learning Strategy on Professional Competence

The result of testing the third hypothesis indicates that learning strategy significantly impacts the professional competency of vocational college teachers learning supports and attitudes based on the standard regression coefficient of learning strategy is 0.463, t=3.693, and the significance level is 0.018<0.05. It shows that the learning strategy significantly impacts professional competence.

H3. Learning strategy significantly impacts teachers' professional competence under Information and Communication Technology.

CONCLUSSION

The research study found that professional identity, organizational identity, and learning strategy significantly impact the professional competence of teachers at Guangzhou Vocational Colleges in China. This competence is essential when providing students with training to prepare them for the job market using Information and Communication Technology. The study results indicated that all three variables were crucial in developing professional competence among teachers at Guangzhou Vocational Colleges. The research findings provide valuable insights to enhance the professional competence of vocational education and training (VET) teachers. The study suggests specific measures schools can take to support their VET teachers' development. Firstly, VET teachers should be motivated to participate in high-level skill competitions, which can be facilitated using Information and Communication Technology. The competition can allow teachers to showcase their skills and learn new techniques from other skilled professionals. Secondly, schools should encourage teachers to obtain advanced professional qualifications related to their specialties, which align with the current job market needs. This will help teachers stay updated with the latest trends and technology in their respective fields and become better equipped to teach their students. Thirdly, teachers responsible for introductory courses should improve their practical professional competence through training support. Teachers studying enterprise-related subjects should be able to participate significantly in enterprises' production and operation processes to support students' practical training and learning. Lastly, schools should consider increasing their support for teachers' professional and technical competencies. For example, schools can recommend that teachers participate in internships and training in enterprises, which can provide valuable hands-on experience. It is also vital for schools to pay attention to the teachers' organizational identification levels, which can impact their job satisfaction, performance, and retention. Implementing these measures can help schools enhance their VET teachers' professional competence, improving student outcomes.

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