Development of a Dual Professional Identities Scale for Chinese Vocational Teachers and Analysis of Its Mediating Effect Between Education/Entry Routes and Resilience

By

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Statement of Originality

I, PAN, Jia Jia, hereby declare that I am the sole author of the thesis and the material presented in this thesis is my original work except those indicated in the acknowledgement. I further declare that I have followed the University's policies and regulations on Academic Honesty, Copyright and Plagiarism in writing the thesis and no material in this thesis has been submitted for a degree in this or other universities.

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Abstract

This study examines the professional identity of vocational teachers in China's collaborative "Dual Model" teaching system, co-developed by schools and enterprises. The Chinese Ministry of Education's emphasis on "dual-qualified" teachers highlights the importance of this model, where teachers work in both school and industry settings, promoting a "Dual Identities" mechanism for professional growth. The research aimed to create a scale to measure the Dual Professional Identities of Chinese vocational teachers, resulting in a 36-item scale with four dimensions: Role Recognition, Professional Efficacy, Community Cohesion, and Work Engagement. The study also explored factors influencing Dual Professional Identity and its impact on teacher development, revealing that both Instructional and Occupational Identities positively affect Resilience, while Entry routes negatively influence Instructional Identity. Instructional Identity further acts as a mediator between Entry and Resilience. However, despite being an important variable in this study, the research findings indicate that Education does not have a significant impact on Dual Professional Identities or on Resilience. The study underscores the unique nature of vocational teachers' work and the need for tailored measurement scales, particularly considering their Trans-Professional Identity. It aligns with the Chinese government's strategy for developing "dual-qualified" teachers and provides insights for enhancing vocational education in China.

Keywords: Vocational Education, Dual Professional Identities, Instructional Identity, Occupational Identity, Education, Entry Routes, Resilience

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List of Abbreviations

AGFI	Adjusted Goodness of Fit Index
AR	Augmented Reality
Avg. Diff.	Average Difference;
BRS	The Brief Resilience Scale
CC	Community Cohesion
CO	Career Commitment
CCPCC	Chinese People's Political Consultative Conference
CDA	Cross-Disciplinary Attitude
CD-RISC	Connor-Davidson Resilience Scale
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index,
CI	Confidence Interval.
CoP	Community of Practice
df	Degree of Freedom;
DIA	Dual Identity Achievement
DIS	Dual Identity Scale
DISI-O	The Dallas Identity Status Inventory - Occupation
DPI	Dual Professional Identities
DPI-VT	Dual Professional Identity of Vocational Teacher Scale
EFA	Exploratory Factor Analysis
GFI	Goodness of Fit Index,
IFI	Incremental Fit Index
FE	Further Education
II	Instructional Identity
KMO	Kaiser-Meyer-Olkin
KPI	Key Performance Indicators
M	Mean
MOE	Ministry of Education of China
MOF	Ministry of Finance of China

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MR	Mixed Reality
KSAO	Knowledge, Skills, Attitudes, And Other characteristics Analysis
NPC	National People's Congress
IPB	Interprofessional Belonging
ITBs	Indirect Teaching Behaviors
LL	Lower Limit
OI	Occupational Identity
PB	Professional Belonging
PCA	Principal Component Analysis
PCFI	Partial Least Squares Path Modeling for Confirmatory Factor Analysis
PE	Professional Expertise
PGFI	Parsimony Goodness of Fit Index,
PNFI	Parsimony Normed Fit Index,
R&D	Research and Development
RMR	Resting Metabolic Rate,
RMSEA	Root Mean Square Error of Approximation,
RR	Role Recognition
SD	Standard Deviation
SE Diff.	Standard Error of the Difference;
Sig.	Significance;
Sig. (2-tailed)	Significance (Two-Tailed);
TLI	Tucker-Lewis Index,
UK	United Kingdom
UL	Upper Limit;
VA	Value Adherence
VR	Virtual Reality
WE	Work engagement

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Chapter 1: Introduction

Chapter Overview

Since 1978, China's vocational education system has grown extensively, with 7,294 secondary vocational schools and 1,486 higher vocational colleges nationwide in 2021 (The Chinese Vocational Education Society, 2022), accommodating millions of students and teachers. Vocational education is pivotal to China's economic and social development, with the teaching force being a key factor (MOE, 2022). Since 1995, the development of "Dual-Qualified-Teachers" (Shuang-shi) has been a policy focus, with various definitions evolving over time, including "Dual Expertise," "Dual Professions," "Dual Professionalism," "Dual Titles," and "Dual Certificates" (MOE, various years).

The "Shuang-shi" policy aims to enhance vocational training quality by requiring teachers to play dual roles as school teachers and trade workers, bridging the gap between theory and practice (MOE, 2022). This initiative has been crucial in ensuring students acquire relevant skills for the modern workforce. Research shows that professional identity formation enhances work performance and responsibility (Fergusson et al., 2020), and Dual Professional Identities are a strength for vocational teachers and institutions (Robson, 1998).

This study delineates and develops a scale to assess the Dual Professional Identities of vocational teachers within the framework of school-enterprise cooperation. It investigates the factors that influence their formation, offering insights and recommendations for the management of vocational teachers. Additionally, the study endeavors to delve into deeper issues within vocational education, identifying the underlying causes that impact Dual Professional Identities in teacher management practices, as well as examining the

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ramifications of Dual Professional Identities on teachers' psychological Resilience.

This chapter analyzes the political, social, and institutional drivers behind vocational teachers' pursuit of "Dual-qualified" status, setting the stage for our research. We then highlight the research's significance, showing the knowledge gaps and critical research blanks. Next, it formulates essential research questions to guide our inquiry and ensure focus on key issues. The meticulously designed research plan outlines methodologies, data sources, and analytical frameworks, ensuring reliable and replicable findings. Finally, it provides a structural overview of the paper, detailing chapter organization for a seamless reading experience and guiding readers through our research on the "Dual-qualified" status of vocational teachers.

Research Background

The Chinese "Dual-qualified Teacher" Policy Analysis

The Evolutionary Journey of the "Shuang-shi" concept in China: 1995-2022. The concept of "Shuang-Shi" (Dual-qualified) teachers came from the fundamental dilemma of vocational education during its early development period. Vocational instructors are required to possess teaching and operating (a professional task) capabilities to engage instructional outcome in vocational institutions. "Teaching" refers to pedagogical and didactic expertise that transfers theoretical knowledge and skills to students. "Operating" refers to occupational expertise that performs a technical skill and closely connects with the trade (Callan 2005). The "Dual-quality" is meaningful to vocational teachers because it is no longer an addition of skills but a "Gate" (Robson, 1998) that marks vocational teachers as members of a specific

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group of professions. From 1999 to 2022, the development of the "Shuang-Shi" concept has gone through five stages:

The concept of "Shuang-shi" teachers was stated in national policy for the first time in 1995. In *The Notice of the Ministry of Education on the Mission of Building Model Vocational Universities* (MOE, 1995). it was stated that if the vocational institution wished to be qualified as a “Model vocational university" (which would lead to access to more educational resources and a prestigious reputation), 1/3 of its teaching force should match the "Shuang-shi" requirement. However, the notion of "Shuang-Shi" was not identified until 1997 and 1998, when two governmental documents: *"The Opinions of the Ministry of Education on the Establishment of higher vocational institutions"* (MOE, 1997) and *" The Principles for deepening teaching reform in vocational education for the 21st century"* (MOE, 1998) have stated that the “Dual-Quality” referred to the “Dual Abilities”, including vocational teachers’ classroom teaching ability and their occupational skill practicing ability.

The second stage of "Shuang-Shi" consists of the refinement and evolution of the concept. Some new complements, such as “Dual Status” and “Dual Professional Title” have been added to the concept. In 1999, “*The Decision of the State Council of the Central Committee of the Communist Party of China on Deepening Education Reform and Comprehensively Promoting Quality Education”* (The State Council, 1999) proposed that teachers in vocational colleges should have the "Dual Professional Status", referring to the qualification of being both schoolteachers and occupational workers. In 2000, the Ministry of Education's *“Opinions on strengthening the training of talents in higher education”* (MOE, 2000) further clarified the "Dual Professional Status" as simultaneously being a schoolteacher

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and another profession (Engineer, mechanist, cook, hairdresser, Etc.).

In 2002, the *Opinions of the General Office of the Ministry of Education on Strengthening the Teacher Training Team in Higher Vocational (and Vocational High School) Institutions* pointed out that "Shuang-Shi Style" teachers should acquire "Dual Expertise", i.e., a solid theoretical foundation and strong technical application ability (MOE, 2002). At the same time, an incentive management system has been established to encourage vocational teachers' "Dual-Quality" development regarding job promotion and salary improvement. The policy also decided to strengthen vocational in-service training and recruit experienced technical or managerial personnel from enterprises to enhance the teaching force.

In 2004, the Ministry of Education and seven other departments issued the *"Opinions on Further Strengthening Vocational Education",* which further deepened the connotation of the "Dual Professionalism" requirement from the perspective of "Dual Certificates" which provided an evaluation system to assess the quality of being “Shuang-Shi Style” teacher. In the same year, *“The Assessment Scheme for the Level of Talent Cultivation Work of Higher Vocational Institutions (Trial Implementation)”* (MOE, 2004) proposed that "Shuang-Shi Style" teachers should have a "Dual Professional Titles", i.e., the title of lecturer (or above) and the title of intermediate (or above) technician, and other equivalent options. Since then, a series of policy documents, such as the *Decision of the State Council on the Development of Vocational Education*, has put forward the requirements for strengthening and broadening the "Dual Qualified" teaching force and refining the "Dual Qualified" status’ certification system.

Since 2010, the "Shuang-Shi" policy has entered a period of concretization. The government has launched multi-teacher training programs to support the development of

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teachers' "Shuang-Shi" competency. *"The Outline of the National Medium and Long-term Education Reform and Development Plan (2010-2020)"* (MOE, 2010) reconfirms that the concept of "Dual-qualified" refers to "Dual Certificates", including the professional qualification for being both schoolteachers and professional workers. The *Outline* also points out the path of building "Dual Professionalism" of vocational teachers by assisting vocational teachers in obtaining "Dual Certificates". It emphasizes the critical role of higher education institutions and large and medium-sized enterprises, which are expected to establish teacher training programs jointly.

In 2022, the Ministry of Education issued the *"Notice from the General Office of the Ministry of Education on Effectively Implementing the Recognition of "Dual-Qualified" Teachers in Vocational Education"* provided explicit criteria for the first time for the evaluation of "Dual-qualified" teachers (MOE, 2022). It states that "Dual-qualified" teachers should possess corresponding theoretical and practical teaching abilities, grasp advanced teaching concepts and methods, actively participate in teaching reforms and research, and be capable of effectively utilizing modern information technology in teaching. Meanwhile, they need to keep abreast of industrial development trends and industry talent demands, have relevant work experiences in enterprises or in-depth practical experiences in enterprises and production service frontlines, understand industrial development, industry demands, and changes in professional positions, and promptly integrate new technologies, new processes, and new standards into teaching. For teachers in secondary vocational schools and higher vocational colleges, applying for dual-qualified teachers at various levels requires meeting specific conditions, including requirements in teaching experience, teaching research ability,

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work experience in enterprises or practical experience, and professional skill levels. These conditions vary according to the different levels of dual-qualified teachers, namely junior, intermediate, and senior, but all emphasize the comprehensive qualities and abilities of teachers in teaching, research, and practice.

National-level Promotion of 'Shuang-shi' Teaching Force Development. Vocational teachers' in-service training takes place regularly every year, and it is funded by the government. The training consists of the refinement of instructional methods and the perfection of occupational skills. Teacher training institutions, model vocational institutions, and cooperated enterprises are involved in the national (Guo Pei) or provincial (Sheng Pei) training projects to provide training programs.

In 2016, the Ministry of Education and the Ministry of Finance issued *Opinions on the Implementation of the Teacher Quality Improvement Plan for Vocational Colleges and Universities (2017-2020)* (MOE & MOF, 2016). The two teacher quality improvement initiatives systematically plan for teacher training from 2011-2015 and 2017-2020, respectively, targeting "organizing 450,000 teachers in vocational institutions and colleges to participate in the in-service training program" and "five-year cycle of teacher training". It also specifies the rules of implementation, working mechanisms, and investment guidelines for the national training plan.

The latest governmental policy requires vocational teachers to have at least "three years" of working experience within the relative industry before becoming vocational teachers (CCPCC, 2018). Possessing three years of work experience in the industry and the work experiences that must be related to the major they teach is the facultative condition for

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being selected as participants.

All governmental policies on vocational teacher training aimed at improving the "Shuang-Shi" competency level. Various governmental measures have been set up to enhance the quality of the training plan. More specifically, the government has adopted a mechanism for evaluating and adjusting the work of teacher training institutions. The purpose is to strengthen the supervision of the training process and the quality of instructors, continuously monitor the quality of training, refine the anonymous online assessment and third-party assessment, strengthen post-training assessment, publish inspection results, Etc.

The continuous training enhances vocational teachers' classroom teaching and occupational practicing abilities. The governmental policies and funding ensure the establishment of the "Dual Certificates" or “Dual titles” acquisition by vocational teachers, which is necessary to fulfill their "Shuang-Shi" status assessment.

Problems Plaguing “Dual-Qualified Teacher” Development in Practice

While educational policies have provided institutional and financial support for the development of the "dual-qualified" teaching faculty, practical bottlenecks continue to be encountered in the process of policy implementation.

Robson (1998) stated that many professionals outside the education sector perceive the UK's FE (further education) teachers as an anomalous group with an ambivalent status and an unclear identity. A similar situation exists in China. The anomalous situation consists of the marginalization of the job perception of vocational teachers, the identity conflicts vis-a-vis the vocational students, and the ambiguity of their professional identity.

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The Marginalized Status of Vocational Education and Vocational Teachers. The marginalization of vocational teachers' social status is linked to the peripheral status of vocational education (Nan, 2008; Chai, 2008; Zhang, 2012; He, 2018). Long seen as a secondary component of the national education system, vocational education often caters to lower-performing students excluded from traditional "Elite Education." This stigma affects vocational teachers' sense of identity and respect. Coupled with lower incomes compared to general schoolteachers or industry professionals, and influenced by Chinese cultural prejudices against manual work, vocational teachers often find themselves marginalized.

Moreover, teaching in the 21st century is recognized as highly stressful (Benade, 2017), exacerbated by factors such as heavy workloads, deteriorating student behavior (Sturman et al., 2005), and mismanaged reforms (Hargreaves & Goodson, 1996; Helsby, 1999; Sachs, 2003; Bottery, 2005). In China, the vocational students are mostly characterized by their low performance in academic performance. The students’ academic deficiency in vocational institutions is generated by various complicated reasons, such as the lack of educational resources in remote villages, divorced families, low-income families, "left-behind" children, orphans, handicapped, Etc. These personal and social reasons reflect severe student problems, such as major depressive disorder, inferiority, weariness of learning, social phobia, violent tendencies, or even suicidal tendencies. Even in the absence of the aforementioned familial or physical/mental disabilities, students enrolled in vocational schools, owing to their failure to secure admission into regular high schools or undergraduate universities, are frequently perceived as those who have been filtered out by China's elite educational system. They are readily labeled by society as possessing "inferior learning

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abilities," thereby differentiating them from those students who can progress seamlessly from regular high schools to undergraduate institutions. These challenges can negatively impact teachers' job satisfaction.

In such marginalized environments, vocational teachers not only confront external challenges but also must address students' diverse learning needs and complex psychological states. Resilience becomes crucial for these teachers, enabling them to recover, adapt, and thrive amidst adversity. It affects their career development, mental health, teaching quality, and student potential stimulation.

Professional identity is a key factor in fostering resilience. It reflects teachers' intrinsic value recognition and emotional attachment to their profession, driving them forward during hard times. Teachers with strong professional identity find satisfaction and a sense of achievement in their work, which supports them when facing challenges. They possess enthusiasm and firm beliefs in education, recognizing their responsibilities and dedicating themselves to student growth. This identity fuels their inner resilience, perseverance, and willingness to explore solutions and enhance teaching skills.

Furthermore, a shared professional identity fosters unity and cooperation among teachers, creating a supportive team that addresses challenges together. This team spirit strengthens the overall resilience of the teacher group and cultivates a positive, upward, and healthy learning environment for students. Therefore, enhancing the professional identity of vocational teachers is vital for bolstering their resilience and improving educational quality.

The impact of the "degree-centric" mindset on teachers' identity and professional self-perception. Contradictorily, as employment competition intensifies, the

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recruitment criteria for vocational teachers have become increasingly demanding, with a particular emphasis on academic qualifications. Many vocational colleges and universities now explicitly stipulate high academic qualifications, such as master's degree of vocational high schools' teachers and doctoral degrees for higher vocational colleges teachers, as prerequisites during the recruitment process, utilizing them as the primary benchmarks for evaluating applicants.

Even more strikingly, within certain vocational colleges and universities, there exists a close correlation between teachers' academic qualifications and their entitlements. Teachers possessing higher academic qualifications often enjoy more generous salaries, superior benefits, and greater opportunities for career advancement, whereas those with lower qualifications may encounter unfair treatment in terms of compensation and significant constraints on their professional growth. This direct link between academic qualifications and entitlements undoubtedly perpetuates the prevalence of the "academic qualification-centric" mindset in the recruitment of vocational education teachers.

The proliferation of this "degree-centric" mindset has further fueled the phenomenon of academic discrimination. During the recruitment process, some vocational institutions employ unreasonable screening criteria based on applicants' alma maters and academic levels, effectively excluding those who are not from prestigious universities or do not hold high academic qualifications.

The consequence of this phenomenon is that vocational college teachers, due to their elite academic backgrounds, possess a different understanding of learning compared to their students. This disparity results in an identity conflict between them and their students. In such

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cases, if vocational teachers persist in asserting their identity as academic elites while communicating with their students, they are destined to erect communication barriers and foster distance, as they fail to integrate into the student community. The mismatch in social identity between vocational teachers and their students leads to confusion, frustration, and uncertainty regarding career prospects among the teachers.

Thus, in the practice, administrators often question the relationship between teachers' educational attainment and their professional identity: Does a higher level of education necessarily correlate with higher levels of Instructional and Occupational Identity?

The "Identity ambiguity" of Chinese Vocational Teachers related to different Entry Routes. Guided by the reform of 2019 and under the "Double-reduction" policy of general education initiated in 2020, half of the junior middle school students will follow the path of vocational and technical study by entering vocational high schools until higher vocational colleges or polytechnical universities. Furthermore, in 2021, the student-teacher ratio in vocational high schools was 18.86:1, whereas that in regular high schools was 12.84:1, representing a nearly 50% lower density compared to vocational schools (The Chinese Vocational Education Society, 2022). This indicates that there is a substantial need for an increase in the number of teachers in vocational colleges. Consequently, more vocational teachers are needed. In order to satisfy the growing need for a teaching force, teachers with different former experiences enter the sector of vocational education. Moreover, along with the expansion of vocational high schools and higher vocational colleges, the quality of vocational teachers has become the short board of vocational education.

Nowadays, Chinese full-time vocational teaching forces consist of teachers with four

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different backgrounds, including: 1) Teacher originating from a non-vocational institution; 2) Individual with experience in an industry pertinent to their major; 3) Individual with experience in industries unrelated to their major; 4) Graduate.

Teachers with the first two backgrounds are omnipresent within today's Chinese vocational education. Some vocational teachers hold an innate resistance to a particular environment because of their entry-route and former experiences. The deep roots in the former occupation leads to a laissez-faire attitude, which refers to the extreme bias in one's professional identity and exposure to one's actions and emotions in front of the students (Esmond, 2017). For example, much research provides evidence that former skilled workers may prioritize their former occupational identity over being a schoolteacher (Cantor & Roberts, 1972, p. 185; Robson, 1998; Esmond, 2017). Robson et al. l (2004, p. 187) furtherly found that most converted teachers prefer to use their former experiences as an endorsement to create prestige and status among students. The case in China is like that in West. Vocational teachers who are converted from general education or graduated from the university may tend to prioritize their identity as schoolteachers. Vocational teachers with previous working experience in the trade may prioritize their identity as skilled workers, and some even despise the identity of being schoolteachers or those who perceive themselves as schoolteachers.

However, the fact that they work in vocational institutions makes it inevitable that they will play the role for which they have few advantages. For example, teachers from the second group must demonstrate occupational skills in front of their students or constantly participate in skill training within enterprises. At the same time, teachers from the first, the

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third and the fourth group need to integrate into school life by dealing with schooling operations such as teaching, doing research, participating in pedagogical meetings, Etc. Teachers involved within an unfamiliar community confront the identity struggle because they perceive themselves or they are perceived in a different way than others. The ambiguity of their professional identity will prevent them from fully participating in professional learning and interacting with their peers at the workplace. For example, according to Esmond's (2017) observation, this prioritization of being occupational workers leads to the low agency of participating in related pedagogical works such as organizing teaching sources, using educational technology, managing classrooms, adapting schools' evaluation systems, and doing academic research. Albeit receiving intensive training in pedagogical skills after entering vocational schools, the routine work of being a teacher seems less interesting than transferring occupational skills. Nevertheless, Orr and Simmons (2010) argue that vocational teachers who rely solely on technical expertise and do not know pedagogy are not competent in vocational education. The latter is because these teachers lack a professional approach to teaching and are not receptive to new teaching methods, preferring to use traditional methods such as didactic teaching (Bristow, 1970).

In conclusion, this study views Education and Entry Routes as crucial variables due to their influence on vocational teachers' professional identity formation, especially within vocational education management. Education shapes teachers' knowledge, skills, and values, with its complexity in vocational contexts affecting Dual Professional Identities and, consequently, teaching effectiveness and student outcomes. Entry Routes into the profession, including traditional education programs, alternative certifications, and industry transfers,

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impact teachers' initial experiences, preparedness, and adaptability, influencing their job satisfaction and classroom effectiveness. By exploring these variables' relationships with teacher resilience, Dual Professional Identities, and job performance, this study aims to understand how different pathways affect teachers' careers and success in vocational education.

The Significance of Integrating Dual Professional Identities into the Study of "Dual-Qualified Teacher" Policy

Issues and Critiques of the "Dual-qualified" Teacher Policy

The implementation of the "Dual-qualified" teacher policy in China over the past two decades has prompted widespread practice in vocational institutions. However, this policy has revealed blind spots in fostering teacher development. A common misconception is equating "Dual-qualified" teachers with those holding "Dual-certificates." This approach, while practical, is flawed due to the limitations of China's professional qualification system. Some certificates are easily obtained, while others are not, leading to a disconnect between "Dual-certificates" and actual "Dual-qualification." Additionally, industry experts who excel in teaching and skill demonstration but are not school employees are often excluded from the "teacher qualification certificate" exam, hindering their recognition as "Dual-qualified" teachers.

Shao (2016) criticized the current evaluation criteria for overlooking the inner world of vocational teachers and their attitudes, beliefs, and value systems. He proposed using implicit criteria to recognize "Dual-qualified" teachers, emphasizing the importance of

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comprehensive expertise and a positive professional attitude. Short-term training and mere certificate acquisition do not adequately reflect a teacher's proficiency or dedication to vocational education.

Therefore, the narrow focus on certificates, titles, or abilities without considering the substantial enhancement of professional expertise and the attainment of a professional value system is a significant oversight in China's "Dual-qualified" teacher development policies. The policy aims to elevate teaching standards, but its implementation yields superficial results. To truly develop a "Dual-qualified" teaching corps, efforts should transcend mere certificate acquisition and emphasize the cultivation of positive attitudes towards vocational education tasks, the integration of "Dual Professional Identities," and the fostering of a sense of pride in the profession.

The Importance of Dual Professional Identities in Vocational Education

Vocational teachers shoulder multiple identities due to the distinctive dual system of vocational education. They must embody both an instructional identity akin to school teachers and an occupational identity as proficient trade workers. Possessing these dual identities reflects a high level of agency and motivation, which can enhance their expertise development, effectiveness in school-enterprise cooperation, and social status.

Vocational teachers must continuously participate in in-service training to reinforce their skills. Their dual professional identities drive this lifelong learning, ensuring the implementation of the "Dual qualification" policy and enhancing the efficiency of school-enterprise cooperation. Furthermore, vocational teachers play a crucial role in imparting

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knowledge/skills and shaping job mentality. To adequately prepare students for their future careers, teachers must assume multifaceted roles and establish a friendly social stance that aligns with students' values.

The school-enterprise cooperation is vital for vocational education, linking schools with industry and teaching workforce skills. "Dual-qualified" teachers guide students, keep up with industrial trends, and bridge students with enterprises.

To build a high-quality "Dual-qualified" teacher team, China's vocational education must go beyond dual certification. This study proposes a new assessment method incorporating Dual Professional Identities to enhance teachers' effectiveness and well-being, catering to evolving needs.

Research Gap

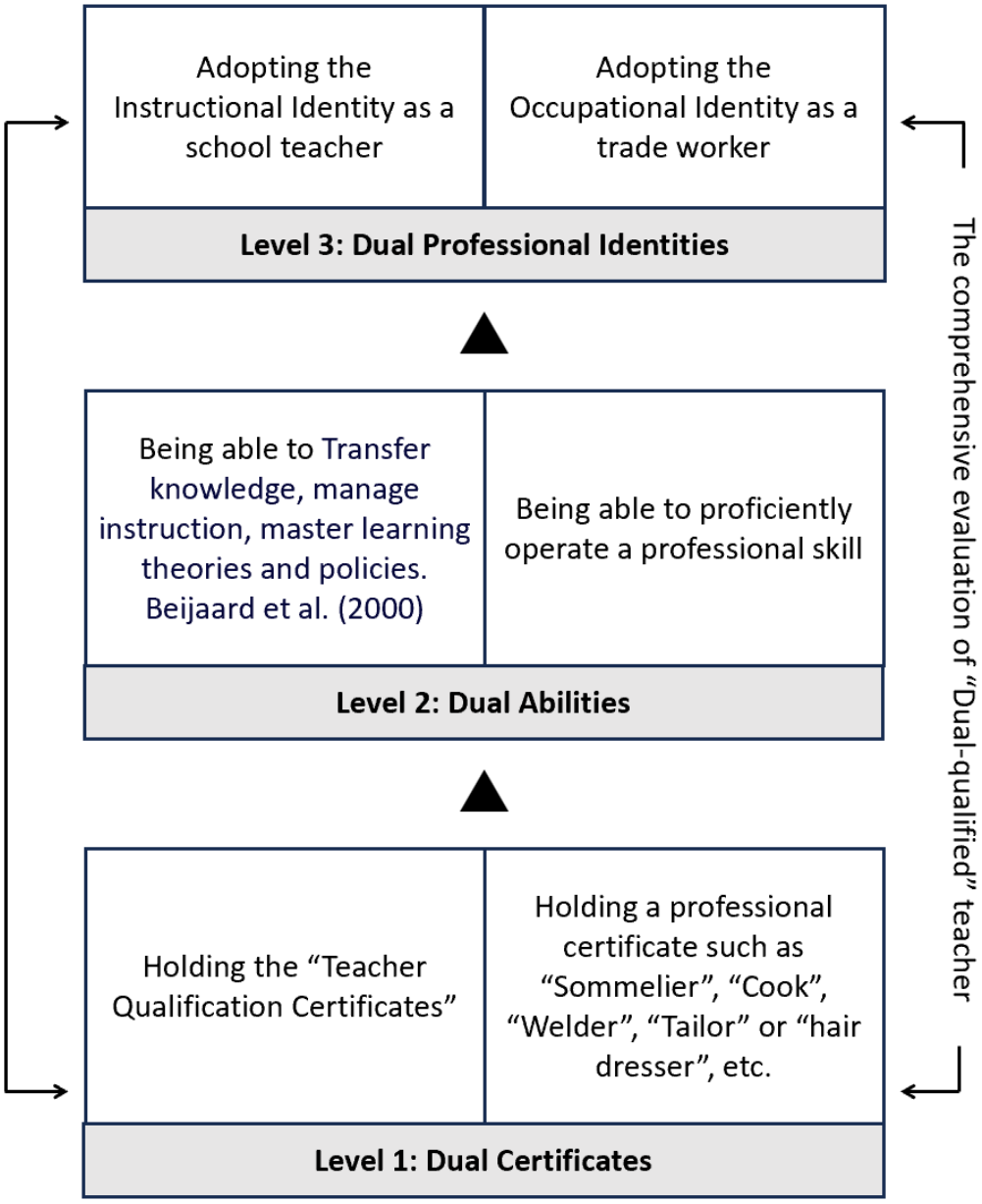
In the realm of vocational education, particularly concerning the development of the Shuang-shi (dual-qualified) teaching workforce and the exploration of Dual Professional Identities (DPI), several critical research gaps have been identified.

Firstly, there is a notable emphasis on the acquisition of expertise in the construction of the Shuang-shi teaching force, while the innate professional identity of teachers, which is crucial for their long-term commitment and effectiveness, remains underexplored. Secondly, the existing research on DPI has predominantly focused on the medical and clinical fields, neglecting the potential applications and implications in other educational and professional contexts.

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Figure 1:

The proposed evaluation framework of "Dual-qualified" teacher (created by author)



Furthermore, the conceptualization of DPI has largely been treated as a monolithic entity, failing to acknowledge and investigate the prioritization and interaction between the individual professional identities within the dual framework.

Additionally, there is a dearth of research examining the influence of professional

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learning within communities of practice on the formation and evolution of DPI, despite the recognized importance of such learning environments for professional growth.

Moreover, the impact of DPI on teaching performance indicators, such as self-efficacy and resilience, has not been adequately studied. Understanding these relationships is crucial for assessing the practical significance of DPI in enhancing teachers' teaching effectiveness and well-being.

Lastly, in the context of vocational education, the influence of factors such as entry routes and education levels on the development and manifestation of DPI has received scant attention, despite their potential to shape teachers' professional identities and career trajectories.

Research Objectives

Despite the importance of constructing a clear professional identity, the formation of professional identities for vocational teachers remains a challenge. This research aims to explore the concept of "Dual Professional Identities" within Chinese vocational education, focusing on educational management and policy-making perspectives. The objectives are to develop a measurement scale for Dual Professional Identities and to investigate the consequential mechanism between these identities and work performance indicators.

Research Questions

Based on the background analysis and the research purpose of this project, this study tries to explore the answers of the following research questions:

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RQ1: What are the key factors that determine the conceptualization and assessment of Dual Professional Identities within the Chinese vocational education context?

RQ2: What is the impact of education and entry routes on the instructional and occupational identity of vocational teachers?

RQ3: What is the impact of Instructional and Occupational Identity on vocational teachers' resilience?

RQ4: What is the mediating effect of instructional and occupational identity on the relationship between education/entry routes and resilience in vocational teachers?

The first question aims to identify key elements and variables shaping the conceptualization and assessment of Dual Professional Identities in Chinese vocational education, exploring how these identities are understood, constructed, and evaluated.

The second question examines how educational background and entry routes influence the formation of vocational teachers' instructional and occupational identities, and how these factors shape their professional self-perceptions and behaviors.

The third question focuses on the impact of these identities on teachers' resilience, exploring how their professional identities affect their ability to cope with workplace challenges and maintain professional commitment and well-being.

The fourth question explores the mediating role of instructional and occupational identity in the relationship between education/entry routes and resilience, shedding light on the complex interplay between these factors.

Overall, the study aims to enhance "Identity Management" strategies for vocational teachers, fostering deeper understanding among leaders, and devise tailored training

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programs to contribute to teachers' professional development and well-being.

Research Design and Technical Routes

This study employs a mixed-methods approach, blending qualitative exploration with quantitative validation to robustly address our research questions. The technical route is divided into two key parts: scale development and antecedent-consequence analysis. (Figure 2) Starting with theory and identity scale analysis, this study formulated an initial scale, which was then refined through semi-structured interviews with 15 teachers. This iterative process ensured the scale captured the construct's complexities.

Next, this study transitioned to a quantitative phase, designing comprehensive questionnaire items aligned with the refined scale. Using Exploratory Factor Analysis (EFA) on 299 responses, this study purified the scale, eliminating redundant items. Confirmatory Factor Analysis (CFA) on an independent 303-response dataset further validated its structure. Reliability and validity tests guaranteed the scale's performance.

Beyond scale development, this study aims to validate a theoretical model. This model examines how entry route and education level, as independent variables, influence Dual Professional Identities, which then mediate resilience, the dependent variable. By exploring these relationships, the study reveals how different backgrounds shape teachers' identities and resilience. This holistic approach offers valuable insights for policy-makers, educators, and researchers, advancing our understanding and practical applications in the field.

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Dissertation Structure Overview

This research project on vocational teachers' Dual Professional Identities comprises seven chapters.

First, it introduces the research background, analyzing the "Dual-Qualified Teacher" policy and current challenges faced by teachers in Chinese vocational institutions. Four research questions are posed, focusing on defining and measuring Instructional and Occupational Identities within the school-enterprise cooperation framework.

The second chapter presents a literature review grounded in Wenger's Community of Practice theory, exploring identity formation and the unique Dual Professional Identities of vocational teachers. It integrates resilience into the theoretical model, proposing a framework with Entry Routes, Education, Instructional Identity, Occupational Identity, and Resilience, and formulating 12 hypotheses.

The third chapter outlines the mixed-methods approach, combining qualitative and quantitative research. Scale development involves theory analysis, semi-structured interviews, and a comprehensive questionnaire, followed by reliability and validity tests. The study aims to validate the theoretical model by examining relationships between variables.

The fourth chapter presents research outcomes, including a validated scale for measuring Dual Professional Identities and statistical results for the 12 hypotheses.
The fifth chapter integrates the researcher's practical work experience with a comprehensive summary and in-depth exploration of the research findings. By weaving together theoretical analyses with firsthand experiences, this chapter aims to provide a rich, nuanced understanding of how the research outcomes can inform and enhance practical work

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scenarios.

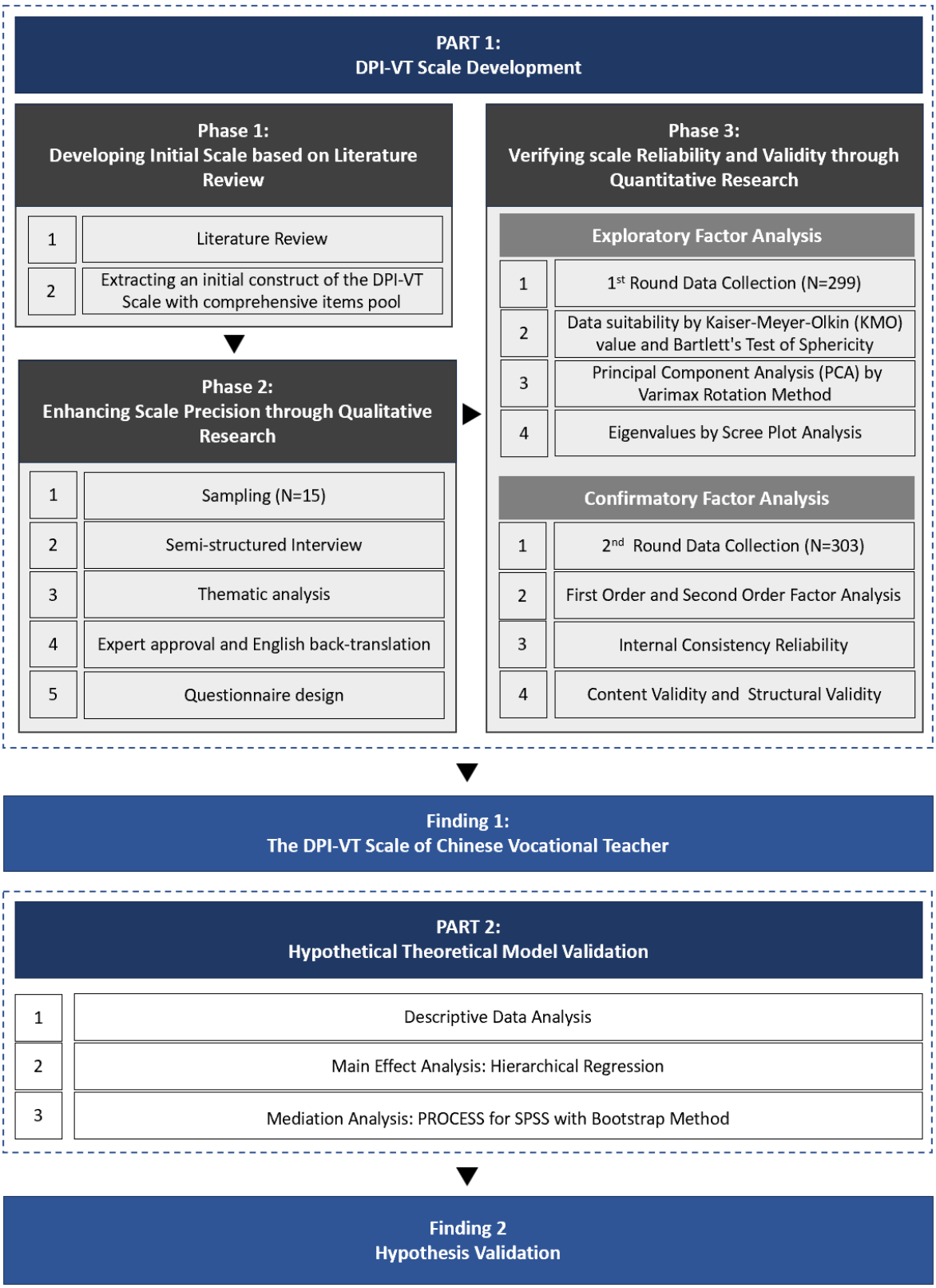
The sixth chapter proposes managerial suggestions for improving the construction of a "Dual-qualified" teaching staff, based on the study's findings. These include reinforcing the professional role, improving the training system, constructing professional learning communities, and fostering school-enterprise cooperation.

Finally, the seventh chapter discusses its limitations and suggests future research directions, such as examining teachers from different vocational institution levels, expanding the geographic scope, and exploring other variables related to vocational teachers' professional identities. This provides a foundation for further research and practical applications in vocational education.

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Figure 2:

The research design and technical route of the research (Created by author)



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Chapter 2: Literature Review

Chapter Overview

This chapter dissects the intricate interplay among identity, professional identity, and the unique environment of vocational education within the scope of a school-enterprise cooperation framework.

Firstly, the chapter narrows its scope to the Dual Professional Identities of vocational educators, carefully distinguishing between their Instructional Identity (Teacher Identity) and Occupational Identity (Trade Professional Identity). This analysis highlights the distinct yet interconnected aspects of vocational teachers' professional lives, emphasizing the need for them to skillfully balance the demands of both teaching expertise and industry knowledge.

Subsequently, the chapter explores the school-enterprise cooperation framework as a crucial Community of Practice. It offers a precise definition of this concept and elaborates on Workplace Professional Learning within this context. The section further investigates the mechanisms through which Dual Professional Identities are shaped through professional learning within the school-enterprise collaboration, underscoring the symbiotic relationship between vocational institutions and enterprises.

The chapter also concludes with an examination of the complex relationship between professional identity and resilience. It delves into the concept of resilience and its inherent link to professional identity, highlighting resilience's critical role in navigating the numerous challenges of vocational education. The section culminates with a comprehensive exploration of the determinants and measurement of resilience, providing valuable insights into strategies

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for vocational teachers to develop and strengthen their resilience in the face of adversity.

Following this theoretical review, the chapter concludes by proposing a hypothetical theoretical model and the hypothetical relationships among the variables.

Identity and Professional Identity

Definition of Identity and Professional Identity

"Identity" initially emerged as a psychological concept, as introduced by Adler in 1924, and has since been extensively explored in anthropology, sociology, politics, and social psychology. According to Wu (2016), identity is perceived as an internal psychological mechanism that bridges the gap between the individual's "self" and their connection to society, nation, or any other form of community.

People are categorized by their sociocultural labels, such as gender, ethnic group, and socioeconomic status. The categorization of people refers to the broad definition of identity as qualities and attributes that make a person or a group of persons who they are (Holland et al., 1998; Marcia, 1980; Brickhouse, 2000). Identity could be understood as one's self-consideration of a certain kind of person and another's perception (Gee, 2001). Self-concept and identity are closely related but are distinctive concepts (Tap & Sordes-Ader, 2012). It is essential to distinguish between identity and self-concept. The “self” refers to the genetic endowment, personality, personal disposition, cognition, and established identities (Swann & Bosson, 2008). In contrast, identity consists of the cognition of self (self-perception), representations, and emotional dimensions (Tap & Sordes-Ader, 2012).

Identity is also considered a way to construct human society. Identity defines an

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individual's social position and relationship with other community members (Chryssochoou, 2003; Shanahan, 2009; Esteban-Guitart et al., 2014; Nasir, 2011). Zacarés and Iborra (2015) summarize five levels of identity: personal Identity, relational identity, collective (social) Identity, ego identity, and cultural Identity. Personal identity encompasses the individual's sense of distinctiveness and uniqueness, encompassing various aspects such as self-awareness, self-presentation, self-image, self-concept, self-esteem, personal worth, and personal virtue. It represents the meanings individuals ascribe to themselves, defining who they are as unique beings. Relational identity refers to the social roles and positions within a relational framework, such as colleagues, friends, and students; Social identity pertains to the sense of commonality or likeness that an individual perceives or experiences with other members belonging to a specific social group. These social groups can encompass a wide array, ranging from inherent affiliations like kinship, clansmanship, gender, ethnicity, or race, to institutional memberships such as citizenship, nationality, profession, or voluntary association memberships. Two other levels of identities are more psychologically concerned: Ego identity refers to the perception of continuity and coherence with the conscious senses of self within one's social relationships. It is developed and shaped due to constant social interactions with others (Erikson, 1968). Cultural identity, different from Collective Identity, refers to the belongingness of specific cultural groups and communities, which are formed based on some value systems.

Professional identity can be understood as an individual's perception of themselves within their profession, which is intricately linked to their knowledge, skills, work, as well as significant others or reference groups related to their occupation, as posited by Bucher and

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Stelling (1977). Miller (1962) was among the early scholars who pointed out the distinction between self-identity and public identity, and emphasized the duality of identity. He viewed identity as a bridge connecting an individual's self-sameness with the influence of the external social environment. Miller's concept of identity underscores the interaction between the individual and the external environment. Every profession has its own professional identity. For example, Creuss et al. (2014) define a physician's professional identity formation process as “an internationalization of the characteristics, values, and norms of the medical profession, resulting in an individual thinking, acting, and feeling like a physician”. Adams et al. (2020) advocate that the formation of professional identity is a result of occupational role construction and emphasize that in the process of building, professional identity formation is shaped by a combination of experiences and various relationships at work.

The changing environment associated with an individual's gradually evolving mental state poses challenges to the adoption of a new professional identity. As Zacarés and Iborra (2015) illustrate, refining the concept of “Self” is a short first-order reflexive Reflexivity. The first-order reflexivity refers to the short-term, conscious process of reflective self-adjustment triggered by external events (e.g., career transitions or role conflicts), characterized by context-dependence (e.g., novice teachers questioning their self-efficacy during initial classroom management failures), high cognitive load (requiring active metacognitive engagement, such as deliberating “Am I suited to teaching?”), and instability (susceptibility to emotional fluctuations and immediate feedback). Individuals becoming more entrenched in the field develop a relatively stable Second Order Spontaneity for dealing with a particular identity change. The Second-Order Spontaneity denotes an automated identity response

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mechanism formed through repeated practice, marked by systemic stability (internalized as "default scripts," exemplified by experienced teachers intuitively addressing disciplinary issues), experience-dependent consolidation (necessitating prolonged exposure to recurring contexts, e.g., over five years of teaching), and low cognitive demand (unconscious execution akin to "muscle memory"), reflecting the developmental trajectory from deliberate reflection to habitual identity internalization.

These individual "Self" behaviors reflect the identity and values choices they make in their work and life (Cast, 2003). Individuals' attitudes and behaviors during this ongoing, long-term process include imitation, resisting, selective alignment, soft balancing, hybridization, recombination, internalization, re-interpreting, subversion, and transcendence. The latter refers to the background analysis where I emphasize the inner motivation and subjective initiative of individual to ensure the quality of the policy implementation and the professional learning within the school-enterprises cooperation framework.

A Literature Review of the Dual Professional Identities

Existing literature prefers to use "The Dual Professional Identity" (in single form) instead of "The Dual Professional Identities" (in plural form). The concept of "dual professional identity" (in single form) also known as interprofessional identity (Khalili & Orchard, 2019), refers to the phenomenon that an individual possesses two professional identities simultaneously in their professional life. By citing the clinician-scientists as an example, Stambulova & Wylleman (2015) suggest that being a broker between two professions, just like what a clinician-scientist does, refers to the "meta-position" held by the

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individual engaged within two professions.

It has been defined as *"the development of a robust sense of belonging to both own professional (In-Professional Favoritism) and to the interprofessional community (Interprofessional Favoritism) in which individuals view themselves simultaneously as a member of their own professional and the interprofessional team"* (Khalili et al., 2019).

The definition reveals three pillars that build the dual professional or interprofessional identity concept. First, the dual professional identity is a developing process; second, the dual professional identity is embedded within two communities; and the word "Favoritism" shows that dual professional identity is an active acquisition of identity within the workplace and it is possible that one professional identity is more prioritized than the other one by individual. The recent work of Tong et al. defines dual professional identification as the interprofessional identity, which is described as "*a robust cognitive, psychological, and emotional sense of belonging to an interprofessional community(s)*" (Tong et al., 2022). Imafuku et al. (2022) define the dual professional identity (interprofessional identity) as a result of relational and experiential practice engendered within intra and inter-professional communities.

The Dual Professional Identity (singular) refers to the recognition of a state wherein two identities are integrated. The Dual Professional Identities (plural), on the other hand, focus on an individual's simultaneous recognition of both the instructional identity and the occupational identity. Furthermore, the latter also emphasizes the relationship between the instructional identity and the occupational identity. The research direction of this study is focused on the latter.

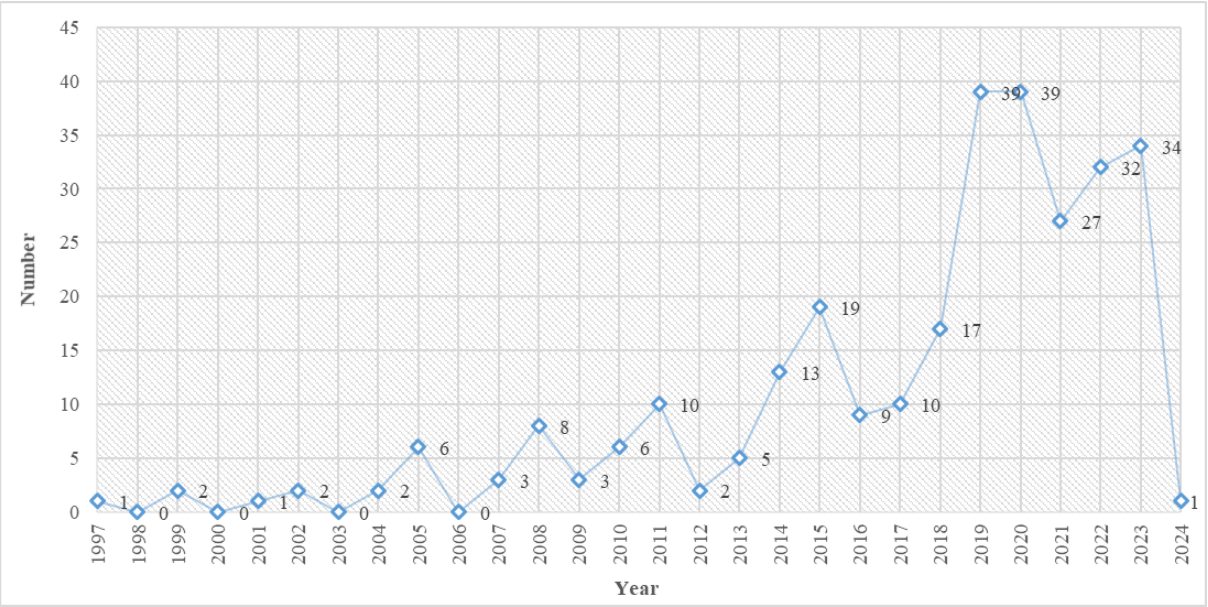
In order to systematically portrait the current research situation of the "Dual

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Professional identity" and the "Dual Professional Identities". This study has chosen the Web of Science as the data source of the literature. The English papers on dual professional identities were searched by combining subject terms with existing academic journal sources. The search method is as follows: the subject term is "dual professional identity", the database is "Web of Science Core Collection", the document type is "Article", the language is "English", and the year is "all years". Two hundred ninety-one (291) eligible publications in academic journals from 1997-2024 were retrieved and exported as Refworks, containing the author, abstract, keywords, year of publication, journal, and research institution. The same action has been taken to search the "Dual Professional Identity" in Chinese, only eighteen (18) eligible publications have been retrieved.

Figure 3:

Subject term-related publications, 1997-2024



Although the number of published papers is small, it can be seen in Figure 3 that there

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is a growing trend in the number of publications in the literature related to “dual professional identities”, especially from 2017 onwards.

The top 10 highest cited articles about this topic focus either on the educational strategies or the influential factors of medical students’ dual professional identity formation.

Concerning educational strategies, Tong et al. (2020) suggest that contact with students of other professions could help medical students build up an interprofessional identity (dual professional identities). DiVall et al. (2014) proved that with their experiences of organizing inter-discipline conferences where students from different professions can meet and dialogue with each other, they could form the inter-professional identity of the medical students. Furthermore, role-playing and team-based case discussion (Ciani et al., 2023), flipped-classroom concepts, individual work shadowing with students from other health professions, and live sessions with interprofessional-teaching-learning teams (Anita et al., 2023) have recently been suggested as effective methods to form the interprofessional identity. Tong et al. (2020) and Cooper-loelu et al. (2022) also suggest that a clear understanding of their profession and the boundaries with other professions could facilitate forming an interprofessional identity.

Concerning the influential factors of dual professional identity formation, interprofessional professionalism adherence, team-centered accountability (Keshimiri, 2022), interprofessional belongings, commitment, and belief (Reinders et al., 2020) are proven to be the influential factors of the Dual Professional Identity’s formation. Tong et al. (2022) also suggests that continuous engagement within the community, a straightforward, professional identification, and a deep understanding of the meaning of interprofessional practice and its

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complex impact on an individual's professional "self" could influence dual professional formation. Khalili Houssein adapted the Dual Identity Scale (DIS) from the Medical Stereotype Scale (Streubert & Carpenter, 1995) and the Multigroup Ethnic Identity Measurement (Phinney, 1992), and subsequently validated it himself (Khalili, 2013). The DIS comprises 30 items grouped into four primary dimensions: Interprofessional Belonging (IPB) with 8 items, Professional Belonging (PB) containing 10 items, Dual Identity Achievement (DIA) encompassing 8 items, and Cross-Disciplinary Attitude (CDA).

The influential factors of Dual Professional Identity emphasize the organizational belonging which is related to the professional communities. It proves that the study of interprofessional or dual professional identities must be included in the impact engendered by the communities where individuals are involved. According to Fejes & Köpsén (2014) and Kluijtmans et al. (2017), the dual professional identities of vocational teachers can be formed by boundary crossing and positively affect professional practice.

Using the CiteSpace algorithm to cluster and label closely related keywords can give a more intuitive picture of the research hotspots of dual professional identities in recent years. The clustering was performed using the LLR algorithm, and the final clustering visualization is shown in Figure 4. The smaller the number in the clustering diagram, the more content it contains. Q value (module value) and S value (average profile value) are the indicators of keyword clustering. If $Q>0.3$, the clustering structure is clear, and if $S>0.5$, it indicates that the clusters are reasonably divided. In this study, we get $Q=0.6746$ and $S=0.8859$, and the results meet the requirements. From the Figure 4, it can be seen that the keywords can be clustered into 13 categories, which are professional identity, organizational identification,

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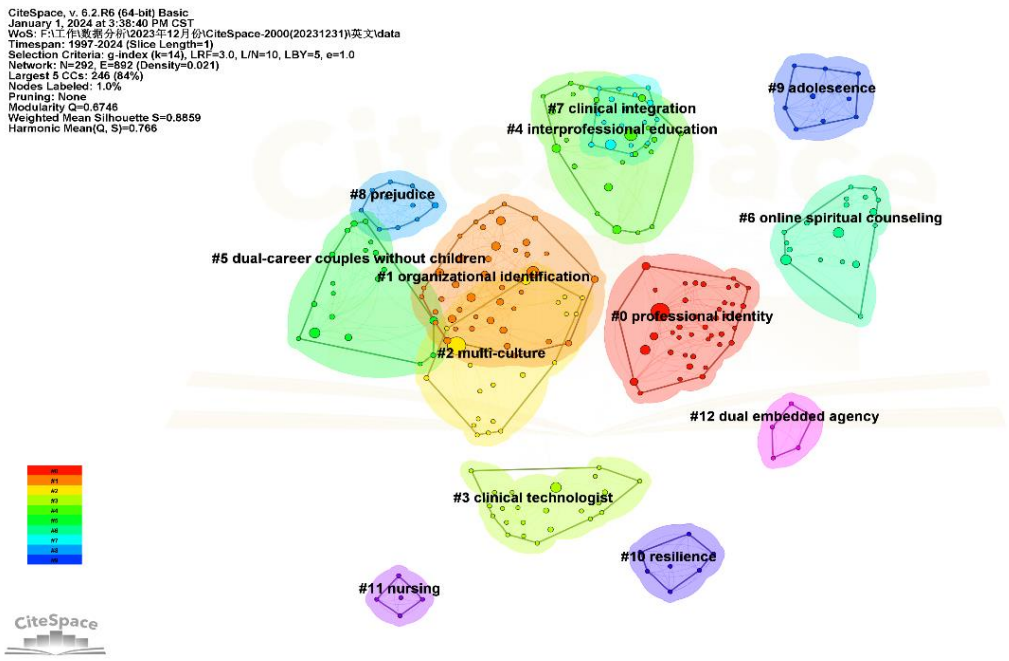
multi-culture, clinical technologist, interprofessional education, dual-career couples without children, online spiritual counseling, clinical integration, prejudice, adolescence, resilience, nursing, and dual embedded agency. Among these keywords, professional identity is the largest category, with a size of 43. The result shows that the concept of “Dual Professional Identity” of vocational education or among vocational teachers has been scarcely researched.

In conclusion, the existing research considers the Dual Professional or Interprofessional Identity as an integral identity assessed uniformly without being broken down by each professional identity. The existing research ignores the impact of different environments or individual habitus on vocational teachers' prioritization of professional identity. These two different professional identities are both independent and interdependent. Moreover, there exist a gap that the concept of the “Dual Professional Identity” seldomly concern the vocational education; Therefore, this study wishes to focus on the sector of Chinese vocational education, and to explore the main factors that influence the formation of these two different professional identities, as well as the outcome of the subtle and complex interaction and hierarchy of the Dual Professional Identities.

Figure 4:

Keyword clustering map of “Dual Professional Identities” (result including “Dual Professional Identity”)

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The Dual Professional Identities of Vocational Teacher

The phenomenon of vocational teachers' Dual Professional Identities is widely regarded as a pivotal asset for individual professionals as well as for vocational institutions (Robson, 1998). This duality encompasses the Integration of Instructional Identity, which pertains to the teachers' role in the educational sphere, and Occupational Identity, referring to their professional identity related to the trade or occupational sector. At the individual level, Instructional Identity characterizes the teacher's school-based responsibilities, while Occupational Identity represents their vocational expertise and role in the trade community. From a societal perspective, Instructional Identity signifies affiliation with the educational sector, whereas Occupational Identity denotes membership in the professional or trade community.

The pluralistic nature of these identities acknowledges their distinct yet complementary nature in shaping vocational teachers' behaviors. It is postulated that the

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coherence of vocational teachers' professional identity necessitates adherence to the dualistic logic, comprising both Instructional and Occupational Identity (Tanggaard, 2007).

Furthermore, Fejes and Köpsén (2014) have examined the imperativeness of possessing these dual identities from a socio-cultural viewpoint. They assert that vocational teachers occupy a pivotal position in bridging the gap between two socio-cultural milieus: the occupational community and the school community, where vocational students operate and develop. This bridging role underscores the necessity of vocational teachers possessing both Instructional and Occupational Identities, thereby enabling them to effectively navigate and contribute to both environments.

The inter-relation of the two co-existing identities is engendered by the external environments such as type of organization (Chappell & Johnston, 2003) and the individual's former experiences such as previous work experiences, preset professional values, and entry route (Robson ,1998; Esmond, 2017). Lee (2017) has categorized the inter-relationship between two related identities into four possible situations: 1) "Repressed", "Born-again", "Integrated", and "Situationist". The latest research of Lee proposed another statement of the typology which replaces the "Born-again" by "Reversing", and replaces the "Situationist" by "Blended" (Lee, 2023). "Integrated" signifies that individuals simultaneously possess different identities at a high level; "Reversing" means that individuals prioritize their initial professional identity and reject the imposed identity; "Repressed" means that individuals passively adopt the group consensus and suppress their value; "integrated" refers to the strategy that individual adopt two identities and the new identity are not at the expense of the old one; "Blended" strategy is one step further than the "integrated" strategy, meaning that

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individual adopts two identities, and synergy emerges between the old and the new one (Lee, 2020). That is why this study prefers to observe the two sub-professional identities separately by not neglecting their complex inter-relations, nor the influences on individual behaviors and mental status.

Instructional Identity. Beijaard et al. (2004) defines teachers' professional identity as their understanding and interpretation of their teaching roles, the unique attributes of teaching, and their self-perception as members of an occupational group. This identity is a blend of personal internal factors, such as values, emotions, traits, and skills, and external elements like professional activities and social interactions. Typically, this identity evolves through teachers' continuous engagement with and interpretation of their environment, influencing various aspects of their professional lives, including job satisfaction, commitment to teaching, self-confidence, and motivation fluctuations, which are crucial determinants of their behavior, as highlighted in academic literature (Ashton and Webb 1986; Firestone 1996; Watt and Richardson 2008).

The formation of a teacher's professional identity is an ongoing process, starting from childhood and extending into their studying period (Lortie, 1975), where they observe their teachers as professional models (Knowles, 1992). According to Sugrue (1997), several factors influence student teachers' personalities, including family, significant others, observations during practicum, atypical teaching episodes, policy context, teaching traditions, cultural archetypes, and tacitly acquired understandings. These factors shape the early professional identity of teachers, which later evolves within the social context through different stages of teacher development, such as initial learning, induction, preservice, and in-service periods.

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The formation of teachers' professional identity involves various knowledge sources, such as knowledge of effect, teaching, human relations, and subject matter (Antonek et al., 1997). These self-concepts strongly determine teachers' teaching methods, development, and attitudes toward educational changes. Teachers' professional identity is a complex, dynamic balance between their professional intentions and the roles they feel compelled to play (Berlak & Berlak, 1983). Most researchers view teachers' professional identity as a continuous integration process between their individual and professional aspects (Li & Yan, 2018). This identity is shaped by teachers' practical experiences, individual backgrounds (Tickle, 2000), and the interplay between their professional self-intentions and the roles they feel compelled to play.

Researchers have proposed various frameworks for measuring teachers' professional identity. Kremer & Hofman (1981) suggest three dimensions: centrality, valence, and solidarity, along with self-presentation. Brickson (2000) proposes a three-factor theory, including individual, collective, and mutual factors. Beijaard et al. (2004) identify three components: subject matter expert, didactical expert, and pedagogical expert. Canrinus et al. (2011) propose a six-dimension scale, while studies in China have suggested different dimensions, such as vocational competence, occupational significance, and recognition from leaders, colleagues, and students (Liu et al., 2008; Qin, 2008; Wei et al., 2013; Sun & Zuo, 2010; Li & Yan, 2018).

The professional identity of vocational education teachers is distinct from that of educators in other sectors, emphasizing the need for contextualized research within the vocational education environment. This identity is shaped by the interplay between the

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practical landscape of vocational training and teachers' diverse roles. When assessing vocational teachers' identity, it is crucial to consider factors unique to vocational education, such as the collaborative relationship between vocational institutions and industry enterprises. This partnership influences teachers' professional identities, shaping their sense of purpose, competencies, and self-worth. A comprehensive measurement of vocational education teachers' identity must encompass their engagement in dual-sector collaboration, capturing how interactions with industry partners affect their professional roles and contributions.

Occupational Identity. Work identity, occupational identity, vocational identity, and career identity are often used synonymously (Kielhofner, 2008; Skorikov & Vondracek, 2011). Work identity pertains to an individual's association with their job, whereas occupational identity typically relates to the identification with a particular profession (e.g., Skorikov & Vondracek, 2011). Erikson's (1968) framework views occupational identity as a form of self-awareness, reflecting an individual's perception of their occupational interests, abilities, objectives, and values (Kielhofner, 2008).

Although there are currently some scales available for measuring generalized occupational identity, such as the DISI-O developed by Dellas, M. (1979), recent research places greater emphasis on integrating occupational identity with diverse professions and cultural backgrounds. Consequently, this has led to the development of more nuanced measurement methods for assessing occupational identity within specific professions and cultural contexts across different countries. For example, for nurse, there exists two scales for measuring its Occupational Identity. Liu (2011) study on nurses testify that evaluation of professional recognition, professional communication skills, professional social support,

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response to setbacks, and self-reflection can impact nurses' professional identity formation. Hao et al. (2014) suggest that nursing students' professional identity comprises professional self-image, the benefit of retention and turnover risk, social comparison and self-reflection, independence of career choice, and social modeling.

The occupational identity of a vocational teacher is the other facet of the Dual Professional Identities. It is noteworthy that vocational teachers' Occupational Identity differs from that of professionals who work in their positions and rely on such work as a means of earning a living. According to the "Dual Professional Identity" definition by Khalili et al., (2019), if the vocational school is the "Own Professional Community" of where the vocational teachers adopt the instructional identity, while the industry and related cooperated enterprises are the "Inter-professional Community" where the vocational teachers adopt the occupational identity.

It is worth noting that, despite the existence of numerous measurement methods for occupational identity, these methods predominantly interpret the occupational identity of full-time employees, rather than addressing the occupational identity of individuals engaged in "cross-community (industry)" and/or "non-full-time" employment. Furthermore, while Khalili introduced the concept of the "Dual Professional Identity Scale," this framework treats two professional identities as an integrated whole, thereby overlooking how to define Occupational Identity in the context of "cross- community (industry)" or "non-full-time" work. More importantly, it neglects the potential relationships between such identities and those within the "primary community (industry)" or "full-time" employment. This oversight is significant because the occupational identity in "cross-community (industry)" and/or "non-

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full-time" contexts must be embedded within the authentic work environments (school teaching within school-enterprise cooperation framework), working methods (integration of theory and practice) and work mission (bridge the school-learning and future employment of vocational students) of vocational teachers. It inherently shares both commonalities (carrying the characteristics, constrains, values, etc., of the primary community) and differences with the professional identity associated with the "primary community (industry)" and/or "full-time" work. This subtle distinction has not been addressed in current research, whether it focuses on "Dual Professional Identity" or "Dual Professional Identities."

Therefore, this study aims to identify appropriate measurement criteria for the occupational identity of vocational teachers in "cross-community (industry)" and/or "non-full-time" contexts through interviews. By doing so, we hope to gain a deeper understanding of the unique characteristics and challenges faced by these teachers in their occupational roles and to develop a measurement tool that accurately captures their occupational identity in these diverse settings. This will not only contribute to the literature on occupational identity but also provide practical implications for the professional development and support of vocational teachers in such contexts.

In conclusion, the literature review on Dual Professional Identities, Instructional Identity, and Occupational Identity is crucial, because for vocational education teachers, Instructional Identity and occupational identity are not only two independently existing identities, but also interact with each other. The construction of "Dual Professional identities" may not occur within a "concurrent model" but rather within a "consecutive model". An individual's professional identity is not a stagnant psychological state, but rather a dynamic

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mental positioning that can be continuously adjusted based on circumstantial changes. As an illustration, vocational teachers have the potential to progressively embrace a fresh identity by traversing the borders of two distinct communities of practice: one nested within the school environment and the other embedded within corporate enterprises (Fejes & Köpsén, 2014).

The objective of this study is to devise an effective scale for gauging the "Dual Professional Identities" of vocational teachers. This scale diverges from the existing "Dual Professional Identity" scale (Khalili, 2013), which views the two identities as a cohesive and unified entity. Additionally, it differs from standalone scales assessing "teacher professional identity" and "Occupational Identity" pertinent to other professions. In developing this scale, this study prioritizes the unique attributes of both "Teacher Professional Identity" and "Occupational Identity" within the vocational education context. We then curate dimensions and relevant items proven effective in previous scales, amalgamating them into a preliminary scale grounded in current theories addressing dual professional identities among vocational education teachers. This scale aims to illustrate, within a unified measurement framework, the individual's level of "Instructional Identity" and "Occupational Identity," along with their complex interplay, through distinct items.

The School-Enterprise Cooperation Framework as a Community of Practice

The efficient collaboration between vocational institutions and their cooperated enterprises engages the professional learning of vocational teachers as well as their Dual Professional Identities formation (Fejes & Köpsén, 2014). This collaboration consists of a

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community of practice where participants from both parties share their value, resources and goal together (Wenger, 1998). This section will review the literature of the community of practice and the school-enterprises cooperation framework in order to give a clearer understanding of teachers' behaviors or thoughts that can be used to evaluate the degree of Dual Professional Identity in the context of school-enterprise cooperation in vocational education.

The Definition of the Community of Practice

Personal understandings of self and identity are dynamic, constantly subject to change, reassessed, and reshaped through the interaction of our private world with social relationships and collective spaces (Wenger, 1998). Lave and Wenger (1991) argue that the formation and interaction of such social relationships come from learning. Community of Practice theory is, therefore, a sociological theory of learning. During his latest theoretical development, Wenger gradually built up the four pillars of the Community of Practice Theory.

1) Meaning: the ability to experience the world;

2) Practice: joint-enterprise, shared repertoire, perspectives, and normative conjuncture that frame the mutual engagement of participants;

3) Community: the field in which we participate in learning and establishing social relationships;

4) Identity: how the self-perception is influenced by participation and learning;

How do individuals gradually develop an identity through learning in a community of practice? Wenger's research suggests that individuals gradually acquire and implement

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behavioral norms in the community of practice through their learning. In implementing these behavioral norms, they gain expertise concerning the community of practice. As expertise increases, the boundaries with other communities of practice become more evident, and the individual's sense of collective belonging is enhanced. As the individual becomes a core community member, the purpose of identification with the community of practice grows, and the identity associated with the community of practice develops.

In this process of identity formation, three main components of the construct of the community of practice can be identified. First, the composition of the community of practice must belong to a particular domain. The domain represents the boundaries of the profession or some common interest, goal, and vision. The vision brings members together and enables them to achieve a common goal by sharing their professional skills. Secondly, the community of practice is a social construct made up of members who learn professionally by exchanging information and skills in the community of practice; and thirdly, the core practical activities. Members use these practical activities to apply tools, norms, language, methods, and resources to professional learning.

Many influential factors impact professional identity formation in the community of practice's professional learning process. These mediating factors have been identified one by one in the studies conducted. Firstly, the intensity of involvement within the community of practice will influence identity formation (Fejes & Köpsén, 2014). Secondly, Lewis et al. (2016) suggested that factors such as attitude, self-efficacy, belonging, and motivation are thought to impact building identity directly. The study by Fracchiolla et al. (2020) shows that the autonomous environment of informal professional learning could help participants

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develop their agency, allowing them to form a different identity than what they adopt within the traditional academic setting. This study implies that agency is also a factor that influences identity in the community of practice. Antonek et al. (1997) prove that the human relations within the community of practice could also affect one's attitude toward shaping a new identity. Significant or influential people who are a model or guides for one's career development may encourage individuals to form their professional identity (Knowles, 1992). Davis (2006) proves that a successful trajectory in the profession could also lead to professional identity development within the community of practice. In summary, the literature review on the influential factors has given various mediating elements that encourage or discourage identity formation within the community of practice in diverse domains. One of the purposes of this research is to focus on the domain of vocational education and investigate and identify the processes that facilitate or impede professional identity formation during learning within the community of practice.

Workplace Professional Learning within the Community of Practice

Robson et al. (2004), Vähäsantanen & Eteläpelto (2009) and Vähäsantanen et al. (2009) apply the theory of community of practice into the educational sector and furtherly demonstrate that the teachers' involvement within different communities could lead to their identity shaping. According to Hargreaves and Goodson (1996), professional learning enables teachers to acquire a broader knowledge base, refine their teaching methods, and boost their self-efficacy as well as dedication to teaching performance. Further, teachers' professional learning can improve their sense of self as a person and a professional (Day & Gu, 2007). In

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the two communities of practice where in-service vocational teachers are involved, they mainly learn through workplace learning (Illeris, 2011; Jacobs & Park, 2009; Barnett, 1999; Zhao & Ko, 2018). In a systematic review of vocational teachers' professional learning completed by Zhou et al. (2022), they concluded that vocational teachers are mainly involved in professional development through participation in predefined professional development programs, self-directed initiated activities in school, collaborative activities in school, and industry-based practice. The individual's attitude to learning in the community of practice determines the learning outcomes and the identity induced by these outcomes.

Learning in the community of practice results from a blend of learning modes. Zhou et al. (2022) summarize the learning styles as formal and non-formal learning (Coombs & Ahmed, 1974, p. 8). Both these two learning modes are with clear objectives and are organized. However, the systematic review by Zhou et al. (2022) ignores Informal Learning (Schugurensky, 2000). Here is a summary of the three learning modes mentioned above.

Formal learning is an "*institutionalized, chronologically graded and hierarchically structured system, spanning lower primary school and the upper reaches of the university*" (Coombs & Ahmed, 1974, p. 8). It is clear from the definition that Formal learning needs appropriate place and time constraints (Garner et al., 2015). “Teacher-focused” is the main characteristic of formal learning (Dovey & Fisher, 2014). The teacher sets the objectives and specifies the activities according to the teacher's wishes (Radović & Passey, 2016) by developing a syllabus (Council of Europe, 2022). In China, In-service vocational teachers' formal education consists mainly of “national training” (Guo Pei) and “provincial training” (Sheng Pei) organized by the governmental education administration and training courses

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purchased by schools according to the actual needs of teachers' skills development. In addition, in-school teaching seminars, irregular lectures by experts, and forums can also be considered formal learning in vocational education.

Coombs & Ahmed's (1974) definition of "Non-Formal Learning" is "*any organized, systematic, educational activity carried on outside the framework of the formal system to provide selected types of learning to particular subgroups in the population, adults as well as children*". Non-formal learning is also an approach to learning structured around learning objectives (Allaste et al., 2021; Mok, 2011; Garner et al., 2015). Unlike formal learning, non-formal learning is not location-specific (Mok, 2011), without a standard curriculum, exams, or certificates to prove to learn (Alnajjar, 2021; Gage et al., 2020; Kiilakoski & Kivijärvi, 2015; Madjar & Cohen-Malayev, 2013). The content absorbed during non-formal learning comes from the learner's judgment and perceptions, and the motivation for learning comes from the learners themselves. Learners can usually acquire knowledge through Indirect Teaching Behaviors (ITBs) such as facial expressions, tone of voice, and gestures. The latter shows that non-formal learning centers on the learner's interests and needs. Within the framework of school-enterprise cooperation in China, Vocational teachers are often required to undertake internship placements in companies. This process is a non-formal learning mode. The vocational institution arranges the process to enhance teachers' professional skills and experience in the industry. However, there is no strict monitoring system for what teachers learn, how they know it, and how well they understand it.

Informal learning does not equal non-formal learning (Colley et al., 2003). If non-formal learning is a residual category of formal learning, then de informal learning is a

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residual category of non-formal learning (Schugurensky, 2000). Coombs and Ahmed (1974) offer a precise definition of informal learning: "*the lifelong process by which every person acquires and accumulates knowledge, skills, attitudes, and insights from daily experiences and exposure to the environment. Generally it is unorganized and often unsystematic; yet it accounts for the great bulk of any person's total lifetime learning-including that of even a highly 'schooled' person*". Informal learning transmits tacit primary knowledge. This tacit knowledge is usually absorbed by learners in a “subtle” way rather than relying on a didactic method of transmission. "Informal learning" is a learning mode that is learner-centered, learner-initiated (Bourke et al., 2018; Kral & Heath, 2013), and based on subjective motivation (Garner et al., 2015). Participating learners can opt in or out of learning and choose what to learn and how to participate. In vocational education, In-service vocational teachers' informal learning occurs everywhere and at every moment. Whether at school or in industry, they often learn informally in their environment through observation, imitation, and interest-based self-directed learning.

Community of Practice is a social theory of learning. It is based initially on Vygotsky’s constructivist approach to knowledge and the legitimate peripheral learning framework (Lave & Wenger, 1991; Lave, 1991). An individual is deemed a newcomer upon entering the community of practice and, as the learning process unfolds, they progressively advance towards full participation. Furthermore, this process gradually establishes the learner's legitimate status. The different positioning of an individual within the trajectory shows the level of involvement. Deep involvement will enable learners to acquire more active and interactive tacit knowledge. Moving from peripheral participation to full participation is

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the process by which a new professional identity is formed.

Furthermore, formal, non-formal, and informal learning are how individuals learn in the community of practice. The Legitimate Peripheral learning theory explains the learning process in the community of practice. In that case, we must recognize the impact of collaborative learning as a learning strategy on learning outcomes. The community of practice promotes a culture of collaboration. The CoP structure provides a mutual learning mechanism consisting of "joint-enterprise, mutual engagement, and shared repertoire" (Smith et al., 2017). This makes collaborative learning in the community of practice a default learning strategy. Professional learning in the community of practice is considered a facilitator for forming a professional identity. Through a study of identity development in the context of informal learning spaces within a community of practice framework, Fracchiolla et al. (2020) found that learning in the community of practice for physics students allows participants to strengthen relationships with members of their peer group, facilitates the expansion of social and professional networks, increases opportunities to participate in the physics community, and a sense of belonging that is reinforced by a growing interest in physics. The practice in the UK for further education proved that the adherence of vocational teachers to the Institute for Learning, an official professional organization, could help teachers identify themselves as instructional teachers (Esmond, 2017). Correspondently, this example supports the discourse, arguing that teachers can shape their professional identity through collaborative learning. However, teachers' collaborative learning can be influenced by the culture of isolation (Hargreaves, 1992), which leads to the formation of inner circles, superficial collaboration, or even contrived collegiality (Hargreaves, 1994).

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Learning in a community of practice is a complex process. For vocational teachers, school-based learning and industry-based learning are of great significance to vocational teachers. Organizational factors, relational factors, and professionalism define the boundaries of the two communities of practice: school and industry. Their learning in two communities of practice with different values simultaneously makes learning and identity formation more complex. This complexity is mainly due to the combination of dual professionalism and the different experiences and backgrounds of the teachers entering the community of practice. In theory, practice in other communities of practice is essential in shaping teachers' professional identity with different backgrounds (Wenger, 1998). The following literature review will focus on the impact of this combination on vocational teachers' professional identity development.

Dual Professional Identities Formation via Professional Learning within the School-Enterprise Cooperation Framework

The Professional Identity is gradually affected by the level of involvement within a particular community (Fejes & Köpsén, 2014). Ferreira, R. (2022) states that joint reflection and action within the community of practice greatly influence teachers' professional identity development.

In the case of vocational education, the school-enterprise cooperated framework consists of two fields, including vocational institutions and cooperative enterprises, representing two different values and two different professionalisms. Each field has its criteria by which the value of cultural and symbolic capital is judged. Moreover, these criteria

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have an impact on the individuals who enter them. Suppose we require vocational teachers to possess both instructional and occupational identities; they must adapt to both criteria and acquire sufficient cultural and symbolic capital through professional learning in each field.

Identity is about maintaining membership in a particular social practice (Fejes et al., 2014). Membership acquisition is determined by the dominant cultural and symbolic capital the vocational teachers can command. To acquire such “Dual Professional Identities”, vocational teachers must therefore acquire membership through intensive practice (professional learning) in both communities of practice. This phenomenon refers to the concept of "Boundary Crossing" developed by Tanggaard (2007) to describe how people are simultaneously involved in two or more different communities.

On the one hand, School-based learning concerns the schools’ structures and routines (Fejes & Köpsén, 2014; Antonek et al., 1997) to help teachers maintain the relationship with the community of practices. Leadership-led learning in schools allows vocational teachers to strengthen their classroom teaching skills. Regardless of vocational teachers' entry route or previous professional background, school-based education requires in-service vocational teachers to know how to use instructional tools, apply new teaching methods, participate in teaching seminars, and engage in industry or pedagogy-related academic research activities. Participating in these activities is also a professional learning process. Gradually solidified relationships with school management and peer teachers allow the notion of membership to be reinforced in the minds of vocational teachers. Relations with students could help vocational teachers shape their professional identity (Bathmaker & Avis, 2013). In vocational institutions, the key to professionalism is to become a “good teacher”, which means

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performing in the classroom and workshop teaching, ensuring the security of students in both school and workplace, obeying the management rules of schools, following the ideological guidance of the Party, being cautious, holding the spirit of devoting by not haggling over the money, and accomplishing the mission of R&D, Etc., The nature of public schools requires teachers to be selfless—non-lucrative, conservative, loyal to the government, and academic-centered role.

On the other hand, industry-based learning is an unavoidable mode of learning for all vocational teachers, as vocational institutions worldwide are dedicated to training application-oriented workers and helping them in their employment. Newman (1994) advocates that vocational teachers should alternate between industry and education to enhance their teaching skills. The school-enterprise cooperation framework between vocational institutions and industry provides an institutional guarantee for vocational teachers' skill upgrading and their students' potential employment. Through this cooperative framework, teachers in vocational institutions gain opportunities to practice and learn from the industry and further pass on their knowledge of the company culture and industry identity to their students. In other words, vocational teachers transmit professional identity from industry to their students.

The enterprise's professional learning differs from that within the vocational institution. Firstly, teachers' practice in enterprises cannot be aligned with actual company employees. The real employers of vocational teachers are vocational institutions. It is not feasible for teachers already employed by vocational institutions to take up a specific primary job in a company, in terms of the current employment mechanism, working schedule, the skill

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level of the teachers, their wishes, Etc. Richard and Sheila (2006) argue that, when doing their internship within their cooperated enterprises, vocational teachers are suggested to do tasks such as actively participating in training in companies, interviewing employers and employees, learning about the skills of innovative knowledge in the industry, and gathering advice and opinions from business people about vocational education. The above guidelines only address the issue of how to engage teachers in peripheral learning (Wenger, 1998) within the community of practice without disrupting the normal functioning of the school and enterprise mechanisms. This peripheral learning can lead to the accumulation of knowledge and the advancement of skills. However, does this peripheral learning allow professional teachers to implant a new professional identity for themselves? What factors can move this peripheral learning towards the center and thus deepen the acceptance of a new professional identity?

Secondly, Enterprises are lucrative entities. The core objective of enterprises is to create benefits through products or services. Professionals need to serve customers, please customers, and solve customers' complaints under mental pressure. In schools, vocational teachers serve their students through education. However, they are also somehow respected by their students thanks to the Chinese "Respecting Teacher" tradition. In trade, professionals are servants vis-à-vis customers. How much a professional is appreciated depends on how much value he/she creates for the enterprise. In enterprise, therefore, an excellent professional means being customer-oriented, sometimes servile, sociable, creative, flexible, competitive, money-first-class, liberal, Etc. The identity of being a professional in the trade is somehow "opposite" to the identity of being a teacher in terms of the view of value.

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The Dual Professional Identity Formation within the School-Enterprises Cooperation Framework

The consistency in the purpose of human resources development makes the vocational institutions and their cooperated enterprises become stakeholders in terms of education. Even though a clear boundary exists between the vocational institutions and the industry, the seemingly "separated" communities of practice are merged within an integral mechanism because of the common objective.

The word "Cooperated" in Chinese vocational education signifies that an official cooperative contract is signed between the vocational institution and the enterprise. The vocational institution is dedicated to training the future employees of the enterprise, and the enterprise is required to offer the necessary training resources and enough work positions for the students. The close relationship between two entities, as well as their personnel involved, fit the characteristics of a community of practice, which are "joint enterprise", "mutual engagement", and "shared repertoire" (Smith et al., 2018):

"Joint-enterprise" refers to a collaborative effort between vocational institutions and their partnered enterprises, where both parties share a common professional value and common objective of advancing the development of the major. This collaboration is manifested through the establishment of shared career goals among teachers from vocational institutions and staff members from cooperating enterprises. These goals encompass enhancing teachers' instructional capabilities, nurturing students, and boosting enterprise performance, among others.

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"Mutual engagement" is characterized by the collaboration between vocational college teachers and enterprises in various aspects. On one hand, teachers in vocational colleges cultivate students who possess sufficient work competence and a strong sense of professional, as well as corporate identity, catering to the needs of enterprises. On the other hand, enterprises provide internship and employment opportunities for vocational college students, offer support for the development of teachers' capabilities, contribute material, experiential, and financial assistance to the professional development of vocational colleges, and enrich the course content and teaching methodologies of these institutions to keep pace with the times.

"Share repertoire" manifests in several key ways. Vocational colleges share productive training facilities, equipment, and personnel with enterprises, alleviating operational pressures and facilitating their development. Leveraging their research capabilities, vocational institutions develop new products and share the outcomes of product transformation with partnering enterprises. In turn, enterprises provide learning and practical training venues and tools for vocational teachers and students. Furthermore, enterprises share their internal training curricula with schools, enabling vocational colleges to train students based on corporate training systems. This not only enriches the teaching content of vocational institutions but also bridges the gap between teachers, students, and enterprises.

In conclusion, although the vocational institution and cooperated enterprise(s) represent distinctive values, culture, and social norms, they are inter-influencing each other. They are grouped within an integrative school-enterprise cooperation framework by various cross-relationships, which consist of legal, personal, and operational connections. Instead of

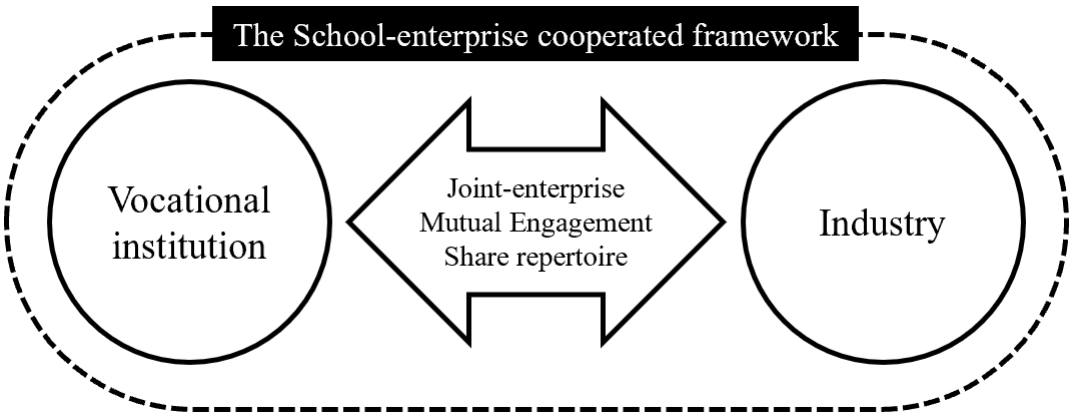
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considering the vocational institution and its cooperated enterprise(s) as two separate communities of practice, it is more reasonable to perceive the school-enterprise cooperation framework as one unified community of practice which consists of two "Sub-communities of practice". (See Figure 5)

The traditional school-enterprise cooperated framework concerns only enterprises with which the vocational institution has established cooperative relationships. However, as this study focuses on the teacher development path, the word "enterprise" should also include enterprises that vocational teachers have worked for in their pre-school careers. The experiences accumulated in these former enterprises are part of the habitus of vocational teachers. It should be, therefore, included in the study questioning process.

Figure 5:

The "School-enterprise cooperated framework" as an integral community of practice (Created by Author)



The school-enterprise cooperation framework bundles two different communities of practice and imposes mandatory requirements on the teachers' learning activities. The school-

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enterprises cooperation framework offers a unified and integrative ambiance where vocational teachers can twist the Institutional Identity and the Occupational Identity formation process together. As a result, some behavioral characteristics which are related to the professional learning of vocational teacher within the school enterprises cooperation framework, as well as their interaction and intention to interact with the environment should be taken into consideration as the evaluation criteria of vocational teachers' Dual Professional Identities acquisition level.

The Professional Identity and the Resilience

The "social marginalization", "value incongruence with students", and "identity prioritization/ambiguity" experienced by vocational teachers contribute to their psychological anxiety. Stress, a ubiquitous phenomenon in human service professions (Berend et al., 2020), is notably prevalent among educators and can have far-reaching implications for the educational system as a whole (Kyriacou & Sutcliffe, 1977). Over time and with societal development, the profession of teaching has become increasingly challenging, demanding, and exhausting (Flores, 2020; Park et al., 2020). This explains why, in recent years, concerns over the high prevalence of teacher burnout, attrition, and dissatisfaction have fueled an escalation in research on teacher resilience (Gratacós et al., 2021). Pettegrew and Wolf (1982) distinguished between task-based, role-related, and work-event stress, assessing their contributions to job burnout. Teacher resilience assumes paramount importance given the myriad challenges and pressures teachers confront daily (Brouskeli et al., 2018; López-Angulo et al., 2022). This study specifically delves into the role-related stress of vocational

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teachers, examining the interrelationship between their professional or dual professional identities and Resilience.

The Resilience and its Relationship with Professional Identity

Resilience was first proposed by American psychologist Anthony (1974) in the 1970s. After more than 30 years of development, it has become a hot issue in international psychological research. It has received more and more attention in various disciplines, such as psychology, clinical medicine, education, and nursing. There is no uniform definition of resilience. The research on its concept is mainly divided into three categories: 1) Resilience is defined as an outcome, considering resilience to be the maintenance of functioning after experiencing stress, setbacks, and trauma, which refers to the competent behaviors and effective functioning at risk; 2) Resilience is defined as an individual ability and quality (Chen, 2023), a characteristic possessed by individuals. Resilience refers to an individual's capacity to bounce back from adverse experiences and adapt flexibly to evolving external environments. For example, Connor (2003) believes that "resilience is the ability to cope with adverse life events such as stress, setbacks, and trauma". Bobek (2002) and Kangas-Dick er al., (2020) also believe that resilience encapsulates an individual's capacity to surmount adversity, recuperate from setbacks, and adapt to dynamic environments; 3) Resilience is a process by which an individual adapts to a stressful event. For example, Rutter (1979) proposes that resilience is a dynamic process, a factor or protective process that interacts with risk factors. Gu & Day (2011) argue that resilience is directly influenced by the individual's personal, social, and organizational environments. Day & Gu (2013) refute the simplistic

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notion of resilience as merely the ability to rapidly recover from difficult or traumatic events. Instead, they contend that resilience is a dynamic and multidimensional concept that can be nurtured through the interplay of personal and environmental resources. In the context of teaching environments, resilience refers to the ability of teachers to maintain their teaching effectiveness and well-being despite the numerous demands and constraints they face in their work (Mansfield et al., 2016). After a comprehensive analysis of the aforementioned three theoretical perspectives on resilience, this study adopts the first conceptualization as its research perspective, defining resilience as an outcome that refers to the ability of vocational education teachers to maintain normal functioning under stressful conditions.

Professional identity or the dual professional identities within the vocational education may serve as a statistically significant predictor of resilience. In one hand, many studies have shown that teachers' professional identity relates to work stress, burn-out (Kremer & Hofman, 1985), and job leaving intention (Yan, 2008; Chen et al., 2017). Teachers with a high professional identity can deal successfully with stress, cope positively with change, and maintain a positive attitude toward their work. Teachers' professional identity directly impacts their commitment to their profession. Teachers with a higher level of professional identity are more motivated to work, have a higher level of job satisfaction, have a greater sense of occupational well-being, and have a lower tendency to leave their jobs (Li et al., 2018). In the other hand, Teacher resilience is associated with work engagement (Van Wingerden & Poell, 2019; Xie, 2021), job burnout (Daniilidou et al., 2020; Liu et al., 2021), and job satisfaction (Li & Lv, 2022). It has been linked to teachers' ability to help students develop resilience and their own desire to leave the teaching profession (Bouillet et al., 2014;

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Bowles & Arnup, 2016). Empirically, Sang et al. (2022) conducted a study in nursing area to explore the underlying mechanism connecting empathy and psychological resilience. Their findings revealed a robust association between resilience and one's professional identity.

Studies have shown that resilience is a crucial factor determining whether teachers working in impoverished areas (Day & Hong, 2016; Suryaratri et al., 2020) and those working with children with special educational needs (Mackenzie, 2012; Abdullah et al., 2019) can persist in their roles. The inferior perceived social status of vocational education in comparison with the general education, the low academic performance of vocational students and the repressive and suppressive mental statement of Chinese vocational teachers has a negative impact on their teaching performance (Zhang, 2006) and intensifies their burn-out, job leaving intention, and stress at work as the two previous categories of teachers. Therefore, associating the concept of resilience with dual professional identities can statistically illustrate whether the dual professional identities can influence the emotional condition of vocational teachers within Chinese vocational education.

The Determinants of Resilience and its Measurement

The concept of resilience has been approached from various viewpoints, leading to the creation of diverse tools designed to evaluate it in distinct manners (Pangallo et *al*., 2015). Individual resilience is recognized as an essential topic in behavioral, medical nursing, and psychological areas (Masten, 2001; Charney, 2004). It has also been frequently explored in the area of children’s care. For example, Mandleco & Peery (2000) proposed a systematic model of children's psychological resilience. This model construction receives inspiration

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from the ancient Chinese yin-yang dichotomy and interaction. Hasse (2014) developed a Resilience in Illness Model (RIM) for adolescents with cancer. This comprehensive, integrated model includes both processes and outcomes of resilience. Resilience has also been studied extensively within the educational area. For example, Zuo et al. (2023) developed a Chinese Resilience Scale for young children. Chen (2023) studied school principals from Hong Kong and Mainland China and developed five dimensions, including a 20-item Principal Resilience Inventory. In the area of teacher resilience research, Mansfield et al. (2012), posed the question "What makes a resilient teacher?" in their study to 200 pre-service and early career teachers. This study focused on identifying protective characteristics that enhance teacher resilience. The results highlighted four broad dimensions of protective factors: those specifically related to the profession (such as self-efficacy and teaching competence), emotional aspects (e.g., positive affect and emotion regulation), social aspects (e.g., supportive relationships with students and colleagues), and motivational aspects (e.g., a sense of purpose in work, including intrinsic motivation, perseverance, aspirations, and goals).

Two widely used scales for measuring resilience are the Connor-Davidson Resilience Scale (CD-RISC) developed by Connor and Davidson in 2003, and the Brief Resilience Scale (BRS) created by Smith et al. in 2008. The Connor-Davidson Resilience measure is a self-rated assessment of stress-coping ability. The scale was developed based on hardiness, adaptation, and stress endurance concepts. The 25-itemized scale consists of five factors: 1) notion of personal competence, high standards, and tenacity; 2) trust in one's instincts, tolerance of negative affect, and strengthening effects of stress; 3) positive acceptance of change, and security relationships, 4) control, and 5) spiritual influences. The Brief

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Resilience Scale (BRS) comprises six items meticulously crafted to assess an individual's perceived ability to bounce back or recover from stressful situations. This scale innovatively measures resilience as a unified construct, incorporating both positively and negatively phrased items, thereby providing a comprehensive assessment.

Chen (2024) has revolutionized the understanding of teacher resilience by delineating it into five distinct yet interconnected dimensions: physical, emotional, psychological, social, and spiritual resilience. This multidimensional framework provides a comprehensive approach to fostering teacher resilience. Physical resilience enables teachers to maintain high energy and well-being despite demanding routines, while emotional resilience helps them manage their emotions and maintain a healthy work-life balance. Psychological resilience allows them to thrive on clear goals, tackle challenges, and demonstrate perseverance. Social resilience is marked by their ability to build strong relationships, seek help, and appreciate the efforts of others. Spiritual resilience is characterized by their unwavering commitment to ethics and values, and their capacity to reflect on their mission when facing changes and challenges. By integrating these dimensions, Chen's framework supports teachers' professional growth and well-being, ultimately enhancing their effectiveness in the classroom and creating a more positive and nurturing educational environment for all students.

Zhang et al. conducted a Systematic Review on teacher resilience in 2023. They searched for English articles on Teacher Resilience published within the last decade and, from an initial pool of 172 articles, selected studies that utilized quantitative measurement tools to assess teacher resilience levels, excluding review and meta-analysis studies. This process yielded 22 eligible articles. Notably, among these 22 studies, the CDRS scale based

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on the Connor and Davidson (2003) study was employed six times, while the Brief Resilience Scale (Smith et al., 2008) and the Multidimensional Teacher Resilience Scale (Mansfield et al., 2015) were utilized three times. This study employs the Brief Resilience Scale (BRS) to refine the conceptual model, given its comprehensibility of content, prevalence as one of the most commonly used scales, conciseness of items, and the alignment of the scale with the conceptual perspective of resilience adopted in this study, namely that resilience is an outcome, and the design of the scale's items corresponds to this requirement. This selection seeks to facilitate a deeper comprehension of the intricate relationship between teacher resilience and dual professional identities.

Theoretical Model and Hypotheses of the Study

As mentioned in the background analysis, there are multiple reasons for the anomalous status of vocational education teachers. Macroscopically, the marginalization of vocational education has further led to the marginalization of vocational teachers' social status. Consequently, teachers need to build stronger resilience to cope with this marginalization, as well as the difficulties and challenges they face in teaching. This study identifies the issues of “identity ambiguity” and “prioritization” stemming from vocational teachers' entry routes, and “identity mismatch” with students due to teachers' learning paths, as the primary causes of confusion in teachers' professional development. It proposes the construction and strengthening of Dual Professional Identities as a solution to these problems as well as the path to cultivating "Dual-qualified" teachers.

Therefore, based on the reasoning from the background analysis and the theoretical

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support provided in the literature review, this study establishes a hypothetical theoretical model by designating entry routes and education as independent variables, the components of The Dual Professional Identities—namely Instructional Identity and Occupational Identity—as mediator variables, and resilience, which is considered capable of altering vocational teachers' sense of well-being and work effectiveness, as the dependent variable. (See Figure 6) Within this framework, the study proposes the following 12 hypotheses:

H1: There is a significant positive correlation between Entry routes and Instructional Identity.

H2: There is a significant negative correlation between Entry routes and Occupational Identity.

H3: There is a significant positive correlation between Education and Instructional Identity.

H4: There is a significant negative correlation between Education and Occupational Identity.

H5: There is a significant positive correlation between Instructional Identity and Resilience.

H6: There is a significant positive correlation between Occupational Identity and Resilience.

H7: There is a significant positive correlation between Entry routes and Resilience.

H8: There is a significant positive correlation between Education and Resilience.

H9: Instructional Identity mediates the relationship between Entry routes and Resilience, exhibiting a significant positive correlation.

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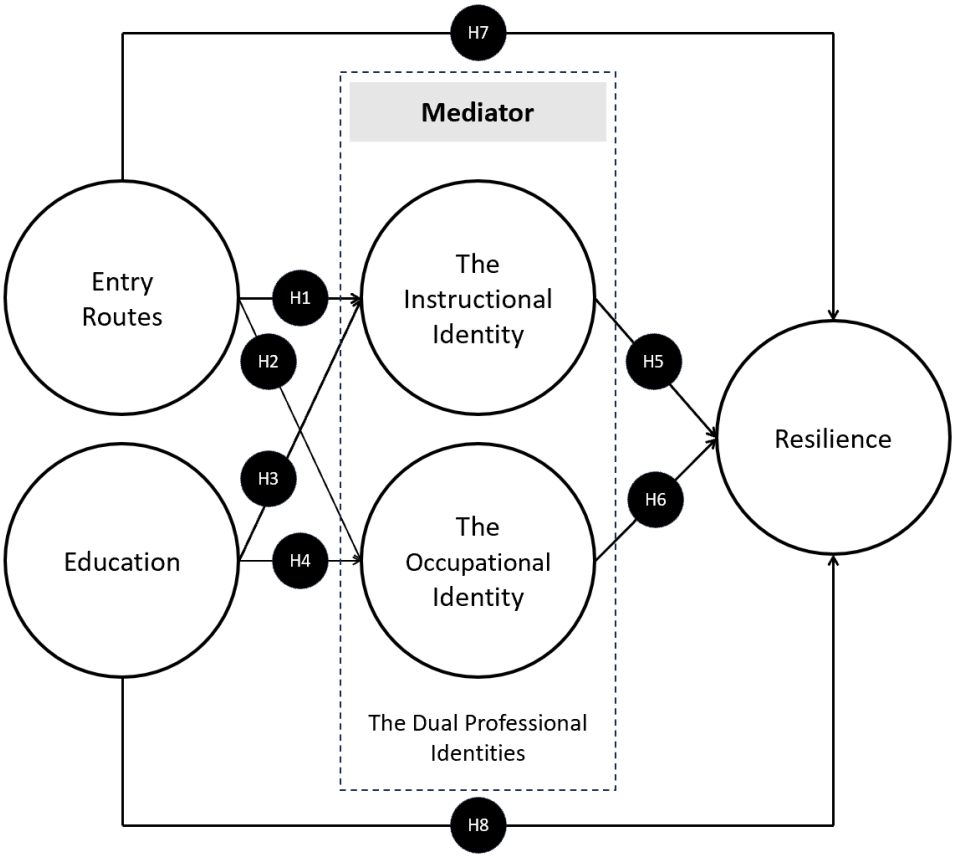
H10: Occupational Identity mediates the relationship between Entry routes and Resilience, exhibiting a significant positive correlation.

H11: Instructional Identity mediates the relationship between Education and Resilience, exhibiting a significant positive correlation.

H12: Occupational Identity mediates the relationship between Education and Resilience, exhibiting a significant positive correlation.

Figure 6:

The hypothetical theoretical model of the research



H9: Entry routes → The Instructional Identity → Resilience
H10: Entry routes → The Occupational Identity → Resilience
H11: Education → The Instructional Identity → Resilience
H12: Education → The Occupational Identity → Resilience

Chapter 3: Methodology

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Chapter Overview

This research is conducted using a quantitative and qualitative mixed methods approach. Mixed methods are considered the “third methodological movement” (Tashakkori & Teddlie, 2003). It is an intuitive approach to research that is constantly being demonstrated in our everyday lives (Creswell & Clark, 2017). A mixed methods approach is beneficial in bridging the gap between quantitative and qualitative research methods and is vital for this study.

This study is divided into two parts (Figure 2). The first part involves the development of the DPI-VT scale, while the second part focuses on path analysis by combining the sample's entry routes, academic degree level, Dual Professional Identities scale, and Teacher Resilience scale.

First and foremost, by examining current theories and measurement scales related to professional identity, this study has crafted an initial DPI-VT (Dual Professional Identities Scale for Vocational Teachers) scale, encompassing a broad range of items.

In the second phase, the study involved conducting semi-structured interviews with 15 vocational teachers. The audio recordings were then transcribed into text. By conducting a thematic analysis of the keywords, phrases, and paragraphs (Teng & Tsaur, 2022) within these transcripts, some items from the initial scale were validated, while others were refined, removed, or supplemented with new ones. This process led to the development of an improved DPI-VT scale.

After qualitative research, the study shifted to a quantitative approach, comprising

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three stages. Initially, I developed a comprehensive questionnaire. Exploratory Factor Analysis (EFA) on 299 datasets refined the scale, identifying its structure and dimensions. Subsequently, Confirmatory Factor Analysis (CFA) on 303 datasets verified the scale's stability and effectiveness. Reliability and validity tests, including Cronbach's Alpha, assessed the scale's performance, ensuring consistency and minimizing error.

Once the scale has been finalized, the study will proceed to validate the model presented in Chapter 2, Figure 6, along with its twelve associated hypotheses.

Part 1: DPI-VT (The Dual Professional Identities Scale for Vocational Teacher) Development

Phase 1: Developing Initial Scale and Generating Item Pool Based on Literature Review

The initial phase entails a comprehensive literature review centered on teacher identity. This involves meticulously synthesizing the dimensions and items from established scales while integrating the unique features of vocational education. Consequently, I selectively curate pertinent elements, particularly items, to lay the groundwork for constructing a novel scale tailored to vocational teachers.

The determinants of Instructional Identity and their developmental trajectory are extracted from existing measurement tools and theoretical frameworks pertaining to teachers' ' professional identities. By employing keywords such as "Instructional Identity Scale" and "Teacher Identity Scale," a thorough search of contemporary literature spanning from 2008 to 2021 was conducted to identify pertinent publications. These recent publications laid the foundation for developing the dimensions and items assessing vocational teachers'

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institutional identity.

This review enables an exploration of a broad range of literature to identify existing scales and frameworks used within educational contexts. The focus is particularly on those tailored for vocational education or those encompassing elements pertinent to this sector. Subsequently, a Critical Appraisal is conducted, analyzing the content, validity, and reliability of these scales, with a particular emphasis on aspects most relevant to the unique requirements of vocational education teachers. Ultimately, 10 scales related to "Teacher Professional Identity" (Instructional Identity) have been selected as the reference for developing the instructional identity. It is noteworthy that 9 of these selected scales were developed within the context of China, highlighting their cultural relevance (See Table 1).

Table 1

Research Status of Scales Related to Instructional Identity

Reference	Scale description	Dimensions	Items	Limitations
Ali et al. (2021)	ITP (Indicators for Measurement of Teachers' Professional Identity)	1) Teachers' Professional Identity	37	No clear dimensional categorization of the items. Samples come from a vast selection of counties with distinct social and economic situations.

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Li et al., (2018)	Measurement of Teachers' Professional Identity	1) Professional values; 2) Sense of professional belonging; 3) Sense of professional efficacy; 4) Value-driven behavioral tendencies; 5) Communal behavioral tendencies; 6) Coping with professional stress;	26	Scale focuses more on the behavioral tendencies.
Yu (2006)	Professional Identity Questionnaire for Young Teachers in Middle Schools	1) Recognition of professional ability; 2) Professional meaning; 3) Professional characteristics; 4) Leadership recognition; 5) Colleagues' recognition; 6) Students' recognition; 7) Acknowledgment of work rewards and work context; 8) Sense of belonging or collectiveness towards the school;	45	The sample is from middle school teachers in small cities in Hunan Province, and the sample has geographical limitations
Wei (2008)	The professional identity scale of primary school and middle school teachers	1) Professional values; 2) Role values; 3) Professional belongingness; 4) Professional behavior tendencies;	18	The application on vocational education
Li et al. (2008)	OIQ, Organizational Identification Questionnaire	1) Organizational Identification;	25	Only focus on organizational identity

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Zhao et al. (2012)	Scale of Professional Identity for stated funding Normal School Teachers	1) Teacher Professional Identity;	15	There are no dimensional categorizations of the scale. Furthermore, the scale focuses on a particular group of participants.
Tang et al. (2013)	Scale of Professional Identity for College English Teachers	1) Professional behavior tendencies; 2) Educational reform recognition; 3) Professional environment recognition; 4) Scientific research recognition;	19	The application of the scale is focusing on the university's English Teacher which possesses different daily tasks comparing to the vocational teachers such as scientific research.
Sun et Zuo, 2010	Measurement of professional identity of primary and secondary school teachers	1) Professional recognition; 2) Professional emotion; 3) Professional value;	12	The scale focuses on the primary and secondary school teachers of the general education.
Qin, 2008	Questionnaire of Kindergarten Teachers' Professional Identity	1) Goal certainty; 2) emotional belonging; 3) Willingness to invest; 4) Competence efficacy; 5) Continuous commitment; 6) Interpersonal support;	12	The application on vocational education needs to be considered
Li et al., 2013	Scale of Professional Identity for Primary and Middle School Teachers	1) Teacher Professional recognition;	20	The scale focuses on the primary and secondary school teachers of the general education.

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The aforementioned scales have produced constructive research outcomes in measuring teachers' professional identity. Most of these scales are tailored for research on teachers' professional identity within the Chinese context, thus they offer certain reference value for studying the professional identity of vocational education teachers who share the same social and educational policy background in China. However, due to the different research directions these scales focus on, they also have certain limitations. Therefore, this study conducted an in-depth analysis of the item contents of these scales (totally 229 items).

Initially, items with minimal relevance to vocational education were removed, followed by the elimination of items with identical connotations. Based on the completed literature review and the unique characteristics of the vocational education context in China, I conducted a process of induction and combination for the scale items related to teacher professional identity for the remaining items. Finally, I conducted a content analysis, by which the unit of analysis may consist of a single word, theme, sentence, paragraph, item, or a series of symbols, as noted by Teng and Tsaur (2022). For this analysis, I have chosen themes and sentences as the smallest units.

After confirming the dimensions and items of the initial scale regarding vocational education teachers' Instructional Identity, I proceeded to expand the development of items related to Occupational Identity. It is worth noting that the development of items concerning Occupational Identity was also initially explored within the dimensional framework of Instructional Identity.

As indicated in the literature review, the conceptualization of vocational teachers' Occupational Identity must be seamlessly integrated into the school-enterprise cooperation

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framework. Detaching it from this context would obscure the distinctiveness of vocational teachers' identity. Therefore, a deep dive into the unique aspects of vocational education is imperative.

This entails recognizing that their occupational identity cannot merely mirror the identity traits of other professions. Instead, it must fully encompass the unique working environment and employment relationships of vocational teachers, along with the specific avenues through which they acquire these identity traits. These include prior work experience, professional learning within the school-enterprise cooperation framework, student-teacher relationships, work modes, and more. Consequently, this exploration was conducted using the Community of Practice theory and the theory of school-enterprise cooperation as foundational frameworks.

Phase 2: Enhancing Scale Precision through Qualitative Research

To develop the DPI-VT scale more comprehensively, I adopted qualitative research methods to refine the initial item pool, referencing previous studies (Boley et al., 2011; Hosany & Gilbert, 2010; Kim et al., 2012; Wong & Wan, 2013; Wu et al., 2022). Thus, the second phase of developing the DPI-VT scale involves conducting semi-structured interviews with a meticulously chosen sample of 15 vocational teachers. This qualitative research endeavor seeks to validate and enrich the key concepts extracted from the literature review. Furthermore, it strives to uncover potential new dimensions and items that distinguish the dual professional identities of these vocational teachers. Data collection during this qualitative phase is primarily conducted through interviews, which undergo thematic analysis

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once information saturation is reached.

Step 1: Sampling of the semi-structure interview. The sampling of the qualitative stage follows the principle of maximum variation sampling, which seeks to anticipate samples with diverse perspectives on core characteristics (Creswell & Clark, 2017). 15 participants with diverse demographic and social variables, such as gender, length of work experiences, teaching majors, level of schools, work locations, and entry routes have been selected.

All participants come from the vocational institutions with which I work as consultant. Selected teachers come from diverse departments, covering seven different professions: Cooking, Tour guiding, Hotel Management, Digital Marketing, Restaurant Services, Wine sales, Sommelier, Coffee making, CNC turning and milling, Autobody repairing, Fashion Technology, Beauty and Therapy, French and International Trade. The main reason for recruiting participants from diverse majors is to gather experiences from an enormous scope of professions and identify possible influential factors that impact vocational teachers' Dual Professional Identities formation within the school-enterprise cooperation framework.

Every selected participant is officially informed of involvement in this research project. The 15 vocational teachers have different entry routes to becoming vocational teachers (Table 2). They possess different perspectives about their professional identity formation and distinctive experiences of acting within the school-enterprises cooperation framework. All participants used their pseudo-names in the data analysis.

The vocational teachers interviewed possess varying years of work experience. Specifically, one respondent, who recently graduated from a normal university and became a

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teacher, has only one year of experience. Another respondent has two years of experience, while three others have five years under their belt. One teacher boasts eight years of experience, four have twelve years, and five have over fifteen years of teaching experience.

Table 2

The participants of semi-structured interviews

Demographic characteristics	No.	%
Gender		
Male	7	46.7%
Female	8	53.3%
Education		
Bachelor	7	46.7%
Master	5	33.3%
Doctor	3	20%
Level of school		
Vocational high school	10	66.7%
Higher vocational college	5	33.3%
Teaching majors		
Hotel Management and Digital Marketing	1	6.67%
Hotel Management and Restaurant Service	1	6.67%
Sommelier	1	6.67%
Cooking	2	1.29%
Wine Sales	1	6.67%
Tea Art and Tea Service	1	6.67%
Coffee Service	1	6.67%
Tour Guide	1	6.67%
French as a Foreign Language	1	6.67%
International Trade	1	6.67%
Fashion Technology	1	6.67%
Beauty and Therapy	1	6.67%
Autobody Repairing	1	6.67%
CNC Turning and Milling	1	6.67%
Total	**15**	**100%**

Step 2: Semi-Structured Interview and Data Collection. The data collection at

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qualitative study aims to understand what factors that relates to the Dual Professional Identities level in the context of Chinese vocational education.

This study will first use narrative inquiry to discover participants' experiences in their daily work and life. A preliminary compilation of the interview protocols has been conducted for this study.

The estimated interview protocol of this research is as follows:

1. Why and how did you choose vocational teachers as a profession?
2. Do you think it is important for a vocational teacher to possess simultaneously the instructional identity and the occupational identity?

The above open questions will help discover the interviewees' general or specific concerns. It will provide an extensive perspective of the interviewee's point of view. The thematic analysis of the interview transcript will allow me to justify, complement, and confirm the initial dimensions and items of the measurement scale.

The questions regarding identity involve two types: Instructional identity and Occupational identity. When asking these questions, teachers are first placed in the context of either a school or an industry, followed by inquiries related to their identity. For each dimension, questions are posed specifically for each type of identity. Since the primary work setting for teachers is within schools, and schools are their sole employers, the design of questions pertaining to instructional identity and occupational identity is based on the real activities and situations that teachers encounter in these two environments. The questioning typically begins with open-ended questions, such as:

"Tell me about some experiences that made you proud of being a schoolteacher."

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Or

"Tell some experiences that make you proud of being part of the industry."

After explaining the concept of dual professional identity of vocational college teachers to the subjects, I asked the following questions to the subjects in close connection with the research objectives, referring to the questioning method of Sun et & Zuo, (2010):

- ✓ "Please describe the various behaviors and characteristics of a vocational college teacher with a high level of dual professional identity in an ideal state."
- ✓ "What are the main differences between teachers with a high level of dual professional identity and those with a low level of dual professional identity?"
- ✓ "Is there a phenomenon where teachers have a high level of identification with their teaching profession but a low level of identification with their specialized field, or vice versa?"

In case that some interviewees can hardly elaborate their experiences and go deeper into the issue, I borrow the items of the existing scales to form the questions for guiding their thinking. For example, I also ask questions like:

- ✓ "Would you be willing to introduce your identity as a vocational teacher when giving a self-introduction?"
- ✓ "Would you be willing to mention the industry related to the skills you teach when giving a self-introduction?"
- ✓ "Do you care about how others perceive the profession of vocational teachers, and do you feel insulted when someone unfairly attacks or criticizes this group?"
- ✓ "Do you care about how others perceive the profession corresponding to the

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skills I teach, and do you feel a sense of relief when you see or hear words praising that profession?"

- ✓ "Does having a harmonious relationship with students enhance your Instructional Identity?"
- ✓ "Does maintaining good connections with industry professionals enhance your Occupational Identity?"

When asking these questions, I also observe the facial and body actions of the interviewees. The facial and body actions sometimes confirm the positive relationship between the items and the professional identity adoption.

Finaly, some demographic information of the selected participants, such as gender, education level, school location, school level, teacher category (Full-time school teacher or part-time teacher), grade, income level and major teaching, have also been collected. Some other information needs to be collected during the interview:

- ✓ "What is your title?"
- ✓ "Do you possess any other professional certificates other than the teacher certificate?"

Interviews data presented a saturation state when the 13th teacher interview was completed. However, I still continued to complete the last two interviews. After a total of 15 interviews, I collected 18 hours and 47 minutes of interview time, a total of 212,431 Chinese words of interview transcripts.

Step 3: Thematic Analysis based on Verbatim Transcript. The qualitative data analysis task is based on a thematic analysis approach (Strauss & Corbin, 2005). The

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thematic analysis helps identify, analyze, and report the themes embedded in the interviewed data (Braun & Clarke, 2006). This method is divided into six steps, including 1) Become familiar with the data, 2) Generate initial codes; 3) Search for themes; 4) Review themes; 5) Define themes; and 6) Write-up the report. The thematic analysis aims to gain a deep understanding of the research phenomenon by identifying and analyzing themes and patterns in the data.

The thematic analysis of this project is divided into two steps. Firstly, a confirmatory thematic analysis is done to confirm the existence of the dimensions extracted from the literature analysis. It serves to confirm some items of the existing scale or to develop the sub-themes that can be used to design the items. Secondly, an exploratory thematic analysis is done to discover the possible new dimensions. It serves to develop new themes and sub-themes that can be used to design the new dimensions and items.

Step 4: Expert Approval and English Version Back-Translation process. To assess the content validity of the scale, this study employs a methodology involving expert review and focus group discussions. This approach aims to evaluate whether the scale items comprehensively cover all aspects of the concept or trait being measured, thereby ensuring the representativeness and comprehensiveness of the scale content. Specifically, I invited two sociologists, two psychology experts, and two leaders from vocational colleges to review the content of the scale items, along with the consistency, clarity, readability, and format of the rating scale for each item. Following their feedback, some of the initial items have been adjusted, re-organized or deleted. Additionally, I invited 10 teachers from vocational colleges to pilot the scale and provided them with an opportunity to comment on the scale instructions,

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item format, clarity and readability of the items, as well as the response options, further refining the scale based on their insights.

After the expert approval, as most of the original sources are in Chinese, the scale went through an initial translation conducted by the researcher, which was then followed by a subsequent meticulous back-translation into Chinese. The Chinese renditions which served to construct the final questionnaire were refined until each element could be accurately back-translated into English.

Step 5: The DPI-VT Questionnaire design. After summarizing the literature review and conducting a thematic analysis of the semi-structured interviews with 15 samples, a questionnaire consisting of three parts was designed. These three parts include a demographic questionnaire for the samples, a Dual Professional Identity questionnaire for vocational teachers, and a Teacher Resilience questionnaire.

1) The Demographic Questionnaire. The demographic questionnaire covers: gender, age, sample's region, entry routes, educational qualification, current teacher status, current professional title, current subject taught, teaching experience, level of affiliated institution, whether they hold any other professional qualifications besides the teacher's qualification certificate, and average monthly income.

2) The Dual Professional Identities Questionnaire. Each dimension in the Dual Professional Identities questionnaire consists of two sub-dimensions. It means that the questionnaire measures both instructional identity and occupational identity within each dimension.

The questionnaire regarding vocational teachers' Dual Professional Identities and

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Resilience was designed using a Likert five-point scoring method, with five levels ranging from "completely disagree" to "completely agree," scored as 1 to 5 respectively. A higher score indicates a higher level of professional identity among teachers.

3) The Teacher Resilience Questionnaire. The Teacher Resilience questionnaire adopts the BRS (Brief Resilience Scale) Questionnaire developed by Smith et al. in 2008. The BRS, initially formulated in English, comprises six elements designed to evaluate an individual's ability to recuperate from stressful circumstances. Given that the BRS had not previously been translated into Chinese, a meticulous back-translation methodology was employed again to render the six elements into Chinese. This process entailed an initial translation by the researcher, followed by a subsequent back-translation into English by two EdD Students and reviewed by an expert in Educational Psychology. Refinements were made to the Chinese renditions until each element could be precisely back-translated into English. Subsequently, participants were prompted to rate their level of agreement with each of the six elements on a 5-point Likert scale, where 1 denoted strong disagreement and 5 signified strong agreement. Among the six original items, items 2, 4, and 6 are reverse-scored items, which were transformed into positively worded questions during the translation into Chinese to facilitate respondents' understanding.

Phase 3: Verifying Scale Reliability and Validity through Quantitative Research

The third phase of this study is dedicated to ensuring the reliability and validity of the developed scale, which is essential for establishing the credibility and applicability of the research instrument. This assessment not only bolsters the reliability of the findings but also

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ensures the accuracy and effectiveness of subsequent data analyses.

Round 1: EFA (Exploratory Factor Analysis). From a methodological perspective, this study initially employed Exploratory Factor Analysis (EFA) to process the 299 datasets collected in the first round, aiming to delve into the underlying data structure. Given that the research subjects possessed dual identities as both instructional and occupational entities, we conducted EFA separately for these two identities using SPSS 24 software. The suitability of the data for EFA, pertaining to both Instructional Identity and Occupational Identity, was confirmed through the Kaiser-Meyer-Olkin (KMO) value and Bartlett's Test of Sphericity.

During the EFA process, Principal Component Analysis (PCA) was utilized to extract common factors, followed by the application of the varimax rotation method to the factor loading matrix, in order to obtain a clearer factor structure. Based on the criteria of factor loading values and cross-loadings, this study screened the questionnaire items, eliminating inappropriate ones, and subsequently conducted EFA again on the remaining items.

In this study, the scree plot was analyzed, leading to an intuitive assessment that a two-factor solution was appealing. Concurrently, further analysis was conducted based on the criterion of eigenvalues exceeding 1. Ultimately, the researchers identified four common factors, which collectively explained a substantial portion of the total variance. These four factors were labeled as "Role Recognition," "Professional Efficacy," " Environmental Belongingness," and "Community Engagement," providing profound insights into the dual identity characteristics of the research subjects.

Round 2: CFA (Confirmatory Factor Analysis). This study employed Confirmatory Factor Analysis (CFA) to explore the dual professional identities of vocational education

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teachers, specifically through first-order and second-order CFA analyses, both conducted using AMOS software for model fitting and validation.

First-Order CFA Analysis. The first-order CFA analysis aimed to verify whether the factor structure aligns with the actual data. Based on the Dual Professional Identity model of vocational teachers, a first-order four-factor model encompassing scales for teaching identity and professional identity was constructed. Utilizing AMOS 24 software, 36 items obtained from Exploratory Factor Analysis (EFA) were analyzed, corresponding to four dimensions within the teaching identity and professional identity scales. Model fitting was conducted to assess the structural dimensions of these scales, and a standardized path diagram was generated, illustrating standardized regression coefficients, correlation coefficients, and R^2 values.

Second-Order CFA Analysis. Building upon the first-order CFA analysis, the second-order CFA analysis further explores the existence of a higher-order factor structure among the factors. When high correlations are observed among first-order factors, it suggests the potential presence of a higher-order factor overseeing these first-order factors. Guided by theoretical insights (Fu et al., 2013) and the results from the first-order CFA analysis, this study identified significant high correlations among the four latent variables within the Instructional Identity and Occupational Identity scales. Consequently, a second-order four-factor CFA models were constructed for Instructional Identity and Occupational Identity, respectively. AMOS software was employed for model fitting, and fit indices such as IFI, TLI, CFI, RMR, and RMSEA were evaluated to validate the plausibility of the second-order factor structure. Additionally, a standardized path diagram for the second-order structure was

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generated, further confirming the relationships among dimensions and the validity of the multidimensional hypotheses.

Through first-order and second-order CFA analyses, this study systematically validated the factor structure of the dual professional identities of vocational education teachers, providing robust statistical support for a deeper understanding of their professional identities.

Internal Consistency Reliability (Cronbach's Alpha). To ensure the reliability of the questionnaire, the study calculated Cronbach's Alpha coefficients for the entire Dual Professional Identity scale, as well as for the Instructional and Occupational Identity scales and their respective dimensions. This internal consistency measure helped to confirm the consistency and stability of the questionnaire items in measuring the intended constructs.

Content Validity. The content validity of the questionnaire was ensured through a development process involving literature review, interviews and expert evaluations with subsequent revisions based on feedback from educational experts and frontline vocational teachers.

Structural Validity. Structural validity was assessed using critical ratio analysis and correlation analysis to evaluate item discrimination and the dimensionality of the Instructional and Occupational Identity scales. Additionally, CFA was used to support the structural validity of the proposed models.

Part 2: Path Analysis and Hypothesis Validation

The second objective of this study is to validate the twelve hypotheses (illustrated in

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Figure 6) outlined in the theoretical model. To achieve this, a methodological approach was employed, leveraging SPSS 24.0 for comprehensive statistical analysis of the collected data.

Descriptive Statistical Analysis

The initial stage of the analysis involved conducting a descriptive statistical analysis on the variables of interest. This step was crucial for understanding the basic characteristics of the dataset, including measures of central tendency (mean), dispersion (standard deviation), and correlation analysis. By gaining insights into the data's descriptive statistics, this study was able to assess the suitability of the dataset for further analysis and identify any potential outliers or anomalies that might need addressing.

Hierarchical Regression

Following the descriptive analysis, hierarchical regression was utilized to examine the main effects of the independent variables on the dependent variable, specifically focusing on the relationship between Entry routes, Education, and Resilience. The three-step regression procedure proposed by Baron and Kenny (1986) was adhered to, allowing for a systematic investigation of the direct and indirect effects of these variables. The mediation analysis follows the three-step approach including: (1) testing the correlation between the independent variable and the mediator; (2) testing the correlation between the independent variable and the dependent variable; and (3) testing the impact of the mediator on the dependent variable, and whether the initial effect of the independent variable on the dependent variable is reduced or eliminated to determine if the mediation is partial or complete. This approach enabled this

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study to assess the extent to which Entry routes and Education influenced Resilience, while also accounting for potential confounding variables.

Mediation Analysis

To further delve into the complex relationships among the variables, particularly the mediating role of identity, PROCESS for SPSS was adopted as the mediation effect testing tool. This powerful statistical package can conduct mediation analysis with greater precision and accuracy. The Bootstrap method, with a 95% confidence interval based on 5,000 iterations, was employed to estimate the mediation effect. This technique provided a robust and reliable assessment of the indirect effect of Entry routes and Education on Resilience through the mediator of identity. By using the Bootstrap method, we were able to account for sampling variability and obtain more accurate estimates of the mediation effect, thereby enhancing the validity and reliability of our findings.

In summary, the methodological approach employed in this study was comprehensive, combining descriptive statistical analysis, hierarchical regression, and mediation analysis using PROCESS for SPSS with the Bootstrap method. This approach led to thoroughly validate the twelve hypotheses proposed in the theoretical model and gain a deeper understanding of the relationships among the variables of interest.

In conclusion, this study employs a mixed-methods approach to explore the dual professional identities of Chinese vocational teachers, integrating both quantitative and qualitative methods. Through comprehensive literature review, semi-structured interviews,

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thematic analysis, and scale development and validation, this research aims to provide a nuanced understanding of the complex phenomenon of vocational teachers' professional identities. The findings from the initial scale development and subsequent reliability and validity analyses will lay a solid foundation for the in-depth data analysis phase. By utilizing various statistical methods, this study expects to uncover the key factors influencing vocational teachers' Dual Professional Identities, their relationships with resilience. The subsequent findings section will delve into the specific results of this research, offering valuable insights into the dual professional identities of Chinese vocational teachers.

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Chapter 4: Finding

Chapter overview

This chapter aims to present the three key findings of this research, namely the DPI-VT (The Dual Professional Identities Scale of vocational teachers), and the influential factor analysis.

The development of the Dual Professional Identities Scale underwent a three-stage process: the scale development stage based on theory and existing scales, the thematic analysis stage based on interviews (N=15) transcripts, and the reliability and validity analysis stage based on questionnaire data analysis. The measurement of professional identity is a complex task that falls within the realm of psychological measurement. Psychological traits are inherent, concealed characteristics that can only be inferred through observable behavioral manifestations. Given this complexity, psychological measurement cannot achieve absolute accuracy but can only aspire to reach a certain level of precision (Dai et al., 2018). Therefore, in developing items for the scale, it was crucial to not only fully consider existing theories but also to take into account the current situation of vocational education in China and the unique behavioral and psychological characteristics of vocational education teachers. This comprehensive approach enabled the formulation of a measurement tool with high reliability and validity. The initial scale was subjected to validation through Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA), demonstrating its high reliability and validity in accurately measuring the dual identity of vocational education teachers.

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Another contribution of this study lies in the exploration of the influence pathways and correlation relationships between the educational attainment, entry route, and teacher resilience of teachers in Chinese vocational colleges, using the developed concept of Dual Professional Identities as a mediating variable. This newly developed theoretical model facilitates vocational education administrators in identifying ways to enhance teacher resilience and shape Dual Professional Identities, thereby more effectively building a team of "Dual-qualified" teachers in vocational education.

This chapter will provide an in-depth elaboration of the research process, from the initial scale development stage to the final verification of reliability and validity, based on demographic variable statistical data analysis and factor analysis, offering a comprehensive view of the research findings and their implications.

The Process of Scale Development and Data Analysis

Items Generation of Vocational Teacher's Instructional Identity

Through the methods of induction, combination and content analysis, I have preliminarily derived 32 dimensions and 229 initial items extracted from 10 existing measurement scales at this stage, laying a solid foundation for the guiding framework of the next stage of research.

Before analyzing the items, this study conducted a content analysis of the 32 dimensions collected from 10 different scales. After summarizing based on the literal meanings and the corresponding item meanings, this study classified the 32 items into six different categories:

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1) Teachers' professional identity (role) recognition;

2) Teachers' professional values;

3) Recognition of teachers' professional abilities;

4) Emotions and commitments towards the teaching profession;

5) Teachers' work environment and coping strategies;

6) Attitudes towards educational reform and scientific research.

These six dimensions are not equivalent to the dimensions set in the Dual Professional Identity scale that this study aims to develop. However, these six dimensions are derived based on the content analysis of existing scales, so they have a certain relationship with the initial scale that will be obtained and can serve as a reference standard for setting the dimensions of the Dual Professional Identity scale.

Then, an exploration of the items is based on the content analysis of 229 items from 10 existing scales is done. After conducting a content analysis of each of the 229 items, I rearranged the items with similar meanings and classified them into 5 dimensions related to teachers' professional identity. These 5 dimensions consist of:

Role Recognition (RR), which encompasses both self-acknowledgment of the teaching profession and responsiveness to external evaluations. It is conducive to shaping a strong professional identity, fosters a sense of belonging, and is equipped with the necessary attributes to facilitate optimal professional growth and performance.

Professional Expertise (PE), referring to capability that are conducive to achieving goals, foster continuous learning, and are equipped with the necessary skills to facilitate exceptional performance.

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Community Cohesion (CC), which is conducive to productivity, fosters collaboration, and is equipped with the necessary resources to facilitate optimal performance.

Value Adherence (VA), which is conducive to shared values, fosters a sense of belonging to the organization and profession, and is accompanied by the necessary commitment to strive for common goals and facilitate optimal professional development.

Career commitment (CO), which is conducive to career advancement, fosters dedication, and is accompanied by the necessary resolve to facilitate exceptional professional growth.

The five dimensions summarized through content analysis and reorganization based on the 229 items are highly similar to the dimensions previously derived solely from the literal meanings and connotations of the dimensions. This further demonstrates that these dimensions have broad representativeness and substantive significance in evaluating teachers' professional identity.

After the defining the initial dimensions framework of the Instructional Identity, I grouped the relevant items into each of the dimensions. I firstly eliminated the items that with exactly the same meaning. And then a second round of content analysis has been done to discover if there exist some sub-dimensions than interpreted the framework more in detail. Furthermore, the finding of literature research also supports that the extracted dimensions can effectively evaluate the Instructional Identity of teacher of even vocational teachers. The content analysis of the remained items showed that all of them can furtherly be grouped into sub-dimensions as showed in the Table 3:

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Table 3

The Initial dimensions and sub-dimensions of Instructional Identity Scale and their theoretical support

Dimensions	Sub-Dimensions	Sources
Role Recognition (RR)	Personal Emotions and Identity	Bucher and Stelling (1977); Kremer & Hofman (1981); Knowles (1992); Liu et al. (2008); Liu (2022); Hao et al. (2014); Tong et al. (2022); Cooper-loelu et al. (2022); Ali et al. (2021)
	External Evaluation and Response	Wei et al. (2013); Li and Yan, (2018)
Professional Efficacy (PE)	Teaching Preparation and Self-confidence	Bucher and Stelling (1977); Liu et al. (2008); Qin (2008); Beijaard et al. (2000)
	Coping with Students and Teaching Ability	Hargreaves and Goodson (1996); Beijaard et al. (2000); Liu (2022)
	Career Development and Personal Fit	Li and Yan (2018)
	Teaching Execution and Technology Application	Hargreaves and Goodson (1996); Beijaard et al. (2000)
Community Cohesion (CC)	Inter-personal Relationship	Fracchiolla et al. (2020); Chryssochoou, (2003); Shanahan (2009); Esteban-Guitart et al. (2014); Nasir (2011); Bathmaker & Avis (2013); Imafuku et al. (2022); Myers and Oetzel (2003); Qin (2008); Ferreira (2022); Liu et al. (2008)
	Environmental Resources and Working Conditions	Yu (2006)
Value Adherence (VA)	Professional Values	Creuss et al. (2014); Cast (2003); Li and Yan (2018); Reinders et al. (2020).

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	Sense of Belonging and Shared Goals	Bucher and Stelling (1977); Li and Yan (2018); Wei (2008);; Liu et al. (2008); Liu et al. (2008)
Career Commitment (CO)	Value-Driven Behavioral Tendencies	Myers and Oetzel (2003); Day & Gu (2007); Li and Yan (2018)
	Communal Behavioral Tendencies	Li and Yan (2018); Tong et al. (2022)

Under the guidance of the sub-dimension framework, it is more conducive to categorizing the existing items and revising them according to the attributes of vocational education.

Based on the framework of dimension and sub-dimension categorization, the items have been reorganized according to their connotations. Furthermore, some item expressions have been reviewed and modified to align with the context of vocational education. The initial Instructional Identity of Vocational teachers is showed in the Table 4:

Table 4

Initial Scale Items of Instructional Identity Based on Literature Review

Dimensions	Sub-Dimensions	Items Description
Role Recognition (RR)	Personal Emotions and Identity	A1. I am proud to be a teacher. A2. I really enjoy teaching. A3. I often introduce myself by saying, "I am a teacher." A4. In the field of vocational education, there are role models that I admire.

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	External Evaluation and Response	A5. When I see or hear words that praise the teaching profession, I feel a sense of gratification. A6. I care about how others view the profession of vocational teachers. When someone unjustly attacks or criticizes this group, I feel insulted.
Professional Efficacy (PE)	Teaching Preparation and Self-confidence	A7. I feel that I am fully prepared for teaching, and I usually demonstrate confidence when dealing with teaching tasks.
	Coping with Students and Teaching Ability	A8. In my classroom, I can effectively manage different groups of students and develop teaching strategies tailored to their actual situations, providing individualized instruction.
	Career Development and Personal Fit	A9. I believe that my personality, experience, and knowledge are well-suited for being a teacher.
	Teaching Execution and Technology Application	A10. I am able to complete my current teaching responsibilities diligently and promptly, and I can skillfully utilize various teaching equipment in my daily teaching.
Community Cohesion (CC)	Inter-personal Relationship	A11. My students recognize my work. A12. I am satisfied with the interpersonal relationships among my colleagues. A13. The school leadership is effective, values teacher development, and handles matters fairly. A14. My colleagues will help me when I need assistance.

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	Environmental Resources and Working Conditions	A15. The school provides sufficient teaching resources, and the environment is conducive to teaching and learning. A16. The school has a well-established accountability system and an incentive system that encourages good performance. A17. The evaluation of professional titles is objective and fair, and the promotion mechanism is satisfactory.
Value Adherence (VA)	Professional Values	A18. I believe that the teaching profession is important for both individual and societal development.
	Sense of Belonging and Shared Goals	A19. I am proud to be a member of my school. A20. I believe that my development is closely linked to the development of the teaching community and the school.
Career Commitment (CO)	Value-Driven Behavioral Tendencies	A21. I have a responsibility to promote the comprehensive development of students. A22. I hold the belief in lifelong learning and strive to continuously improve my professional level.
	Communal Behavioral Tendencies	A23. I will be mindful of my words and actions, and will not bring any negative impact to the image of the school. A24. I care about the development of the school, and I am willing to contribute my wisdom and strength for its better development.

Items generation of vocational teacher's Occupational Identity

Occupational identity, serving as a collective term or synonym for various Professional Identities, shares similar measurement criteria with general professional identity

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or exhibits certain analogous or identical metrics with professional identities across different occupations. Consequently, this study conducted a thorough analysis and integration of multiple scales encompassing various Professional Identities, including Instructional Identity, ultimately arriving at five measurement dimensions that align with Instructional Identity. This outcome underscores the remarkable similarity in the measurement approaches employed for different professional identities within existing literature and scales.

However, as mentioned in the Literature Review of this study, vocational teachers' Occupational Identity differs from that of professionals who actually work in their positions and rely on such work as a means of earning a living. Therefore, this study cannot simply borrow the developed items of Occupational Identity measurement scales of other professions to design that of vocational teachers'. It is also inappropriate to design scale items directly by mirroring those used for Instructional Identity. For instance, in the "Role Recognition" dimension, a vocational education teacher might express their identity as a teacher by stating, "I am proud to be a teacher." However, when designing items for Occupational Identity, one cannot simply use "I am proud to be a Sommelier" to indicate their identification with the Sommelier role. This is because 'Teacher' represents the participant's actual profession, whereas 'Sommelier' does not. If seeking a basis for item design within existing theories, such a basis should be derived from content related to the five dimensions found in theories such as Community of Practice, Professional Learning, school-enterprise cooperation, and the construction of occupational identity in other professions (Table 5). Due to the lack of readily available theories as a foundation, these items derived from theory must undergo repeated validation through interviews with participants before they can be considered valid.

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After conducting literature research, within the framework of the original five dimensions, I have initially obtained the following items:

Table 5

Scale items of Occupational Identity based on literature research

Dimensions	Item description	Sources
Role Recognition (RR)	B1. I am concerned about how others perceive the professional group corresponding to the skills I teach, and I feel insulted when someone unfairly attacks or criticizes this group. B2. When introducing myself, I am happy to mention the industry related to the skills I teach. B3. There are admirable role models in the industry related to the skills I teach.	Bucher and Stelling (1977); Kremer & Hofman (1981); Knowles (1992); Tong et al. (2022); Cooper-loelu et al. (2022).
Professional Efficacy (PE)	B4. The industry skills I possess enable me to be competent in my job, and I usually exhibit confidence when participating in industry-related activities. B5. I have no communication barriers when interacting with people within the industry.	Bucher and Stelling (1977); Hargreaves and Goodson (1996); Beijaard et al. (2000); Liu (2022).

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Community Cohesion (CC)	B6. I maintain good connections with people within the industry. B7. My professional abilities are recognized by industry professionals. B8. When I need help, I believe industry professionals will assist me. B9. It provides excellent learning opportunities.	Chryssochoou, (2003); Myers and Oetzel (2003); Shanahan (2009); Nasir (2011); Bathmaker & Avis (2013); Esteban-Guitart et al. (2014); Fracchiolla et al. (2020); Imafuku et al. (2022).
Value Adherence (VA)	B10. I endorse the behavioral norms and standards within the industry. B11. I believe that my development is closely linked to the development of the industry that referring to my major.	Bucher and Stelling (1977); Cast (2003); Creuss et al. (2014); Lewis et al. (2016); Reinders et al. (2020).
Career Commitment (CO)	B12. I am willing to engage in activities between schools and enterprises and learn from them. B13. I am willing to strengthen cooperation with partner enterprises in professional development. B14. I am willing to work with partner enterprises to jointly cultivate talents that meet the needs of enterprise positions. B15. I am willing to share resources with partner enterprises.	Lave and Wenger (1991); Wenger (1998); Barnett (1999); Jacobs & Park, (2009); Wenger (2010), Illeris (2011); Zhao & Ko (2018).

In conclusion, five possible dimensions are extracted from the existing literature and

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scales that measure either teacher's professional identity or professional identity of other professions. However, the existing items of each dimension cannot be directly used without taking into account the characteristics of vocational education. Therefore, qualitative research which consists of semi-structured face-to-face interview with vocational teachers of different background is necessary to perfectionate the initial measurement scale.

Thematic Analysis Result

Overview of the Thematic Analysis Result. The following findings are structured based on the items of the initially developed scales, connecting the themes obtained from the interviews to observe whether the interview content supports the viewpoints of the items. The results of the thematic analysis indicate that the five main themes derived from the existing theory and scales remain valid. However, the classification of sub-themes under each main theme has undergone changes.

The findings also indicate that most of the items developed based on theory were recognized by the interviewees. However, some items were not mentioned by the interviewees. To further verify whether these unmentioned items are related to teachers' Instructional Identity and Occupational Identity, the researcher actively posed them as questions to the interviewees.

The empirical process revealed that some items derived from theory align well with the research context proposed by the theory but may not necessarily fit the research context of vocational education in China. These items in the initial scale that were not validated by the interviewees were deleted by the researcher.

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During the interviews, the interviewees also proposed some viewpoints that were not present in the existing theory and believed that these viewpoints could be set as items related to evaluating teachers' Instructional identity or Occupational professional identity. These new viewpoints discovered during the interviews, after being validated by multiple interviewees from different perspectives, were incorporated into the initial scales (Table 7, II-04, OI-03, II-05, OI-04, II-08, OI-05, II-09, OI-08, OI-11, II-16, OI-13, OI-14, OI-15). 5 items about the Instructional Identity and 8 items about the Occupational Identity have been newly discovered after the thematic analysis.

Some items in the initial scales received support from both theory and interviews regarding their connotations, but their expressions were relatively vague or did not conform to the research context of vocational education in China. For such items, the researcher retained them and made appropriate adjustments to their expressions. As long as the newly discovered items and adjusted items are approved by the EFA and CFA, the supplementary items will be considered as part of the theoretical contribution of the research.

Finally, after thematic analysis, the researcher found that the connotations of some confirmed items should be classified under other themes, so the study reorganized these items accordingly.

Table 6

Summary table of operations adopted after the theme analysis

Items	Operation	Items	Operation
A1	Adjusted (English, Chinese)	A23	Re-organized
A2	Deleted	A24	Adjusted (English, Chinese)

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A3	Adjusted (English, Chinese)	B1	Deleted
A5	Deleted	B2	Adjusted (English, Chinese)
A6	Deleted	B3	Adjusted (English, Chinese)
A7	Adjusted (English, Chinese)	B4	Adjusted (English, Chinese)
A10	Adjusted (English, Chinese)	B7	Re-organized
A11	Adjusted (English, Chinese)	B8	Deleted
A13	Adjusted (English, Chinese)	B9	Adjusted (English, Chinese)
A14	Adjusted (English, Chinese)	B10	Adjusted (English, Chinese)
A15	Deleted	B11	Re-organized, Adjusted (English, Chinese)
A16	Deleted	B15	Deleted
A17	Adjusted (English, Chinese)		

After two rounds of initial scale development (based on literature and existing scales, and thematic analysis of interview transcripts), I obtained the following initial scale. The scale consists of five dimensions, 10 sub-dimensions and 41 items. In each of the sub-dimensions, there are two categories of items. One is numbered with II (Abbreviation of Instructional Identity) aims to measure the Instructional Identity of vocational teachers, and the other is numbered with OI (Abbreviation of Occupational Identity) aims to measure the Occupational Identity of vocational teachers.

Table 7

The initial scale after the thematic analysis

Themes	No.	Items
Role Recognition (RR)	II-01	I am proud to be a vocational teacher.
	II-02	I often introduce myself by saying, "I am a vocational teacher."
	II-03	In the field of vocational education, there are role models that I admire.
	II-04	I understand the difference between vocational teachers and general education teachers.
	OI-01	When introducing myself, I am happy to mention the industry related to my major.

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	OI-02	There are admirable role models in the industry related to my major.
	OI-03	I understand the differences between my major and other majors in terms of professional image and work significance.
	II-05	I care about the social comments on vocational education.
	OI-04	I care about the social comments on the industry related to my major.
Professional Expertise (PE)	II-06	I believe that my personality, experience, and knowledge are well-suited for being a vocational teacher.
	II-07	In my classroom, I can effectively manage different groups of students and develop teaching strategies tailored to their actual situations, providing individualized instruction.
	II-08	I can skillfully utilize various teaching equipment in my teaching.
	OI-05	My industrial skills enable me to be competent in my teaching work.
	OI-06	My professional abilities are recognized by industry professionals.
	OI-07	I have no communication barriers when interacting with industrial professionals.
	II-09	I usually demonstrate confidence when dealing with teaching tasks.
	OI-08	I usually exhibit confidence when participating in industry-related activities.
Work Environment (WE)	II-10	My students recognize my work.
	II-11	I am satisfied with the interpersonal relationships among my colleagues.
	II-12	Our school leadership is effective, values teacher development, and handles matters fairly.
	OI-09	I have good connections with people within the industry.
	II-13	Our school provides sufficient teaching resources and facilities, and the environment is conducive to teaching and learning.
	II-14	In our school, the evaluation of professional titles and the promotion mechanism is objective and fair.
	OI-10	The school-enterprise cooperation framework provides satisfactory learning opportunities.
	OI-11	The industry can provide good job opportunities for my students.
	OI-12	When I need help, I believe industry professionals will assist me.
	OI-13	I am able to obtain the necessary resources for teaching from collaborative enterprises through school-enterprise cooperation.
	OI-14	If needed, industry experts will actively participate in my classroom

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		teaching.
	OI-15	In the industry related to my profession, there exists a credible system for assessing professional competence levels.
Value Adherence (VA)	II-15	I believe that the vocational teaching profession is important for both individual and societal development.
	II-16	I agree with the direction of national vocational education reform.
	OI-16	I endorse the behavioral norms and moral code within the industry.
	OI-17	I believe that the industry related to my major is an indispensable part of social and economic development.
	II-17	I am proud to be a member of my school.
	II-18	I am mindful of my words and actions, and will not bring any negative impact to the image of the school.
	II-19	I believe that my development is closely linked to the development of the teaching community and the school.
	OI-18	Although I am a vocational teacher, I believe that I am also a part of the industry.
	OI-19	I will be mindful of my words and actions, so as to establish a good professional image in front of students.
	OI-20	I believe that my development is closely linked to the development of the industry related to my major.
Career Commitment (CO)	II-20	I hold the belief in lifelong learning and strive to continuously improve my professional competence.
	OI-21	I am willing to engage in collaborative projects between schools and enterprises and learn from them.
	II-21	I have a responsibility to promote the comprehensive development of students.
	II-22	I am willing to contribute my wisdom and strength for the better development of my school.
	OI-22	I am willing to strengthen cooperation with partner enterprises in curriculum development.
	OI-23	I am willing to work with partner enterprises to jointly cultivate talents that meet the needs of enterprise positions.

Thematic Analysis Process in Detail. When discussing evidence or examples of a certain theme or sub-theme, the fundamental idea is to convince readers that these themes or

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sub-themes are grounded in data. At the same time, Dai et al. (2018) state that when conducting thematic analysis, researchers, apart from presenting the hierarchy of themes, should also be adept at utilizing specific literature and diverse data sources to demonstrate the validity of the themes. Additionally, they advocate for providing different perspectives of the research subjects to reinforce the themes. The subsequent data analysis will follow the suggestions of the aforementioned research methods, presenting the process of analyzing, refining, and optimizing the themes, sub-themes, and items in the initial scale based on the interview data.

When quoting the words of the interviewees, there are some supplementary contents added by researcher in brackets to improve the citation content. These supplementary contents in brackets are obtained after secondary confirmation by researchers and interviewees.

Theme: Role Recognition (RR). The content of existing literature, scales, and interviews all confirms that the cognition of professional roles is a prerequisite for the formation of identity (Holland et al. 1980, Tong et al. 2020, Cooper-Loelu et al. 2022). Current theories and scales suggest that individuals will only identify with the professional identity corresponding to a role if they have a favorable feeling and a clear understanding of that role. During the interview process, researchers found that this cognition of roles stems from two aspects. One aspect is derived from the individual's subjective emotions and cognition towards the role, while the other aspect originates from their reaction on social evaluations.

1) Sub-theme: Pride. The participants' favorable feelings towards their professional

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roles are most directly manifested in the "sense of pride" they express. Theoretically, Li et al. (2018) consider pride in the teaching profession as an expression of professional values. Li et al. (2018) also includes "I am proud to be a teacher" as an item to measure teachers' professional identity. Similarly, Qin et al. (2008), in their scale design for assessing kindergarten teachers' professional identity, incorporate "Being a kindergarten teacher makes me feel proud" as one of the items for measurement. Internationally, Ali et al. (2021), in their design of the ITP (Indicators for Measurement of Teachers' Professional Identity), set "I am proud of being a teacher" as an item to gauge teachers' professional identity. These items suggest that a higher sense of pride indicates a higher level of professional identity.

During the interviews, most respondents did not overtly state, "I am proud to be a teacher." Such extroverted emotional expressions may not be the preferred mode of communication for Chinese intellectuals. Therefore, during the interviews, the researcher posed the question to the respondents, "Are you proud to be a teacher?" The respondents' answers were predominantly affirmative. The sense of "pride" primarily stems from the respondents' affirmation of the profession of vocational teachers. For instance, HF believes that being a vocational teacher is a profession with lofty moral requirements:

(HF1) *"The reflection on the special identity of teachers is mainly because teaching is a profession with high moral requirements, especially in Chinese society. Because teaching is not an ordinary profession; ...People have expectations for this role. Teachers, like doctors, and lawyers all have very high social moral standards."*

Additionally, respondents would mention the status and value of the teaching profession within the sociocultural context of Chinese society. For example, XJ stated:

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(XJ1) *"China has a long-standing tradition of respecting teachers and valuing education. In the field of vocational education, teachers have acquired a new identity as mentors who guide you into the industry, because they not only provide you with a profession but also teach you how to make a living."*

Secondly, the "pride" expressed by the interviewees primarily stems from the achievements of their students in academic and career development. This pride, derived from student success, manifests in the interviewees' body language and facial expressions, predominantly as outpourings of happiness and joy, and they are exceedingly willing to share details with the researcher. For instance, when discussing students' academic progress or their successes in skill competitions after the teachers' arduous efforts, RS stated:

(RS1) *"... when I saw my student who participated in skill competitions receive a scholarship, I felt extremely proud and gratified. Because my dedication and efforts were well reflected in him, and I was able to help them obtain scholarships. "*

"Pride" also arises when students, after accumulating work experience and social exposure, express gratitude for the teachers' past efforts and demonstrate understanding of their former instructions:

(XW1) *"...having been a teacher for over 15 years, my happiest moments actually come from my graduated students. When they truly develop an understanding of society and come back to the school to sincerely thank their teachers, you feel a sense of identity as a teacher."*

"Pride" can also stem from instances where students, upon achieving success in their careers, share their joy with their teachers, as exemplified by YR:

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(YR1) *"…when students achieve some accomplishments after they start working, they come and share them with their teachers. That kind of happiness is truly special and joyful."*

More simply put, "pride" derives from witnessing students engaging in professions related to the fields that the teacher has previously instructed them in, such as:

(XR1) *"This still depends on whether the individual can recognize the value of the hotel industry. Personally, I have three students from my own class who have stayed at Hilton, all working in the food and beverage sector. I feel very pleased about that."*

Alternatively, "pride" can also arise from the achievements that students attain in their professional careers.

(HF2) *"When I go to any company and suddenly discover that one of my students is working there as a supervisor or has already become a manager, or I learn that their career has developed very well, I feel very happy…It makes me particularly delighted to see my students' achievements and their professional sustainability."*

It can be inferred that when mentioning the "sense of pride," each teacher has their own "touching moments," and the accumulation of such "sense of pride" in these moving moments throughout their careers can be regarded as a component of professional satisfaction, thereby serving as an important criterion for measuring the degree of professional identity. In the initial scale developed in the first round, the original item was "(A1) I am proud to be a teacher". However, after conducting interviews with vocational college teachers, the researcher added the specifier "vocational teacher," resulting in "**(II-01) I am proud to be a vocational teacher."** The researcher believes that this revision allows the scale to be more focused on the research field of vocational education.

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2) Sub-theme: Self-presentation. The analysis of interview materials confirms that the way individuals introduce their identity and work environment in social interactions can also reflect the level of their professional identity. This phenomenon has also been validated by Ali et al. (2021). In their developed ITP (Indicators for Measurement of Teachers' Professional Identity), the statement "I am proud to tell others that I am a teacher" has been proven to be a reliable and valid measure. That is, the more willing teachers are to introduce vocational education and share information about it with strangers at appropriate times, it indicates a stronger sense of self-confidence in their profession and a higher level of Instructional Identity. An anecdote shared by interviewee XW illustrates this:

(XW2) *"...if someone else is very interested in vocational education, I am also willing to share my experiences. Recently, I went to my son's school for a parents' meeting before their high school entrance exam. At the end of the meeting, they invited people from vocational schools to talk to the students, telling them about which schools they could go to and so on. Later, when the teacher approached me and we started chatting about this topic, he asked me what vocational schools are really like. I told him that I am a teacher in a vocational school and shared my views with him."*

The narration of the aforementioned anecdote demonstrates the interviewee's willingness to share and a sense of obligation ("Obligated") to do so. For individuals, this attitude reflects their endorsement of the profession. Therefore, it can be affirmed that "**(II-02) I often introduce myself by saying, 'I am a vocational teacher'"** serves as an important yardstick for measuring vocational teachers' instructional identity.

Meanwhile, whether vocational college teachers are willing to actively mention

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industries related to their teaching major during social interactions can be regarded as a manifestation of their occupational identity. Since vocational education teachers do not hold positions within these industries, their Occupational Identity can be seen as a form of trans-professional identity (Khalili et al. 2013). This trans-professional identity emerges from practical activities within a shared community. The teaching major acts as a bridge connecting Instructional identity and Occupational Identity. Therefore, in the field of vocational education, the expression of vocational teachers' Occupational Identity in social interactions can be determined by how vocational teachers introduce the major they teach, the industry related to their profession, and the working environment of that industry. For example, a teacher who teaches "hotel service" skills—whether they are willing to introduce the hospitality major they teach, the hotel service industry, and share the development of the hotel service industry during social interactions can be seen as a measure of vocational teachers' Occupational Identity. A representative statement might be:

(YS1) *"I often discuss the current state of the industry with my family and friends. I think that the more they understand about the industry, the better they can comprehend my work."*

When the interviewees view vocational education issues, they consider the industry as an integral part of vocational education and their own identity. Therefore, the researcher believes that **"(OI-01) When introducing myself, I am happy to mention the industry related to my major"** is a valid and somewhat effective measurement item.

3) Sub-theme: Role model. Industry role models exert a powerful influence. Viewing someone as an industry role model signifies that the individual endorses the role model's

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successful pattern, admires their achievements, and is willing to learn from them (Bucher and Stelling, 1977; Knowles, 1992; Hao et al., 2014). In the field of vocational education, dual identities arises from the two communities of school and industry. Thus, whether vocational education teachers establish role models they admire within these two communities can respectively measure the degree of their Instructional Identity and Occupational Identity. During the interviews, the researcher found that the role models established by the interviewees within the school community were typically school leaders or teachers who had achieved certain challenging accomplishments (such as winning National Teaching Ability Competitions, student skill contests, and research projects). For example:

(HF4) *"I really like my current leader. He is young, capable, agile, fast, and efficient. I like this kind of collaboration mode."*

It is evident that school leaders, as professional role models, serve as objects of individual learning in terms of their behavioral patterns. The degree of admiration for leaders (as role models) influences professional favorability, which subsequently affects professional identity. Regarding the same issue of leadership, some teachers expressed the absence of "role model" leaders and its impact on their professional identity. For instance, XW expressed the desire for a leader whom they could establish as a role model:

(XW5) *"I really hope to follow a leader whom I admire and go with him to open up new territories. Regardless of whether there are achievements or not, you would feel that this leader has courage and vision…But I feel that in my many years of career, I haven't had this opportunity."*

The disappointment expressed during the interview reveals the impact of "role model"

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leadership on XW's professional beliefs.

The importance of "role model" leaders is firstly reflected in their role as a source of confidence for teachers' professional perseverance. As RS believes:

(RS2) *"He would make me feel that our profession still has value."*

Secondly, the significance of "role model" leaders is embodied in their leading role, as exemplified by:

(RS3) *"Honestly, what we lack most right now is a leader who can clearly guide your work direction. From the moment I entered this school, I've hoped for such a leader…I believe if they are an expert who can achieve results in this field, we can use them as a model and benchmark their successful experiences."*

The admiration for role models within the school or in the broader field of vocational education (outside the school) is manifested in the respect for their achievements in teaching, competitions, research, and other aspects. For example:

(XW4) *"There are some teachers in our school that I really admire. For example, you know about the National Teaching Ability Competition for teachers, right? Some teachers in our school have been persistently participating in this competition, refusing to give up until they win the national first prize. I really admire them. Sometimes when I feel sluggish, just thinking of them makes me dare not to slack off."*

Therefore, "(II-03) In the field of vocational education, there are role models that I admire" is an item that measures Instructional Identity, as corroborated by both theory and interview content. Similarly, for the assessment of Occupational Identity, understanding whether the interviewees have admirable role models in their industry can also determine the

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degree of their professional identity. As HF mentioned regarding role models in the industry related to their teaching major:

(HF5) *" There's the general manager of Guangzhou Star River Hotel. I think his personal experience is very impressive and excellent. He's just over 30 years old now and has already become the general manager of the hotel within their group, and it's the flagship hotel under their Star River Group (young age but high achievement). He started as a bellboy during his internship and has now risen to the position of Director of Housekeeping. When I was doing practical training at their hotel, he was still the Director of Housekeeping (Career path). He must be really amazing, very disciplined as a person. Despite being a muscular 1.9-meter-tall man (Appearance) and being so busy every day, he still manages to exercise, write Chinese calligraphy, and he loves reading. He often speaks in classical Chinese and likes to recite poetry (multi-talents). I think it's amazing how he can cross boundaries and achieve so much, so quickly and with such difficulty."*

When recounting the aforementioned case, the interviewee exhibited an excited state, speaking rapidly and expressing him/herself fluently, demonstrating a strong willingness to share. The terms mentioned in the case, such as "young and promising," "versatile," "an enviable career development path," and "outstanding appearance," vividly portrayed the image of this "successful individual" as a role model in the interviewee's mind. The interview process revealed the interviewee's recognition of this "role model" and also indicated her desire to cultivate her students based on this "role model." Thus, it can be seen that asking the interviewee whether **"(OI-02) There are admirable role models in the industry related to the skills I teach"** helps to measure the degree of his/her Occupational Identity.

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4) Sub-theme: Role differentiation. If “professional pride” (II-01), “the way of self-introduction” (II-02, II-03), and “whether to establish professional role models” (OI-01, OI-02) are evaluations of professional roles based on subjective emotions, then the objective cognition of professional roles can be reflected in whether one can rationally distinguish the differences between their own profession and other professions. (Holland et al. 1980; Liu et al. 2008; Tong et al. 2020; Cooper-loelu et al. 2022).

During the interview process, the researcher found that when discussing instructional identity and occupational identity, respondents had different ways of categorizing professional identities. For example, when discussing teacher identity, they would clearly distinguish between "vocational education" teachers and "general education" teachers. When talking about industry identity, they focused more on industry division of labor, distinguishing industries related to their own teaching majors from those related to other professions. In the existing literature and scales, the issue of "differentiated cognition" regarding the identity of vocational college teachers has not been addressed.

When discussing the "differentiated identity" with teachers in general education, interviewees with a high sense of professional identity not only clearly analyzed the needs of vocational education teachers versus general education teachers in terms of teaching methods, teaching environment, and salary:

(YT1) *“Before I came to this vocational school, I didn't have a clear understanding of the differences between vocational schools and regular schools. I used to think that the only difference might be that students in vocational schools had weaker learning abilities compared to those in regular high schools. However, I later realized that, apart from this,*

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vocational education differs significantly from general education in many aspects. For instance, everyone talks about "teaching students according to their aptitude," which means devising different teaching strategies based on variations in students' learning abilities and interests. But you'll find that the diversity in abilities among vocational high school students is very pronounced, unlike that in regular high schools…Additionally, there are differences in the content of learning, which are quite evident… "

...but also clearly recognized and deeply reflected upon the differences in social status between vocational education teachers and general education teachers. This indicates that teachers with a high sense of professional identity, even when aware of the social status differences between the two, do not waver in their commitment and passion for vocational education. For instance:

(XW3) *"The words 'vocational education' don't make me feel that if I admit I'm a teacher in vocational education, others will look down on me."*

This further confirms that having a clear cognition and mature contemplation of the vocational education teacher's profession is a crucial indicator for measuring the degree of teachers' professional identity. Therefore, the researcher designed "(II-04) I understand the difference between vocational teachers and general education teachers" as one of the items to measure vocational teachers' Instructional Identity.

How to highlight the cross-industry professional identity of vocational teachers through industry distinctions? The answer to this question cannot be found in existing scales. During the interviews, interviewees mentioned the differences between themselves and general education teachers. This difference lies in the unique attributes possessed by

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vocational teachers within the educational field. When discussing their industry attributes, interviewees did not mention the differences between teaching and other industries, but rather emphasized the distinctions in teaching major attributes. Interviewees believed that their other dimension of industry attribute is conferred by their teaching major, as their teaching major corresponds to a specific industry. This is also a significant difference between vocational teachers and general education teachers.

In the interviews, vocational education teachers elaborated on another way of professional comparison, which is horizontal, i.e., comparing themselves with teachers from other majors and their corresponding industries. For example:

(PP1) *"I often discuss things related to other majors with teachers from those majors. Besides discussing school matters, another interesting topic is discussing matters related to their respective industries. For instance, how is the employment situation in the industry aligned with their major? What is the industry's prosperity level? Of course, I also share things happening in the industry corresponding to our major. I find such discussions very interesting."*

Another example:

(RS4) *"In vocational colleges, you'll find that the uniforms of students from different majors are different. For example, in our hotel service major, our uniforms are hotel service uniforms. In the aviation service major, the uniforms are like those of flight attendants; in the logistics major, their uniforms are again different. Each major feels like an independently operated company, and each student feels like an employee at work. "*

YZ added:

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(YZ1) *"I observe that the appearance and behavior of students from each major are also different. For example, students studying hospitality will be more affable, while those studying mechanics, auto repair, and other majors will be more outgoing and like to play and joke around in class."*

From the content of the interviews, it can be seen that the focus of horizontal professional comparison is on professional image and work content. Work image belongs to professional qualities and is an important teaching content in vocational education. Work content, on the other hand, is a crucial basis for distinguishing between majors. Even within the same major, the skills taught by teachers involve multiple different positions in the industry's supply chain. The work content of different positions also has obvious distinctions. In existing theories and scales, professional differentiated cognition is only used to measure "teachers' professional identity" (Liu et al. 2008). Through thematic analysis, combined with the working environment of vocational teachers, this study explores the measurement methods of vocational teachers' occupational identities in the field of vocational education, and confirms that **"(OI-03) I understand the differences between my major and other majors in terms of professional image and work significance"** is one of the items to measure vocational teachers' Occupational Identity.

5) Sub-theme: Reaction to the external comments. Numerous scales utilize individual feedback to societal evaluations of occupations as a tool to measure individual professional identity (Li et al. 2018). For instance, consider the measurement item for reaction regarding positive evaluations: “When I see or hear words that praise the teaching profession, I feel a sense of gratification.” And “When I receive the positive news about the industry that related

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to my major, I feel I feel greatly encouraged." And measurement items for reaction regarding negative evaluations. "When someone unfairly attacks or criticizes the industrial sectors and professional positions that I am teaching, I feel insulted." And "When someone unjustly attacks or criticizes the professions related to the vocational education, I feel insulted."

This theory was also corroborated by interviewees during the interviews. When asked, "Do you care about social media's evaluation of vocational education?" or "Do you care about society's perception of the industry related to your teaching major?" the interviewees exhibited a positive and enthusiastic mental state while answering. Society's evaluations of occupations can be both positive and negative, as well as fair and unfair. Regarding positive comments, PP mentioned:

(PP2) *"…many people may not fully understand vocational education... with increasing attention from the government and media towards vocational education, it has piqued the curiosity of many…I feel good about it. I've also seen reports about some excellent vocational schools where the admission scores of their students are not lower than those of regular high schools. The media also reports on such matters, thereby changing people's prejudices towards vocational education. I think it's great."*

YR, on the other hand, noted:

(YR3) *"In recent years, Chinese vocational students have won gold, silver, and other good results in skill competitions. These award-winning students receive generous funding and social status rewards upon returning home. When these are reported by the media, many people envy vocational education and believe that learning skills is not a bad thing. I feel encouraged after reading these positive reports about vocational education."*

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Compared to their feedback on positive evaluations, interviewees were more sensitive to feedback on negative evaluations or stigmatization. Teachers felt "insulted" by some "irrational," "unjust," or "unfounded" social evaluations. For instance, interviewees unanimously mentioned phenomena similar to what JD had said:

(JD1) *"Many people assume that students in vocational schools are poor performers and inferior. I strongly disagree with such prejudices…Our students are not intellectually inferior to those in regular high schools; it's just that they are not suited to that learning style. After graduation, they can all find jobs that suit them, and the incomes of many vocational school graduates are even higher than those of university graduates."*

For some fact-based criticisms or evaluations, interviewees also approached them objectively and reflected upon them. For example, HF mentioned:

(HF3) *"From my perspective, I think there are indeed many issues with vocational education (that are being discussed by people). If the stigmatization or insults are based on objective facts, I think I would reflect on them (would be seriously thinking of the reason of the stigmatization)."*

During the interviews, the researcher found that what reflected the interviewees' "Professional Identity" was not their differential feedback to positive or negative societal evaluations, but rather the "presence of feedback" and the "degree of response." Traditional scales measure positive and negative feedback separately through distinct items. However, this study suggests transforming the traditional item design to focus on the degree of the research subjects' "caring attitude." Specifically, the items is suggested to be adjusted to: **"(II-05) I care about the social comments on vocational education."** and, **"(OI-04) I care**

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about the social comments on the industry related to my major."

Theme: Professional Expertise (PE). Professional competence is closely associated with professional identity, as thoroughly elaborated in the literature review phase of this study. The analysis of interview results led to revisions in the design of the initial scale in the first round. The interview analysis revealed that the manifestations of professional expertise in the field of vocational education differ from those in general education. Consequently, the researcher appropriately adjusted the items related to Instructional Identity within the dimension of professional expertise, resulting in four items.

Regarding Occupational Identity, as stated by Khalili et al. (2013), the industry represents another community for vocational teachers, and the professional identity derived from this community belongs to a trans-professional or cross-professional identity. Since vocational teachers are not employed by specific enterprises within the industry and their daily work does not involve specific tasks within the industry, it is inappropriate to measure their occupational identity using the same methods applied to industry personnel. Through thematic analysis of the interviews, this study extracted four items within the dimension of professional expertise to measure the Occupational Identity of vocational teachers.

1) Sub-theme: Habitus (Personality, experience, and knowledge). Tickle (2000) suggests that personal practical experience and background shape identity formation. Consequently, the personality developed, experiences accumulated, and knowledge gained during an individual's growth process constitute their comparative advantage in a particular field (Bourdieu, 1987). When these accumulations are related to a profession, a strong sense of professional identity is likely to form. Vocational education teachers constitute a

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subcategory of teachers. Beijaard et al. (2000) categorize teachers into three roles based on their abilities: a subject matter expert, a didactical expert, and a pedagogical expert. This means that teachers should possess accumulations in teaching content, teaching methods (approaches), and teaching philosophies and strategies. These accumulations construct teachers' professional identity in terms of abilities.

During the interview, JD emphasized the importance of personality for being a vocational education teacher:

(JD2) *"When facing students, you must be sunny and cheerful. At the same time, you shouldn't be overly meticulous about issues…You must become their friend first, and then their teacher."*

Secondly, the significance of "experience" was also frequently mentioned in the interviews. Different interviewees had varying understandings of experience. Some teachers with only school teaching experience emphasized the importance of teaching experience and work attitude, such as:

(HH1) *"I may not be a professional in this industry, but I think I am capable of teaching students. I really hope to share as much as I know with them, so that they can better establish themselves in the industry."*

Some teachers who possess both industry experience and teaching experience would express the importance of industry experience or the advantages of having both for becoming an excellent vocational teacher, as exemplified by:

(XJ2) *"It's also possible that during the teaching process, when I give examples to illustrate knowledge to my students, all my examples are based on my personal experiences.*

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Instead, I rely more on the experiences I have accumulated in the industry. when I share examples from my own work experiences, they might not be as exciting, but they are more authentic."

Another Example:

(YR2) *"...even though I haven't worked in the industry, I feel obligated to introduce industry development information to my students. Sometimes, for more professional topics, I might seek help from my friends and ask them for relevant materials or case studies. But mostly, I would search for it online myself."*

In the aforementioned narratives, interviewees also mentioned teaching content, which encompasses both theoretical knowledge and practical skills. Therefore, the researcher designated **"(II-06) I believe that my personality, experience, and knowledge are well-suited for being a vocational teacher"** as the first indicator for measuring "professional competence." It should be noted that the term "vocational" was added to this item based on the first round developed item (A9), aiming to make the research scope more precise.

2) Sub-theme: Teaching Strategy. For vocational teachers, the second significant indicator of professional competence is teaching methodology (Beijaard et al., 2004). In vocational education, the quality of classroom instruction is of paramount concern, with "stratified teaching" and "individualized instruction" being the most frequently mentioned teaching methods (The State Council, 2019). This refers to the ability to skillfully apply different teaching techniques and methods to students with varying learning abilities and interests. During interviews, the researcher found that the ability to "control the classroom" and "provide individualized instruction" are crucial measures reflecting vocational teachers'

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professional expertise. As RS mentioned:

(RS5) *"In my class, students' learning abilities vary greatly. Some of them got B's, some D's, and some E's in their junior high school graduation exams. During class, you can see significant differences among them. First, not everyone is willing to listen because not everyone can or wants to understand what the teacher is saying. Therefore, we must group the students in the class. Sometimes the grouping is based on their learning abilities, and sometimes on their learning interests. Then, we implement different teaching strategies for each group. "*

Hargreaves and Goodson (1996) argue that teachers with a high sense of professional identity continuously refine their teaching methods and boost their self-efficacy and dedication to teaching performance. Therefore, this study considers teachers' classroom performance as a crucial indicator of their competence and formulates the item based on the guidance of national education policies and the commonly recognized "individualized instruction" by interviewees. It leads to confirm the item **"(II-7) In my classroom, I can effectively manage different groups of students and develop teaching strategies tailored to their actual situations, providing individualized instruction."** This item assumes that higher level of this competence indicates a higher degree of vocational teachers' Institutional Identity.

3) Sub-theme: Equipment Literacy. Unlike the teaching process in general education, the implementation of teaching in vocational education requires teachers to operate a variety of teaching tools. Teaching tools in vocational education encompass those used for disseminating knowledge, such as multimedia equipment, learning management platforms, AI

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platforms, and online survey platforms like WenJuanXing, as well as production-oriented tools related to job skill operations, such as kitchen equipment, forklifts, automotive repair tools, and robots. It is evident that equipment and tools play an extremely crucial role in vocational education, warranting separate discussion of this competence. In the field of vocational education, both knowledge dissemination tools and production tools undergo updates and iterations with the upgrading and development of industries. Therefore, teachers are required to keep abreast of the times, actively learn new teaching tools, and apply them to classroom instruction.

Apart from teaching equipment, the Chinese Ministry of Education has also set requirements for enhancing vocational teachers' digital literacy. The *"PRC National Professional Standard of Digital Legacy of Teacher"* (MOE, 2023) articulates Teachers' Digital Literacy as encompassing the awareness, capability, and responsibility to adeptly utilize digital technology for acquiring, processing, utilizing, managing, and evaluating digital information and resources. This standard serves as a benchmark for assessing educators' comprehensive digitalized proficiency, encompassing five pivotal domains: digital awareness, knowledge and skills, application, social responsibility, and professional development. It can be seen that digital literacy also necessitates vocational teachers' ability to utilize innovative teaching equipment. In the evaluation system of the "National Teaching Ability Competition," hosted annually by the Chinese Ministry of Education, the integration of "ICT (Information and Communication Technology)-based teaching tools" into the teaching process is regarded as a significant assessment criterion. Therefore, teachers' ability to apply teaching equipment in instruction is also a crucial indicator for measuring their

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professional competence. Teachers with strong equipment application abilities demonstrate a high learning willingness and capacity, which can be inferred as indicative of a strong sense of professional identity. For example:

(XR2) *"In my teaching process, I use many different equipment and tools. I teach cocktail mixing. To master cocktail mixing techniques, one must know how to use tools and equipment. I believe that the use of these equipment and tools related to job skills is essential.... Besides, we also need to know how to use many other teaching equipment in the teaching process, such as the Seewo whiteboard with multimedia functions, robots, VR, AR, and other equipment used for teaching. These equipment are emerging endlessly, and I admit that they are somewhat helpful for teaching because they can increase students' interest in learning and make it easier for them to understand knowledge. "*

It is noteworthy that some interviewees also pointed out that the ability to use equipment is not necessarily "the more the better" or "the newer the better." The application of equipment should also be reasonably arranged according to the actual teaching needs and the school's financial capabilities. Some interviewees held an objective and rational view on this issue. For instance:

(JX1) *"The first thing I would consider is whether this new technology is necessary for enhancing my teaching effectiveness."*

This rational thinking reflects the questioning from experienced teachers towards the prevailing misconception in the field of vocational education, which is "using innovative equipment for the sake of using it" while ignoring actual classroom needs. This mature professional mindset, along with the discrimination of equipment suitable for teaching, also

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reflects teachers' true abilities in equipment application. Due to the diversification of teaching equipment, researchers cannot design items specifically for the application ability of a certain teaching equipment (such as traditional or innovative ones). Therefore, in this study, teaching equipment is collectively referred to as "teaching equipment," resulting in confirming the item which is **"(II-08) I can skillfully utilize various teaching equipment in my teaching."**

4) Sub-theme: Skill proficiency. When measuring the Occupational Identity of vocational teachers from the perspective of professional competence, they cannot be regarded as practicing workers within the industry. The role of vocational teachers is that of school teachers, and thus their behaviors reflecting Occupational Identity differ from those of trade workers. Firstly, from the perspective of professional competence, the industrial skills of vocational teachers are mainly manifested in applying the skills they have mastered to classroom teaching. Teachers who are proficient in occupational skills often have a stronger sense of Occupational Identity. This is because to become proficient in these skills, one must first develop a liking for them and be willing to achieve proficiency through repeated practice. Alternatively, vocational teachers may have industry work experience before becoming teachers. According to Esmond's (2017) research, it can be generally inferred that this type of vocational teacher possesses a strong Occupational Identity. For example, XR, who had worked in the industry and was able to apply relevant industry experience and skills to the teaching process, directly expressed his sense of pride:

(XR3) *"Some people have said that when I teach my students these industry skills, I would appear very proud because I have done it myself, and I would express that pride."*

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Additionally, YR mentioned:

(YR4) *"The latest information and industry trends can be effectively and promptly applied to our teaching."*

It is evident that "latest information" and "industry trends," which are part of industrial skills, also constitute components of the interviewees' occupational expertise. These industrial skills can only reflect their occupational expertise when applied to teaching by vocational teachers. Therefore, the item **"(OI-05) The industry skills I possess enable me to be competent in my job"** designed with “industrial skills” as a keyword, can embody the occupational expertise of vocational teachers and serve as an indicator for measuring occupational identity.

5) Sub-theme: Trans-professional ability recognition. During the interviews, several interviewees confirmed that recognition of their professional abilities by industry professionals would significantly enhance their occupational identity. For example:

(YS2) *"Once, I was invited by an industry association to train professionals within the industry. My training focused on theoretical and management aspects. After the training, many industry professionals added me on WeChat, hoping to maintain contact in the future. I felt that when my professional knowledge was recognized by industry professionals, my sense of occupational identity in this field was awakened."*

Another example is HF's personal experience:

(HF6) *"Last time, I was fortunately invited to participate in the INTERWINE wine exhibition. During the event, I led my students to provide wine service for the master class. The representatives from the wineries highly praised my students and me for our*

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professionalism…When you receive recognition from professionals, you feel like you are a part of the industry."

Some interviewees emphasized the value their personal abilities bring to the industry, which in turn earns them respect and attention from the industry.

(XW6) *"Why can I get some resources from the industry and why are others willing to help me? Maybe it's because I can provide some value."*

For some vocational teachers who have previously worked in the industry, interviewees believed that professional abilities encompass not only the manipulative aspects of industrial skills but also the comprehensive abilities required by the industry, including industrial skills, theory, grasp of the industry's current status and development direction, or extensive interpersonal relationships. The phenomenon of receiving recognition from cross-industry professionals is not mentioned in existing theories and scales. However, since it was frequently mentioned or confirmed by interviewees during the interviews, the researcher included the item **"(OI-06) My professional abilities are recognized by industry professionals."** It can be seen that this item is designed to measure occupational identity based on the specificity of vocational teachers. This aligns with the characteristic of vocational teachers having to engage in boundaries crossing practices in their work (Fejes et al. 2014), meaning their practice scope includes both schools and industries related to their profession. Due to the non-permanent and irregular nature of vocational teachers' activities in the industry, they do not engage in professional activities within the industry in a full-time capacity. Even so, their professional abilities are still recognized by trade workers. This social evaluation brings a psychological sense of superiority to vocational teachers, enhancing their

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sense of belonging to the industry and their occupational identity.

6) Sub-theme: Trans-professional communication. The ability to communicate smoothly with trade workers is also a manifestation of occupational expertise. This communication is founded on competence, which encompasses both technical skills—the ability to communicate effortlessly at the level of technical exchanges, as illustrated by:

(PP3) *"When communicating with industry professionals, being able to discuss technical details proficiently is not easy for school teachers, but I still hope to maintain this communication ability by participating more in their activities."*

It also includes the ability to understand the hidden languages within the industry, that is, the capacity to comprehend conversations with implicit meanings, as exemplified by:

(JD3) *"If you enter a work setting and cannot understand their hidden language, it will be difficult for you to integrate into the circle of professionals."*

Furthermore, it encompasses the ability to comprehend in-depth topics such as the industry's unique management models, current salary situations, and work pressures, as exemplified by:

(XW7) *"It means you understand their language, and they understand what you say. This is very important, as it proves that everyone is speaking the same language."*

Another example:

(RS6) *"Actually, I think it's not just about training. There's also professional exchange where you can propose insightful and valuable viewpoints, making others feel that they have discovered something they hadn't noticed before..."*

It is also demonstrated that the interviewees possess a rich network of friendships

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within the industry, enabling them to share deep thoughts and feelings about their work with industry professionals, as illustrated by:

(YS3) *"…when you are not very familiar with them, you may only see their glamorous side. But when they really consider you as a friend, you may learn more information, and you will discover that everyone who stands out in an industry has actually paid a lot…"*

From the perspective of industry professionals, vocational teachers are often regarded as outsiders (which vocational teachers themselves are also aware of). In many cases, teachers from vocational colleges cannot truly integrate into the professional conversations of industry insiders. However, the higher the degree of this "integration," the stronger the sense of Occupational Identity it undoubtedly brings to vocational teachers. Therefore, the researcher set **"(OI-07) I have no communication barriers when interacting with industrial professionals"** as an item to measure vocational teachers Occupational Identity. Similarly, Liu (2022) considered professional communication skills as one of the factors for measuring professional identity. This study is an extension of Liu's theory, applying it to the cross-industry professional identity in the field of vocational education.

7) Sub-theme: Self-Confidence. Self-confidence is a psychological response founded on ability or belief (Lewis et al., 2016). Demonstrating self-confidence when dealing with professional matters indicates an individual's ability to calmly face work environments and job requirements. During interviews, respondents mentioned sources of self-confidence arising from the teaching process in schools, as illustrated by:

(HH2) *"In the process of teaching in school, the stronger your practical skills are, students will think you're cool, and therefore, you'll receive more recognition from them.*

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Students' admiration for you is a source of your self-confidence..."

This viewpoint from the respondents is also supported by Li et al. (2018). In their developed scale, "I usually demonstrate confidence when dealing with teaching tasks" is set as one of the items to measure teachers' professional identity. Therefore, this study likewise adopts the item from Li et al. (2018) and includes it as one of the items in the vocational teachers' Dual Professional Identity scale.

Similarly, the researcher extends the application of this item by applying self-confidence to scenarios where vocational teachers participate in industry practices to measure their occupational identity. For instance, XM, who has worked in the industry before and is currently engaged in part-time work or entrepreneurship in the industry, mentioned:

(XM1) *" The last time I went for an internship at an enterprise, they also held an interesting program. It mainly involved teaching children how to make baked goods and beverages. These are skills that I am familiar with. I even contributed some new ideas to the enterprise. During the work, I felt confident and I knew exactly what I was doing and what I should do because I did it before."*

Hence, the researcher sets the expression of self-confidence by vocational teachers when engaging in industry activities as one of the items to measure their Occupational Identity: **"(OI-08) I usually exhibit confidence when participating in industry-related activities."**

Theme: Community Cohesion (CC). The Community Cohesion encompasses the interpersonal environment in which vocational teachers are situated, as well as the hardware and institutional environments that relate to the execution of their work. Through thematic

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analysis, researchers categorize the work environment into two sub-themes: "Interpersonal Relationships" and "Development Resources." Analysis of interview data indicates that the quality of the work environment is closely linked to whether individuals can develop a sense of professional identity. In the ITP (Indicators for Measurement of Teachers' Professional Identity) developed by Ali et al. (2021), the item "My school environment is conducive for teaching-learning" demonstrates the impact of the work environment on professional identity. Other items in this scale are also designed with considerations for interpersonal relationships, school resources, and school systems. The design of items related to instructional identity in the initial scale of the first round of this study was based on the item design in the ITP (Indicators for Measurement of Teachers' Professional Identity).

1) Sub-theme: Interpersonal relationship. Numerous studies and existing scales have established a correlation between the degree of harmony in relationships with work partners and the level of professional identity (Antonek et al., 1997; Chryssochouou, 2003; Shanahan, 2009; Esteban-Guitart et al., 2014; Nasir, 2011; Bathmaker & Avis, 2013). In their research on the professional identity of nursing students, Fracchiolla et al. (2020) discovered that relationships with peer group members facilitate the expansion of social and professional networks, enhance opportunities for engagement within the physics community, and strengthen a sense of belonging through an increasing interest in physics. Within the educational domain, Liu et al. (2008) categorized interpersonal relationships into three tiers: recognition from superiors, recognition from colleagues, and recognition from students. Adams et al. (2020) posited that identity is shaped by intricate personal experiences and various interpersonal dynamics at work. Imafuku et al. (2022) suggested that cross-industry

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interpersonal relationships exert an influence on cross-industry professional identity. This theoretical framework is pertinent to exploring the factors influencing the occupational identity of vocational teachers. The outcomes of thematic analysis conducted on interview data affirm the validity of these theories.

In the realm of vocational education, work partners encompass students, colleagues, and supervisors. Furthermore, within the context of school-enterprise collaboration, the work partners of vocational education teachers also include staff from partnering enterprises and other professionals in the industry known through the teachers' own networks. Analysis of interview content reveals that the degree of harmony in relationships with individuals from both educational institutions and industries determines the level of acceptance of vocational teachers' Instructional Identity and Occupational Identity, respectively. For instance, HF, who has over five years of teaching experience and a strong sense of professional identity, perceives student recognition as:

(HF7) *"The recognition from students is a kind of spiritual nourishment."*

Another example is RS, who believes that her relationship with students dictates her evaluation of work effectiveness:

(RS7) *"I think the consistent philosophy as a teacher is that if I can handle relationships with my students well and have a positive impact on them, then I feel like I'm doing a great job."*

Another instance is as follows:

(YR5) *"As a teacher, the most satisfying thing for me is when my philosophy is understood by my students."*

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The aforementioned two examples highlight the significance of "relationships with students." Their shared focus lies in "student recognition" or "understanding" of their work, rather than merely maintaining a "friendly" relationship with students. Therefore, with reference to the existing scales developed by Liu et al. (2018), the researcher has designated **"(II-10) My students recognize my work."** as the first item under this theme.

Secondly, relationships with colleagues within the teaching staff were also mentioned during the interviews, as exemplified by JD:

(JD4) *"I find that sometimes the relationships among teachers can be quite subtle. Harmonious colleague relationships can fill you with positive energy and inspire you to strive for better achievements."*

XW defines a harmonious relationship with colleagues as one where "you can obtain resources or emotional support when needed," as illustrated by:

(XW8) *"I think there will be, yes, because leaders, such as the principal or your department chair, have a certain distance from you. When they can provide you with resources or a lot of spiritual support, it does strengthen my identity.*

Through interviews, the researcher found that when discussing relationships with colleagues, respondents' satisfaction did not stem from "recognition" of their work by colleagues, but rather from the maintenance of "harmonious" relationships. This is because sustaining such harmony contributes to creating a friendly work and development environment, as illustrated by:

(XW9) *"I don't actually need my colleagues' recognition for my work. To some extent, I understand that there is a mix of competition and cooperation among colleagues. I won't*

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owe anyone anything, and no one will owe me anything; we're all serving the students and the school. Sometimes, just maintaining a superficial harmony is enough to make me satisfied."

It can be seen that views on relationships with colleagues are diverse. There are both "mutual assistance" relationships and "superficially friendly" relationships. Therefore, the item regarding "colleague relationships" was designed with "satisfaction" as the key word, namely: **"(II-11) I am satisfied with the interpersonal relationships among my colleagues."** This item also draws on the research by Liu et al. (2008) on the Current Situation of Young Teachers' Professional Identity in Secondary Schools in Small Cities in China.

Lastly, within the scope of interpersonal relationships, establishing good relationships with leaders and receiving their assistance is crucial for teachers' development. This phenomenon was affirmed by respondents during the interviews, for instance:

(RS8) *"...If the leader and you have a good rapport, they may think you are very capable. But if you are not good at social interactions or you are relatively young and haven't grasped this point, even if you are very diligent, the leader may not think much of you. "*

Another example:

(XW10) *"The number of resources we can get at school depends on the recognition we receive from our leaders."*

However, the expressions of the above two respondents reflect a bottom-up process of relationship building, where teachers "have to" establish friendly relationships with school leaders to some extent for the convenience of their career development. This expression

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carries a sense of being "suppressed" (Lee, 2017, 2020) because not all teachers are willing to unconditionally establish close relationships with leaders. A relationship that truly fosters professional identity should be based on teachers' active recognition and affirmation of their leaders. Therefore, during the interviews, the researcher referred to items from existing scales (Liu et al., 2008) and attempted to explore whether these items would impact vocational teachers' institutional identity by starting from the respondents' evaluations of leaders' management abilities, behavioral styles, and other aspects. The respondents in the interviews expressed that they were most concerned about whether leaders were fair and impartial when evaluating teachers' abilities and contributions, whether they were efficient in implementing reforms and executing projects, and whether they were fair when dealing with conflicts. If these aspects meet the respondents' expectations, they will have a positive impact on the construction of vocational teachers' institutional identity. As HF mentioned:

(HF8) *"Because the leadership style of school leaders largely determines the school ecosystem. It's a whole package, including complex factors such as the sense of fairness and trust you feel in your career. I think it will have an impac*t (on my instructional identity)*."*

For instance, XJ mentioned:

(XJ3) *" It's very important for leaders to be fair and impartial in dealing with both people and matters. I know it's difficult to achieve…but it's crucial regardless. When leaders evaluate someone without objectivity or handle conflicts unfairly, it can easily affect the team's morale."*

It can be seen that the interview results align with existing theories and scales, indicating that leaders' work styles influence the relationship between teachers and leaders,

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and this relationship further affects teachers' individual Instructional Identity. The researcher used "efficiency," "evaluation," and "fairness" as keywords to formulate the item **"(II-12) Our school leadership is effective, values teacher development, and handles matters fairly."**

Beyond the school context, respondents seemed to value harmonious relationships with industry professionals during cross-industry activities even more, believing that such relationships have a greater impact on the formation of their Occupational Identity. For example, JD believes:

(JD5) *"The more friends you have in the industry, the more resources you will get…. This feeling of being well-connected makes you feel like you are a member of the industry."*

The research shows that this kind of close relationship or recognition from a "farther" distance is more capable of strengthening the corresponding professional identity. Some respondents even believe that harmony among teachers is a norm, a state that should naturally exist, and has no relation to teacher identity. It is the establishment of relationships with cross-boundary industry partners that can truly build professional identity:

Harmony with school colleagues is expected because it is a collaboration or mutually beneficial exchange that should naturally exist in the workplace. Therefore, even if there is harmony, it is normal and has little effect on enhancing identity. Another reason is that relationships with school colleagues have become complicated, with some evolving into friendships akin to "sisters" or "family," so they are not closely related to professional identity. However, harmony with industry partners can increase industry identity. Therefore, the item **"(OI-09) I have good connections with people within the industry"** was set to measure

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vocational teachers' occupational identity. This item is also supported by the cross-industry identity theory proposed by Imafuku et al. (2022).

Compared to the initial items generated in the first round, the item "(A14) My colleagues will help me when I need assistance" was removed in the second round of scale design. Although this item exists in existing scales for measuring teachers' professional identity, it was interpreted in different perspectives by XW. For example, she believes that receiving material resources, emotional support, and assistance from colleagues of the same level is mutual and normal, and it should not be related to teachers' professional identity formation incentive. However, XW thinks that such help is related to the teachers' professional identity only when it comes from their leaders. Therefore, when measuring teachers' professional identity with "colleague relationships," the researcher only retained II-11 as the item.

2) Sub-theme: Teaching resources. Whether the work environment can provide sufficient work resources is crucial for an individual's development within that environment. Therefore, the adequacy of resources is associated with job satisfaction, which in turn is linked to professional identity. A thematic analysis of interview transcripts reveals that within the school context, resources encompass both teaching resources and institutional resources. In the corporate realm, for teachers in vocational colleges, these resources more often pertain to learning resources and resources for student employment. As XW mentioned in the interview:

(XW11) *"I think it's important to feel that you have abilities, but actually, the growth of your own abilities is even more important. Because 80% of your work is done on the*

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platform of your school. "

Within the school context, teaching-related facilities, equipment, and the enthusiasm of teachers are interconnected. Respondents held unanimous views on this issue. Adequate teaching facilities not only facilitate the implementation of instruction but also propel advancements in teaching research and scientific exploration, thereby stimulating students' interest in learning. Furthermore, the school's investment in teaching equipment contributes to teachers achieving excellent results in student skill competitions and National Teaching Ability Competition. For instance:

(QB1) *"We teach automobile maintenance, where professional training equipment and venues are essential for conducting classes."*

Some statements inversely underscore the importance of teaching resources, for example:

(YZ3) *"The process for applying and purchasing teaching equipment at our school is always lengthy, resulting in a shortage of many teaching aids, which makes it difficult for us to conduct classes. Students have a poor experience in the classroom, and as teachers, we feel frustrated."*

RS, who has participated in the National Teaching Ability Competition, said:

(RS9) *"During the last National Teaching Ability Competition, we achieved a historic first-prize at the national level. I would like to say that, apart from our team's efforts, the school's investment in teaching equipment and the transformation of the teaching environment were crucial. Undoubtedly, the school's support and these achievements enhance our professional identity."*

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These accomplishments, attributed to abundant resources, are significant factors in shaping teachers' institutional identity. It is worth emphasizing that in the field of vocational education, due to the simulation of actual enterprise production processes in teaching content, there is a particularly high demand for equipment, tools, etc. The provision of these production tools not only brings professional identity to teachers by facilitating teaching and skill competitions but also, through the process of using these production equipment and tools, enables teachers to better understand the distinct roles of vocational education and general education, thereby fostering a more complex Dual Professional Identity. Therefore, based on the interview results, the researcher established **"(II-13) Our school provides sufficient teaching resources and facilities, and the environment is conducive to teaching and learning"** as an item to measure vocational teachers' Institutional Identity.

3) Sub-theme: Promotional System. The satisfaction of teaching material conditions is correlated with teachers' professional identity, and the institutional environment of the school also bears relevance to their professional identity. Among various school institutions, the most concerned systems for the respondents are the professional title evaluation system and the promotion system. For teachers, these two systems are integrally related. The professional title evaluation system is pivotal as it pertains to the development of teachers' careers, their professional status, and income, thereby constituting a primary focus of their attention. RS complained:

(RS10) *"Since 2018, our school has had very limited slots for evaluating teachers' professional titles. Many new teachers have no means to advance in their professional titles, leading to a phenomenon where some teachers have adopted a 'lying flat' attitude, while*

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others have intentions to leave their jobs."

Similarly, YZ mentioned:

(YZ4) *"The income level of vocational teachers is entirely determined by their professional titles. Or, the income of administrative staff at our school is also determined by their job grades…If a school lacks a fair promotion system, then we have only two choices: either go to another school or stop being vocational teachers."*

In fact, the fairness of such systems is analogous to the role of leadership mentioned in II-12, both concerning issues of fairness in the work environment. The difference lies in that II-12 highlights the role of individuals, while under the theme of "Development Resources" it reflects the role of institutions. Given the consistency of the concerns expressed by the respondents, the researcher designed the item: **"(II-14) In our school, the evaluation of professional titles and the promotion mechanism is objective and fair."** This item was validated in Yu's (2006) study on the current status of professional identity among young middle school teachers in small cities in Hunan Province.

4) Sub-theme: Learning Opportunities. As vocational teachers, how can they construct their occupational identity in the process of cross-occupational communication? The interview results reveal two important clues. Firstly, vocational teachers obtain development opportunities through the framework of school-enterprise cooperation at the enterprise end. These development opportunities primarily consist of learning opportunities provided by enterprises or jointly by enterprises and institutions within the framework of school-enterprise cooperation. These opportunities are mainly manifested in initiatives such as inviting industry experts into classrooms, incorporating industry standards into curricula,

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providing skills training by enterprises, and "on-site visits" to factories and stores, all aimed at broadening teachers' industry perspectives and enhancing their professional technical abilities. XM believes:

(XM2) *"As teachers who teach skills in vocational colleges, we are very willing to intern and work in cooperating enterprises. Through such practices, we can undoubtedly improve our skill levels."*

However, RS holds a different view:

(RS11) *"Many current school-enterprise cooperations are actually not successful because we lack opportunities to practice and learn in enterprises. These opportunities are very important to us, but the problem is that there is no cooperative mechanism between schools and enterprises that allows us to participate in enterprise operations."*

Both statements, from positive and negative perspectives, affirm that the school-enterprise cooperation framework is the institutional foundation for vocational teachers' cross-industry learning. They also confirm that the most direct way for vocational teachers to enhance their professional abilities is to obtain opportunities for practice and learning in enterprises. In the interviews, although not all respondents expressed satisfaction with their current school-enterprise cooperation framework, they all agreed that learning within the existing framework or constructing a new, better framework for school-enterprise cooperation and obtaining better learning opportunities would impact the construction of their cross-industry occupational identity. As QB mentioned,

(QB2) *"I think our school should establish a better cooperation mechanism with partnering enterprises to give us opportunities to learn in enterprises. We also understand*

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that not all enterprises are suitable for such agreements. But I think we should communicate more with enterprises, express our learning desires and plans, and I believe we will find learning opportunities."

Therefore, the researcher set **"(OI-10) The school-enterprise cooperation framework provides satisfactory learning opportunities"** as an item to measure vocational teachers' Occupational Identity. This item refers to the design of items related to teachers' professional identity by Yu (2006) and takes "learning opportunities" as the theme for item design, applied in the context of vocational teachers' cross-boundary practices and professional learning.

5) Sub-theme: Employment prospect. The analysis of interview transcripts also indicates that a significant resource that industries can provide, related to vocational teachers, includes employment opportunities. This resource is indirectly related to the vocational teachers themselves but directly connected to the employment prospects of their vocational students. For instance, YS firmly believes that students' employment prospects are tied to their own work situation:

(YS4) *"If an industry cannot provide employment opportunities for our students, my sense of identity with that industry is very low. If they can't find jobs after learning from me, I will feel very frustrated."*

Another example is XJ, who expressed his views based on the school's enrollment situation:

(XJ4) *"Whether students can achieve good development in this industry, they will pass on this information to their younger classmates. If graduates can't find jobs, then I'm*

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sure our major will have poor enrollment in the future."

It can be seen that the underlying logic in the respondents' words is that students' employment opportunities reflect the current status and prospects of the industry. The current status and prospects of industry development, in turn, are related to the development status and prospects of the profession. Therefore, it can be hypothesized that industries with development potential have a positive effect on teachers' Occupational Identity. Consequently, the researcher used "job opportunities" as a keyword and formulated **"(OI-11) The industry can provide good job opportunities for my students"** as a measurement item for vocational teachers' Occupational Identity within the dimension of industry resources.

6) Sub-theme: Industrial Assistance. Whether they can receive assistance from within the industry is a guarantee for vocational teachers to ensure the high-quality operation of their skills-based classrooms. This assistance enables vocational teachers to teach more effectively, thereby enhancing their favorable impressions of and dependence on the industry or collaborating enterprises. Such favorable impressions and dependence may trigger the formation of vocational teachers' occupational identity. For instance, QB mentions that she herself does not have sufficient industry experience, and when teaching, she lacks a clear understanding of the current status and future direction of industry development. At such times, she particularly hopes to receive help from the industry. He says:

(QB) "The industry is constantly evolving, and it is challenging for us within the confines of a school to grasp the latest information and cutting-edge technologies of industry development. This often results in our teaching content failing to stimulate students' interest during classes, and we ourselves lack confidence. Fortunately, one of my classmates, after

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graduating from university, went to work at ABB, and I frequently communicate with him. He is willing to share with me information on new knowledge and technological development trend. He also shares customer cases with me, which has helped me appear more confident in front of my students."

The aforementioned quotation is merely one of the scattered cases concerning industrial assistance mentioned by interviewees during the interview process. These cases all illustrate one point: when teachers feel helpless during teaching or interacting with students, they hope to receive support and assistance from the industry. Such assistance provides teachers with significant emotional value, thereby fostering their recognition of the industry. Therefore, as a general assessment, I have set "OI-12. When I need help, I believe industry professionals will assist me." as an item for measurement. Besides, interviewees also emphasized two tangible forms of assistance, both of which are collaborative achievements established within the framework of school-enterprise cooperation. The first is assistance with teaching resources. School-enterprise cooperation implies synchronization between skill teaching and the job scenarios of students' future internship enterprises. The purpose of school-enterprise cooperation is to enable students to learn targeted job skills of cooperating enterprises and teachers to teach these skills, all under the collaboration between schools and enterprises. Therefore, whether enterprises can provide the same training equipment and tools as those used in enterprise jobs has a significant impact on teaching. If the created teaching scenarios are the same as the actual work scenarios of cooperating enterprises, both teaching and learning will be conducted in a simulated environment, which makes it easier to shape the professional identity of teachers and students. For teachers, receiving material support

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from enterprises makes them appear more confident in front of students and adopt a more "proprietary" stance when conveying corporate culture and norms. Such psychological efficacy is helpful for shaping professional identity. For example, XR said:

(XR4) *"Last year, Huachen Group built a comprehensive beverage training room for us free of charge. The equipment and tools inside are designed according to real job positions. The equipment provided by the enterprise has created a favorable impression of the enterprise among students, and as a teacher, I also have a favorable impression, even a sense of belonging. This positive mindset greatly inspires me."*

Therefore, the researcher sets "OI-13. I am able to obtain the necessary resources for teaching from collaborative enterprises through school-enterprise cooperation." as an item to test vocational teachers' occupational identity.

Apart from providing material assistance, cooperating enterprises also offer assistance in teaching staff. For instance, they dispatch professionals to the classroom to promote corporate culture, give lectures on some cutting-edge technologies, and demonstrate skills. Their participation enriches the teaching modes of teachers, enhances students' learning interest, and improves teaching quality. Students will directly feel the humanistic care and technological strength from the enterprise. As teachers, the most direct feeling is that they have an additional companion from the enterprise on the teaching platform, which makes them feel the power of the enterprise "team". As HF said:

(HF) "Every year, I invite you to give our students the 'First Lesson of the Semester'. The feedback from students is excellent. They tell me, 'Teacher, your friend is really amazing,' and some ask me, 'Teacher, can I work in his company?' Each time I hear this feedback, I feel

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like I am a member of your team, and it makes me feel proud."

The case provided by HF is personally relevant to me because I frequently give lectures to students and teachers in various vocational colleges as an expert in the tourism and hotel industry. My experience tells me that the involvement of industry experts in courses provides teachers with tremendous support, both professionally and psychologically. In the eyes of students, when industry experts stand together with their teachers, students perceive their teachers as professional, and vocational teachers are also aware of this change in students' psychology. Therefore, I set "OI-14. If needed, industry experts will actively participate in my classroom teaching." as an item to measure vocational teachers' occupational identity.

7) Sub-theme: Credible assessment system. During the interviews, a recurring theme mentioned by respondents was "industry certification." Among numerous administrative documents issued by the Chinese government, obtaining "dual certification" is a crucial criterion for evaluating the "dual-qualified" status of vocational college teachers. "Dual certification" refers to holding both a "teacher's qualification certificate" and an "industry skill level certificate." The "teacher's qualification certificate" is a prerequisite for all teachers entering the teaching profession. However, the "industry skill level certificate" varies across different industries. Some industries have assessment systems for their "skill level certificates," which carry significant weight and high public credibility. Conversely, certificates in certain industries lack credibility due to lax evaluation systems. Furthermore, some industries and positions do not have corresponding certification systems for "industry skill level certificates." Credible "skill level certifications" within the industry provide an

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effective assessment of vocational teachers' professional competence. Teachers who obtain these certificates receive recognition for their professional skills. Such recognition, in turn, enhances their personal self-efficacy (Bandura, 1977). As YS stated:

(YS) "Currently, the "Bartender" certification has been abolished. I had always been eager to obtain this certification, but there is no suitable examination available now. Sometimes, I feel frustrated because there is nothing to prove my ability in this field."

Therefore, the researcher believes that the existence of a credible certification system for "industry skill level certificates" within the industry is a significant indicator influencing teachers' professional identity. Consequently, the researcher included the item, "OI-15. In the industry related to my profession, there exists a credible system for assessing professional competence levels."

Theme: Value Adherence (VA). Kremer & Hofman (1981) argue that when an individual shares common beliefs, values, or development goals with a group, their sense of identity within that group will be established. The analysis of interview data also indicates that if an individual's values align with those of the group, meaning the individual approves of the group's development direction, it positively promotes the development of their professional identity related to the group.

1) Sub-theme: Value appreciation. Firstly, during the interviews, the researcher found that the recognition of vocational teachers' instructional identity primarily stems from the affirmation of the social value of this profession. For example, XW stated:

(XW12) *"Our vocational education indeed addresses significant social issues. I remember a vocational school principal once said, 'If the country opens one more vocational*

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school, one prison will be reduced.' We truly help society manage many troubled teenagers."

This reflects the interviewees' acknowledgment of the role of vocational education in rescuing, assisting, and nurturing socially marginalized adolescents. When expressing this, the interviewees demonstrated a sense of responsibility and mission. Most interviewees believe that being a vocational teacher is a "sacred" and "great" professional role that contributes to social development. For instance, HF believes:

(HF9) *"..., I think the ideal of vocational education is sacred. It's just that I haven't reached that goal yet. I acknowledge that I haven't achieved it…"*

XR, meanwhile, enthusiastically shared a success story about one of his students:

(XR5) *"One of my students comes from a single-parent family and usually stays with his mother. He didn't like studying and rarely communicated with his mother. Gradually, his personality became withdrawn, and he didn't like interacting with anyone. After joining our vocational school, he fell in love with coffee making…Since he took up coffee, we have focused on cultivating his interest in this area and encouraged him to participate in industry competitions. Now, he has become more outgoing and optimistic, and his life has a new direction. Just imagine if he had gone to an ordinary high school to study subjects he wasn't interested in or good at; he would still be growing up in a suppressing environment."*

When expressing these views, the interviewees often appeared excited, with proud expressions on their faces. This indicates that, after recognizing the role of vocational education in societal development, these vocational education participants are satisfied with the nobility of their work. Therefore, it can also be hypothesized that the recognition of the importance of their work is related to vocational teachers' Institutional Identity. Based on the

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content obtained from the interviews, the researcher directed this importance towards student development and societal development, and set the item as **"(II-15) I believe that the vocational teaching profession is important for both individual and societal development."**

2) Sub-theme: Policy reform endorsement. Secondly, apart from acknowledging the importance of vocational education, the national reform measures concerning vocational education were frequently mentioned in the interviews. For instance, XW noted:

(XW13) *"As a teacher with over 15 years of experience, I can tell you that before 2020, vocational education received very little attention, and there weren't many national policies focusing on this area. However, after the release of the '20 Guidelines' in 2020 and the subsequent 'Vocational Education Law', the whole society's attention to vocational education has significantly increased."*

Chinese vocational education has entered a rapid development phase since 2020. Multiple reform measures have followed in quick succession. These reforms involve every aspect of vocational education, including: 1) educational approaches; 2) school operation modes; 3) management systems and safeguard mechanisms; 4) the vocational college entrance examination system; 5) the "1+X" certificate system; and 6) the structure of vocational education and vocational undergraduate education (The State Council, 2019). The implementation of policies in any of these aspects relies heavily on vocational teachers at the frontline of teaching. Therefore, if vocational teachers do not endorse the national vocational education reform policies, they may experience job burnout, as YS said:

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(YS5) *"I strongly dislike the '1+X' certificate policy. This certificate has no credibility in society, but we, as teachers and students, have to spend money to learn for it. This makes us feel very tired because you feel like you're wasting time and effort on something that's worthless."*

Conversely, if individuals endorse the vocational education reform policies and are willing to cooperate with their implementation, it can stimulate their work enthusiasm and enhance their professional identity. For example, YT believes:

(YT3) *"Vocational education is now much more flexible than before. Our secondary vocational school students can easily progress to higher vocational colleges, and higher vocational college students can also easily progress to undergraduate programs. The new vocational education reforms have opened up many pathways for student progression. I think this is very good."*

Apart from the endorsement of the implementation measures of vocational education reform, interviewees also mentioned the endorsement of the "value concept" of vocational education in the reform. For instance:

(HH3) *"Vocational education is now recognized as an educational category that is on the same status as general education. This is stipulated in the new 'Vocational Education Law'. That means vocational education is no longer a lower-tier form of education. Now we also find that the level of students we recruit is getting higher. Previously, vocational education was seen as a refuge for underachieving students, but this perception is changing."*

Therefore, based on the interviewees' level of cooperation with the educational reform policies and their endorsement of the reform concepts, the researcher took the "direction of

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vocational education reform" as the core keyword and summarized it into the item **"(II-16) I agree with the direction of national vocational education reform."**

3) Sub-theme: Industrial code of conduct. Vocational teachers serve as a bridge between vocational students and the industry (Fejes et al., 2014). They not only impart industry-specific skills to students but also transmit behavioral norms and ethical standards prevalent in the industry. During interviews, respondents frequently emphasized the importance of industry behavioral norms and ethical standards. For instance, JX stated:

(JX2) *"In school…what we strongly emphasize in school is their professional ethics, meaning they must clearly understand the behavioral norms of the industry."*

Similarly, XM opined:

(XM3) *"…Some students may not excel in skills, but they know how to respect supervisors, respect clients, endure hardships, communicate effectively, ask questions when unsure, and maintain hygiene when entering the kitchen. Such students are more welcomed by enterprises."*

This demonstrates that adherence with behavioral norms and ethical standards in the industry reflects teachers' identification with industry roles. It is noteworthy that, in the process of school-enterprise collaboration, schools and partner enterprises often have differing views on certain issues. For example, conflicts frequently arise over the workload assigned to students. Schools believe that enterprises should accommodate the individual needs of students and provide appropriate considerations for those who cannot handle the enterprise's workload. From the enterprise's perspective, under the premise of equal pay, everyone's workload should be equal. Another example is schools' requirement for enterprises

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to strictly enforce limits on students' working hours. However, in the actual operation of enterprises, particularly in the social service industry, the actual working hours of students are often influenced by guest residence times and thus become longer than expected. When faced with such "trade-off" issues, XW's viewpoint is representative:

(XW14) *"So actually, I endorse the company's approach in some degree…When values conflict, I will think from the perspective of the company."*

It can thus be inferred that in the realm of vocational education, only vocational teachers with a high degree of occupational identity attach greater importance to the values upheld by enterprises. It is evident that the values they instill in students during the teaching process are the behavioral norms and moral standards advocated within the industry. Consequently, it can be hypothesized that the level of acceptance of **"behavioral norms and moral code within the industry"** is correlated with the degree of vocational teachers' occupational identity (OI-12).

4) Sub-theme: Industry pertinence. In vocational education, each teaching major corresponds to a specific industry or a particular technical position. During interviews, the researchers found that respondents paid particular attention to the significance of the industries and positions corresponding to their teaching majors. For example:

(JD6) *"Artificial intelligence is very popular now, but I believe that the students trained in our major will not be replaced by AI. High-end service industries will always exist, and they require person-to-person services that are warm and creative."*

When discussing industries and positions, respondents emphasized their importance. This is because it is related to the significance of their teaching and, consequently, to the

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future work significance of their students. For instance:

(JX3) *"Our industry has a high technological content and has now incorporated many AI elements. We also integrate these elements into our teaching to keep students up-to-date. However, regardless of how it evolves, this industry will continue to exist, perhaps in different forms."*

Based on this, one can postulate that the sentiments regarding the industry and role, shaped by prior work experiences or academic disciplines, along with anticipations for their students' future career trajectories, constitute crucial elements in the formation of occupational identity across different industries among vocational educators. Within the scope of this research, the aforementioned "sentiments" and "anticipations" are consolidated into "acknowledgment of the industry's significance," and an assessment item, OI-16, is formulated as follows: **"I hold the belief that the industry pertinent to my field of study is an integral component of socio-economic development."** This item posits that an increased sense of industry identification among vocational teachers correlates with a heightened level of their Occupational Identity.

5) Sub-theme: Organizational Belonging. Numerous studies have demonstrated the correlation between a sense of belonging to an organization and professional identity (Bucher et al. 1977; Wei, 2008; Liu et al. 2008; Lewis et al. 2016; Li et al. 2018; Beijarrd, 2018). That is, the stronger an individual's sense of belonging to an organization or group, the higher their professional identity related to that organization or group. For instance, in the ITP (Indicators for Measurement of Teachers' Professional Identity) developed by Ali Samsudin et al. (2021), the statement "I am proud of my school" is used as an item to measure teachers' professional

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identity. In the field of vocational education in China, this theory is corroborated by the findings of this interview. Analysis of the interviews reveals that taking pride in their school enhances vocational teachers' self-confidence and pride as vocational educators. The content of the interviews further indicates that this sense of pride is multifaceted, exemplified by:

(YT2) *"Our school has developed rapidly in the past decade…The current campus looks like a university, very impressive."*

Another example:

(YS6) *"Our school was originally a Dazhuan (Higher Vocational College), but now it's about to be promoted to a Vocational University (Shengben). That means we will also be University teachers in the future."*

There are also aspects related to the school's increased reputation:

(HH4) *"Vocational schools didn't have much reputation before, but now many people know about our school. In recent years, society's evaluation of vocational schools has indeed changed a lot."*

Additionally, there is the aspect of the school's raised hiring standards:

(XJ5) *"New teachers joining our school are now required to have a doctoral degree. It's hard to imagine that it's so difficult to become a teacher in a vocational school nowadays."*

It can be seen that with the rapid development of vocational education today, the government has increased financial investment in this field, and the progress of each vocational college is evident to all. These advancements and changes have, to some extent, increased the organizational belonging of vocational teachers. Therefore, referencing existing

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scale items, the researcher has set **"(II-17) I am proud to be a member of my school"** as one of the conditions for measuring the Institutional Identity of vocational teachers.

6) Sub-theme: Trans-community belonging. However, designing items to measure a sense of belonging to an industry, as opposed to a school, poses challenges. This is because, in reality, the organizational structure for teachers is the school. The school is the employer and the source of livelihood for teachers, whereas an industry or a specific company within the industry is not. Researchers cannot use "I am proud to be a member of a certain company" as a criterion to measure the organizational belonging of vocational teachers. The literature and existing scales do not provide a cross-industry method for setting items to measure the occupational identity of vocational teachers in this dimension. Therefore, during the interviews, the researcher sought to identify entry points for measuring the occupational identity of vocational teachers from the perspective of organizational belonging.

The interviews revealed that vocational teachers consider themselves as part of the industry rather than part of a specific company. For example, YZ views herself as a trainer of industry talent. Thus, although he is a teacher, he also considers himself a member of the industry:

(YZ2) *"You can think of vocational schools as the HR departments of industries and companies. We cultivate talent for them, provide pre-job training for them, and we are their trainers."*

Another example is YR, who, although a teacher in a vocational school, maintains close ties with the industry and companies, sharing the latest information with her students. She does not feel that she has left the industry, as she explains:

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(YR6) *"I left C-Trip to become a teacher in a school due to family reasons. But I have always maintained contact with my former company and colleagues. Through these interactions, I can keep abreast of the latest industry developments. I don't feel like I've left my industry."*

Some teachers believe that vocational schools are inherently part of the industry, for instance:

(JX4) *"The earliest vocational schools were all established by enterprises. Nowadays, these schools have simply gathered various specialties together to form comprehensive vocational schools. However, it's important to understand that within these comprehensive schools, each specialty should still belong to an enterprise. Ideally, they should be organized and funded by industries or enterprises."*

Therefore, while each interviewee expressed different reasons for their sense of belonging to the industry, their words all attested to the existence of a cross-industry sense of belonging. Consequently, for clarity in expression, when designing the items, the researcher still emphasized the perspective of vocational teachers' original professional identity, expressing their desire to be "a part of the industry." This was articulated as item: **"(OI-18) Although I am a vocational teacher, I believe that I am also a part of the industry."**

7) Sub-theme: Community of Shared future. Sense of identity also encompasses group identity. Li et al. (2018) argue that "the close connection between an individual teacher's development and the school's development" is a manifestation of professional belonging. In their Teachers' Professional Identity scale, they include "I often feel that I am a part of this school, and my development is closely linked to the school's development" as one of the

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items to measure teachers' professional identity, falling under the dimension of "professional belonging." This sense of belonging is specifically reflected in the "binding" of an individual's future to the group's future. For instance, JD mentions:

(JD7) *"Teaching is a stable job. Although the pay is not as high as in corporations. I think I will continue working at our school; the school's platform is crucial. If the school platform develops well, we will naturally have more opportunities for growth."*

Similarly, YR states:

(YR7) *"... I think, as a school teacher, you still need to develop alongside the school and make contributions to the school. Of course, these are also your personal achievements, which are intertwined with the school's achievements."*

Other interviewees also mentioned that matters related to personal development, such as "salary," "professional titles," "paper publication," and "family relationships and children's education," are closely tied to the school's development.

XW emphasized the role of the school's platform more than once during the interview, implicitly acknowledging the correlation between personal and school development:

(XW15) *"...You must recognize what your platform can offer, you must value your broader context, as well as the support your leaders and your school can provide. But when I was very young, I didn't realize this point."*

The researcher summarizes the factors mentioned by the interviewees as "personal development," linking them with the development of the teaching community and the school, forming an item to measure teachers' professional identity. That is, the hypothesis is that the more a teacher believes that "their development is closely linked to the development of the

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teaching community and the school," the higher their Instructional Identity. The item is stated as: **"(II-19) I believe that my development is closely linked to the development of the teaching community and the school."**

Similarly to the above analysis, teachers' cross-industry professional identity can also be hypothesized as follows: "the more closely their development is linked to the development of the industry," the higher their occupational identity. During the interview, HH mentioned:

(HH5) *"The better the industry develops, we, as teachers in related majors, will definitely feel more proud."*

This indicates that due to the close connection between vocational education and the industry, vocational teachers also "bind" their personal futures to the group's future. The reasons for this are not singular, as RS believes:

(RS12) *"…the number of kindergartens has been decreasing sharply during this period. Therefore, the enrollment of our 'Early Childhood Education' major has been greatly affected. If this continues, our major may very likely be eliminated by the school, and we may face job transfer or dismissal."*

The above case shows that this sentiment is based on complex considerations, which also include factors such as students' futures and the sustainable development of the major. Additionally, potential job security is another angle of consideration, a phenomenon that was also mentioned in Esmond's (2017) study. For example, XJ mentioned:

(YR8) *"The requirements for teachers in vocational schools are becoming increasingly higher…It's really tiring, and the income is not very high. I wouldn't rule out the possibility of returning to the corporate world someday."*

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Furthermore, interviewees also mentioned factors such as "school-enterprise collaboration on horizontal projects," "additional earning opportunities," "future job opportunities," and "social interpersonal networks." It can be seen that even though the work setting of vocational teachers is not within industry enterprises, they all realize that the prosperity of the industry is closely linked to their career prospects. Therefore, the researcher se**t "(OI-20) I believe that my development is closely linked to the development of the industry related to my major"** as one of the items to measure vocational teachers' Occupational Identity. It is worth noting that this item differs from OI-13. This item focuses on measuring the relationship between personal and group development, representing an individual's belief. In contrast, OI-13 focuses on measuring an individual's perception of the group's importance in the socio-economic context.

8) Sub-theme: Image Maintenance. Lastly, the willingness to "actively maintain the group's image" is also regarded as a behavior positively correlated with group identity (Li et al., 2018). The group image is related to one's own professional image. For teachers, the group image encompasses the image of professional teachers and the image of the school they belong to. For vocational teachers, the group image also includes the image associated with the industry. The thematic analysis of interviews reveals that as school teachers, teachers in vocational colleges emphasize "being a model for students," that is, paying attention to their own image and behavior, thereby maintaining the school's image. The management of these respective behaviors can involve legal aspects, as YZ shared:

(YZ5) *" As school teachers, if our words or actions are inappropriate in any way, we will be complained about, which can lead to significant social public opinion and bring*

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negative impacts to the school. Therefore, we are usually cautious, especially when talking with students."

It also involves daily behaviors, as HH mentioned:

(HH6) *"I think as a teacher, your words and actions can represent your collective. It's not just your performance during class, but also your behavior in daily life. We often communicate with people in the industry. For example, they tend to like smoking, but I still restrain myself. When others invite me to smoke with them, I will refuse."*

Therefore, "Words" and "Actions" can be summarized as part of teachers' self-management, and through this management, the goal of maintaining the school's image is achieved. Consequently, the researcher formulated the item **"(II-18) I am mindful of my words and actions, and will not bring any negative impact to the image of the school"** as a factor in the scale.

However, what cross-industry behaviors do vocational teachers typically engage in to maintain the image associated with their industry? During the interviews, most respondents mentioned that in the process of teaching, there are courses related to "professional ethics":

(QB3) *"I emphasize the cultivation of 'professional ethics' in my classes. 'Professional ethics' starts with the professional image. Every profession has its own professional image. For example, in our profession, it is required to wear uniforms and perform safety precautions before entering the job…I also try to present a healthy professional image to my students. In our industry (automotive repair), some senior employees like to smoke, drink, play cards, and brag...I will let my students understand the reality and teach them to distinguish between good and bad behaviors, thereby shaping a good image for themselves."*

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Meanwhile, in the courses, the primary way for vocational teachers is to convey and shape a professional, healthy, and noble industry image to students through their own image presentation. For example, YT pays particular attention to professional attire:

(YT4) *"Every time I teach, I wear a uniform. This helps me present a professional image to my students and familiarizes them with the work environment they will encounter in the future."*

Some teachers also believe that proficiency in vocational skills contributes to establishing a good professional image in students' minds, as illustrated by:

(JD8) *"...The more skilled you are, the more professional you appear. Students will like your class because of your professionalism."*

It can be seen that although the interviewees are "constrained" by their professional roles and work settings as "vocational teachers," due to their mission of cultivating excellent employees for the industry and enterprises, they still set an "example" for students by regulating and even optimizing their speech and behavior. This practice fully embodies the mission of vocational teachers to cultivate talents for enterprises and also reflects the identification with the dual professional identities of vocational education teachers.

Therefore, by summarizing the common work scenarios and purposes presented in the interviews, I have placed vocational teachers in their daily work settings and set the work purpose as "establishing a good professional image in front of students" to design the item: **"(OI-19) I will be mindful of my words and actions, so as to establish a good professional image in front of students."** This item hypothesizes that the more teachers hope to shape a good professional image in front of students through their words and actions,

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the higher their Occupational Identity as vocational teachers is.

Theme: Career Commitment (CC). During the interviews, the respondents expressed their perspectives on the future development of vocational education as well as their expectations and requirements for their own development. Key terms such as "lifelong learning," "optimization," "improvement," "effective utilization of enterprise resources," and "strengthening school-enterprise cooperation" frequently emerged throughout the interviews. These keywords, which are related to "occupational commitment," also confirmed the existence value of certain items in the initial scale. Simultaneously, they prompted the researcher to revise and delete some items from the first-round initial scale.

1) Sub-theme: Learning with schools. The theme of "learning" has been frequently mentioned by interviewees. From their statements, it can be inferred that for vocational teachers, "learning" encompasses learning within two contexts: the first is learning within the school environment, and the second is learning within the framework of school-enterprise cooperation. The respondents believe that a stronger motivation for learning and deeper involvement in learning lead to a higher sense of professional identity. This viewpoint is also supported by Wenger's (1998) theory of professional learning, which suggests that deep professional learning within a community of practice is conducive to shaping professional identity (Fracchiolla et al., 2020).

In the interviews, PP emphasized the importance of lifelong learning:

(PP4) *"As vocational teachers, our knowledge evolves with the development of the industry. If we stop learning, the knowledge our students acquire will be outdated."*

Some interviewees also expressed dissatisfaction with the existing learning modes

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within the school framework, such as "national training" (Guopei) and "provincial training" (Shengpei) and expressed a desire for urgent improvement:

(HF10) *"The school provides us with many learning opportunities. The most common are 'national training' and 'provincial training.' However, unfortunately, I must say that most of these trainings are ineffective."*

QB believes that vocational teachers need to establish a "lifelong learning" model:

(QB4) *"Lifelong learning is definitely beneficial, as it allows us to maintain our competitiveness. Enhancing our abilities means enhancing our professional identity."*

Therefore, based on a summary of the interview materials, the researcher has set the item **"(II-20) I hold the belief in lifelong learning and strive to continuously improve my professional competence"** to measure teachers' professional identity.

2) Sub-theme: Mutual engagement. Another context for teacher learning is through practical opportunities or learning programs provided by partner enterprises within the framework of school-enterprise cooperation. JX believes:

(JX5) *"I need to participate in enterprise projects with the identity of a corporate employee, even if it is temporary, because our current goal in cultivating talents is to produce individuals who meet the market demands for the industry and enterprises."*

XW mentioned that contact with professionals stimulates her desire to learn:

(XW16) *"Whenever I am with industry professionals, I become more strongly aware that I need to communicate more with them and learn something from them."*

XR, on the other hand, hopes to gain opportunities for exchanging ideas with professionals by participating in industry activities:

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(XR6) *"But I think if you often know what's happening in the industry, I am willing to participate together with industry professionals."*

It is evident that as interviewees have more contact with industry professionals, their motivation to engage with enterprises becomes stronger. This engagement is not merely for learning but also for understanding enterprise needs and transforming these needs into teaching projects. The more teachers participate in and deeply engage with projects provided by professional communities, or the more they interact with members of these communities, their sense of professional identity increases (Tong et al., 2022). For instance, XM's feedback after participating in the "enterprise internship" program arranged by an enterprise within the school-enterprise cooperation framework was:

(XM4) *"During the last internship at the Qingyuan enterprise, I felt that I learned a lot. It's not that I learned new skills, but I understood what my students should do when they work in these enterprises in the future. I must thank this enterprise because not all enterprises in school-enterprise cooperation can provide such good opportunities. Now, when I return to school, I know how to teach my students."*

Thus, it can be seen that the practice of vocational teachers in school-enterprise cooperation is of great significance for their teaching and personal career development. This practice updates vocational teachers' understanding of the current state of industry development and enhances their job skills. After transforming these gains into classroom teaching content, their work will be recognized by more students. In other words, "enterprise practice" itself has a strong correlation with the measurement tools proposed in items such as II-09, II-10, OI-05, OI-06, OI-07, OI-08, and OI-09. For example, RS expressed the desire to

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participate in commercial projects jointly developed through school-enterprise cooperation:

(RS13) *"I am indeed willing to participate in businesses* (*business project which is engaged by the school-enterprise cooperation framework*), *and I believe that if I do so, it will positively promote my teaching in turn."*

These commercially oriented projects jointly developed through school-enterprise cooperation are referred to as "productive training bases" in China. Essentially, they are independently operated factories where teachers and students engage in production according to enterprise demands and fulfill teaching tasks in the production process. Therefore, considering the characteristics of school-enterprise cooperation in vocational education, researchers have adopted the school-enterprise cooperation framework as the measurement context, using the learning and practical opportunities provided within this framework as a platform to assess the enthusiasm of vocational teachers in participating in professional learning. This has led to the development of the item (OI-21): **"I am willing to engage in collaborative projects between schools and enterprises and learn from them."**

3) Sub-theme: Instructional Responsibility. Ali et al. (2021) suggest that "having a sense of responsibility for student development" can serve as a factor in measuring teachers' professional identity. In their developed ITP (Indicators for Measurement of Teachers' Professional Identity), this item is stated as: "I have a responsibility for the wholesome development of children/students." "Sense of responsibility" is a keyword that frequently appears in interviews. Statements regarding responsibility can be categorized as part of "career commitment." For example:

(RS14) *"I definitely need to fulfill the basic tasks of teaching and educating students,*

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right?"

Summarizing the scope of "sense of responsibility" mentioned by the interviewees, most of it is related to "student development." For instance, YT mentioned:

(YT5) *"Students who come to vocational schools often have had a rough journey in their growth. Therefore, they may have some physical and mental issues. I think, as vocational teachers, my most important task is not just teaching classes, but providing psychological counseling to my students, helping them become mentally healthy."*

It also includes students' academic performance, such as:

(XM5) *"The students who come to our major (Pastry) have the highest entrance scores in the entire school. They have excellent learning abilities, so they actually hope to continue their studies after graduation…Therefore, I think I should provide them with more guidance in this aspect."*

As well as students' understanding of the industry, such as:

(XJ6) *"And I think we should do our best to let them know the real current situation of the industry. And when they go out and compare it, they will come back and thank the teacher."*

It can be seen that the sense of responsibility of vocational teachers is similar to that of teachers in general education. However, the concerns of the two differ slightly. Vocational teachers' concerns are more comprehensive, encompassing both the learning and employment phases. Therefore, this study uses "sense of responsibility" and "comprehensive development" as keywords to develop the item: **"(II-21) I have a responsibility to promote the comprehensive development of students."** This item is semantically similar to the

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statement made by Ali Samsudin et al. (2021).

4) Sub-theme: Professional commitment. Wei (2008) has conducted long-term and systematic research on teachers' professional identity since 2005, continually revising the structure of teachers' professional identity. In her latest study, she identifies four dimensions which consist the teacher professional identity: 1) professional behavior tendencies, 2) professional values, 3) role values, and 4) professional belonging (Wei, 2013). Among these, professional behavior tendencies refer to the behavioral tendencies exhibited by teachers when completing work tasks, fulfilling professional responsibilities, or enhancing professional efficacy. These "behavioral tendencies" are mainly expressed in interview narratives through phrases such as "I am willing to...", "I hope I can...", and "I hope to dedicate myself to...". Through thematic analysis of the interview transcripts, several prominent themes related to the interviewees' professional commitment and "behavioral tendencies" emerge.

For example, interviewees mention their willingness to contribute their efforts to the development of the school. As stated by:

(JX6) *"Yes, I hope to make some efforts within my capabilities to make our major better."*

Another example is provided by XJ:

(XJ7) *"...I am pursuing a Ph.D. and hope to go to a higher-level school later. But no matter which school I am at, you are a teacher of that school, and your achievements are the school's achievements."*

Based on the theory of "behavioral tendencies" and the key information that emerged

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during the interviews, such as "wisdom" and "strength," the researcher formulated the item:

"(II-22) I am willing to contribute my wisdom and strength for the better development of my school." This item indicates that teachers with professional identity are willing to contribute to the development of their school throughout their career. This item is also related to items II-17 and II-19, which are designed to measure teachers' organizational belonging.

5) Sub-theme: Joint curriculum development. The second type of "behavioral tendency" that emerged during the interviews is related to the theme of school-enterprise cooperation. The interviewees expressed their desire to optimize the current school-enterprise cooperation model. Some interviewees expressed dissatisfaction with the existing model of school-enterprise cooperation. For instance, HF stated:

(HF11) *"Regarding school-enterprise cooperation, I think we have not done enough. Actually, if we compare with foreign countries, we can see that what we are doing now may not even be called 'school-enterprise cooperation.' Real 'school-enterprise cooperation' requires joint efforts from schools, enterprises, teachers, and even the government. In the current cooperation, schools are just seeking a 'gimmick,' while enterprises are mainly looking to obtain cheap labor from schools. I think this is something worth reflecting on."*

Within the framework of school-enterprise cooperation, interviewees believed that the most desired goal was to achieve co-construction of curriculum resources. For example, HH stated:

(HH7) *"Honestly, our current curricula are quite outdated. Enterprises don't know what we are teaching, and we don't know what enterprises want us to teach. I hope that*

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through school-enterprise cooperation, we can develop curricula, including student courses, related textbook development, and teacher training, among other things."

JD, on the other hand, viewed it as a sustainable process and a mode of cooperation that must be mutually beneficial:

(JD9) *"Actually, I know that enterprises are here to make money; they are not charity organizations helping schools with this and that. So, we should sit down and talk about what each party is concerned about, or…what both parties hope to gain. Then we can delve deeper into whether there are any opportunities for cooperation. Without mutual benefit as a prerequisite, any school-enterprise cooperation cannot be sustained."*

Synthesizing the key themes presented in the interviews, the researcher developed the item with "school-enterprise cooperation" and "curriculum development" as keywords to develop the item: **"(OI-22) I am willing to strengthen cooperation with partner enterprises in curriculum development."**

In fact, the framework of school-enterprise cooperation constitutes a Community of Practice. According to Wenger's theory of Community of Practice, cooperating stakeholders in a Community of Practice should achieve three modes of cooperation: 1) Joint-enterprise; 2) Mutual engagement; and 3) Shared repertoire (Wenger, 1998). The process of "curriculum development" within the framework of school-enterprise cooperation reflected in IO-18 can be regarded as a comprehensive manifestation of these three modes of cooperation. That is, schools (teachers) and partner enterprises jointly develop high-quality curriculum resources, share resources during the development process, and make mutual commitments and joint participation to achieve the desired cooperation effects. The purpose of school-enterprise

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cooperation to achieve "curriculum development," as mentioned by the interviewees, is a characteristic that distinguishes vocational education from general education. The formulation of talent training programs in vocational education should be the result of cooperation between schools and enterprises. The course content taught in vocational education should meet the job requirements of enterprises. For example, when teachers develop course content, they should first conduct research in enterprises and jointly analyze typical job tasks with enterprises, transforming the results of this analysis into teaching tasks. The cooperation process embodies the three elements of the Community of Practice, all of which reflect the "behavioral tendencies" of vocational teachers in school-enterprise cooperation.

6) Sub-theme: Joint talent cultivation. Another shared objective of school-enterprise collaboration that emerged during the interview was "cultivating talents who meet the requirements of enterprises." As QB mentioned:

(QB5) *"We also need to interact with businesses. What kind of talent do we need to cultivate…We need to effectively communicate and convey that, right?"*

XW, who works as a vocational teacher while also running her own wine retail business, continuously refines her teaching content through her own practical experiences.

(XW17) *"So in the past three years, during class time, I have actually been re-preparing for each of my courses, such as the wine course. Every year, I revise my course materials and add new content to them."*

HH, on the other hand, emphasizes the importance of collaborative education between schools and enterprises:

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(HH8) *"The individuals we cultivate in vocational schools today will be the workforce in enterprises tomorrow. Those working in enterprises today may become the teachers we invite to our classrooms tomorrow. Therefore, when it comes to cultivating talent, vocational schools and enterprises are a community of interest, working together."*

This theme aligns with the core objective of the "Three Comprehensive Approaches to Educating People" policy currently advocated in China's vocational education, which refers to educating people comprehensively by involving all stakeholders, throughout the entire educational process, and in all aspects. This policy was proposed in the "Opinions of the CPC Central Committee and the State Council on Strengthening and Improving Ideological and Political Work in Colleges and Universities Under the New Circumstances". Among them, "educating people by involving all stakeholders" refers to the collective effort of schools, governments, industries, and enterprises in cultivating talent, highlighting their shared responsibility. Furthermore, "educating people throughout the entire educational process" manifests in vocational education as nurturing students through stages such as "school learning," "enterprise internships," and "enterprise employment." The framework of school-enterprise cooperation serves as a guarantee for vocational colleges and partner enterprises to jointly cultivate talent. This study hypothesizes that within the framework of school-enterprise cooperation, the higher the willingness of vocational teachers to collaborate with enterprises in "cultivating talents that meet the requirements of enterprises," the higher their cross-industry occupational identity. This hypothesis is consistent with the settings of the "behavioral tendency" theory (Wei, 2008). Hence, the item **"(OI-23) I am willing to work with partner enterprises to jointly cultivate talents that meet the needs of enterprise**

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positions" is formulated.

In the first round of scale development, the researcher included the item "I am willing to share resources with partner enterprises." However, this item was removed during the second round of scale revision. The reasons are as follows: Firstly, during the creation of items OI-18 and OI-19, it was found that the behavior of "resource sharing" was already reflected in the aforementioned two behaviors of vocational teachers, known as "Shared repertoire," thus it was unnecessary to form an independent item. Secondly, while the collaborators in school-enterprise cooperation are schools and enterprises, the actual operators of the cooperation are the vocational teachers themselves. From the perspective of vocational teachers, the resources they share are those of the school platform, rather than personal resources (without the permission of the school, teachers do not have the authority to share school resources). The purpose of setting items in this study is to measure occupational identity through individual behavior, which deviates from the subject of resource sharing, i.e., vocational schools.

The Exploratory Factor Analysis Result

Statistical Data Description of the First-Round Data Collection. The teachers who participated in the questionnaire for exploratory factor analysis were primarily from secondary vocational schools and tertiary institutions in the Pearl River Delta region and its surrounding areas. A total of 311 questionnaires were collected, with 12 being invalid and 299 being valid, resulting in an effective questionnaire rate of 96.14%. Among the valid respondents, there were 162 (54.2%) secondary vocational teachers, 101 (33.8%) higher

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vocational teachers, and 36 (12%) teachers from the vocational universities. The gender distribution comprised 77 (25.8%) male teachers and 222 (74.2%) female teachers. In terms of age, the respondents ranged widely from 22 to 62 years old, with an average age of 37.65 years. Similarly, teaching experience spanned from 0.5 to 40 years, with an average of 11.86 years.

According to the collected questionnaires, almost all the teachers had an undergraduate degree or higher. Specifically, 132 (44.2%) teachers held bachelor's degrees, 126 (42.1%) held master's degrees, 39 (13%) held doctoral degrees, and only 2 (0.7%) held associate degrees. Regarding professional titles, the highest proportion of teachers, 133 (44.5%), held intermediate titles, while only 5 (1.7%) held the highest professional title. Additionally, 52 (17.4%) teachers had no title, 44 (36.4%) held junior titles, and 65 (21.7%) held senior vice titles.

Concerning monthly income, the statistics showed that the majority of teachers fell into the ranges of 3001-5000 yuan, 5001-8000 yuan, 8001-12000 yuan, and 12001-18000 yuan, with 60 (20%), 72 (24.1%), 91 (30.4%), and 55 (18.4%) teachers respectively. Fewer teachers had monthly incomes below 3000 yuan or above 18000 yuan, with 9 (3%) and 12 (4.1%) teachers respectively.

The Result of the Exploratory Factor Analysis. For the purposes of this study, an exploratory factor analysis (EFA) was conducted on the 299 datasets collected in the first round. Moreover, given that the survey questionnaire in this study targeted individuals who had dual identities as both Instructional and Occupational Identities, EFA was separately performed for the identities of teachers and workers using SPSS 24 software.

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Regarding the perspective of Instructional Identity, the results indicated that the Kaiser-Meyer-Olkin (KMO) value was 0.917, and the Bartlett's Test of Sphericity was significant (x^2 = 3742.653, *df* = 231, P < 0.001), suggesting the presence of common factors in the correlation matrix of the sample data. Therefore, the data were suitable for EFA.

In this study, principal component analysis (PCA) was employed to extract common factors, yielding an initial factor loading matrix, which was then rotated using the varimax method to obtain the rotated component matrix. Based on the results of the factor analysis, four inappropriate items (II-06, II-15, II-16, II-17) were removed from the questionnaire according to the criteria of item loading values less than 0.6 and cross-loadings greater than 0.4, leaving 18 items. We conducted EFA again on the remaining 18 items.

The scree plot (Figure 7) indicated that a two-factor solution was optimal, while a four-factor solution had eigenvalues greater than 1 (meeting the criteria). According to the criterion of eigenvalues greater than 1, a total of four factors with eigenvalues greater than 1 were identified, which together explained 66.670% of the total variance. Therefore, it was most appropriate to select four common factors. The specific item loadings are presented in Table 8. The first factor in Table 8, consisting of five items, was named "Role Recognition"; the second factor, consisting of four items, was named "Professional Efficacy"; the third factor, also consisting of four items, was named "Community Belongingness"; and the fourth factor, consisting of five items, was named " Work engagement".

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Figure 7

Scree Plot result for Instructional Identity

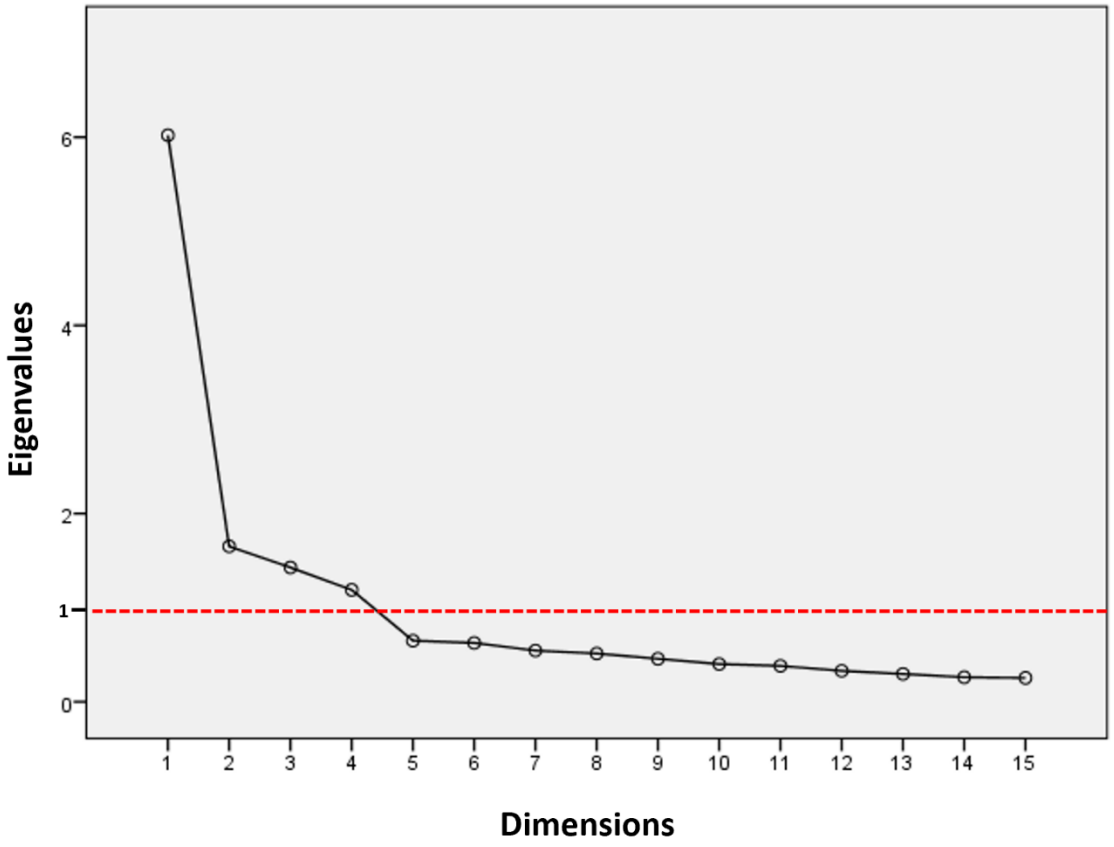


Table 8

Exploratory Factor Analysis result of the Instructional Identity

Dimensions and Items		Factor loading			
		F1	F2	F3	F4
F1	**Role Recognition**				
II-01	I am proud to be a vocational teacher.	0.658			
II-02	I often introduce myself by saying, "I am a vocational teacher."	0.685			
II-03	In the field of vocational education, there are role models that I admire.	0.790			
II-04	I understand the difference between vocational teachers and general education teachers.	0.661			

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II-05	I care about the social comments on vocational education.	0.633			
F2	**Professional Efficacy**				
II-07	In my classroom, I can effectively manage different groups of students and develop teaching strategies tailored to their actual situations, providing individualized instruction.		0.791		
II-08	I can skillfully utilize various teaching equipment in my teaching.		0.747		
II-09	I usually demonstrate confidence when dealing with teaching tasks.		0.753		
II-10	My students recognize my work.		0.722		
F3	**Community Cohesion**				
II-11	I am satisfied with the interpersonal relationships among my colleagues.			0.761	
II-12	Our school leadership is effective, values teacher development, and handles matters fairly.			0.744	
II-13	Our school provides sufficient teaching resources and facilities, and the environment is conducive to teaching and learning.			0.808	
II-14	In our school, the evaluation of professional titles and the promotion mechanism is objective and fair.			0.798	
F4	**Work Engagement**				
II-18	I am mindful of my words and actions, and will not bring any negative impact to the image of the school.				0.762
II-19	I believe that my development is closely linked to the development of the teaching community and the school.				0.671
II-20	I hold the belief in lifelong learning and strive to continuously improve my professional competence.				0.744
II-21	I have a responsibility to promote the comprehensive development of students.				0.800
II-22	I am willing to contribute my wisdom and strength for the better development of my school.				0.789

Regarding the perspective of Occupational Identity, the results revealed that the KMO

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value was 0.890, and the Bartlett's Test of Sphericity was significant (x^2 = 3489.517, *df* = 253, P < 0.001), indicating the presence of common factors in the correlation matrix of the sample data. Thus, the data were also suitable for exploratory factor analysis (EFA).

In this study, principal component analysis (PCA) was utilized to extract common factors, resulting in an initial factor loading matrix, which was subsequently rotated using the varimax method to obtain the rotated component matrix. Based on the factor analysis results, five inappropriate items (OI-12, OI-15, OI-16, OI-17, OI-21) were excluded from the questionnaire according to the criteria of item loading values less than 0.6 and cross-loadings greater than 0.4, leaving 18 items. We conducted EFA again on the remaining 18 items.

The scree plot (Figure 8) indicated that a two-factor solution was optimal, while a four-dimensions solution had eigenvalues greater than 1 (meeting the criteria). According to the criterion of eigenvalues greater than 1, a total of four factors with eigenvalues greater than 1 were identified, which together explained 67.365% of the total variance. Therefore, it was most appropriate to select four common factors.

The specific item loadings are presented in Table 9. The first factor in Table 9, consisting of four items, was named "Role Recognition"; the second factor, consisting of five items, was named "Professional Efficacy"; the third factor, also consisting of four items, was named " Community Cohesion"; and the fourth factor, consisting of five items, was named "Work Engagement".

Figure 8

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Scree Plot result for Occupational Identity

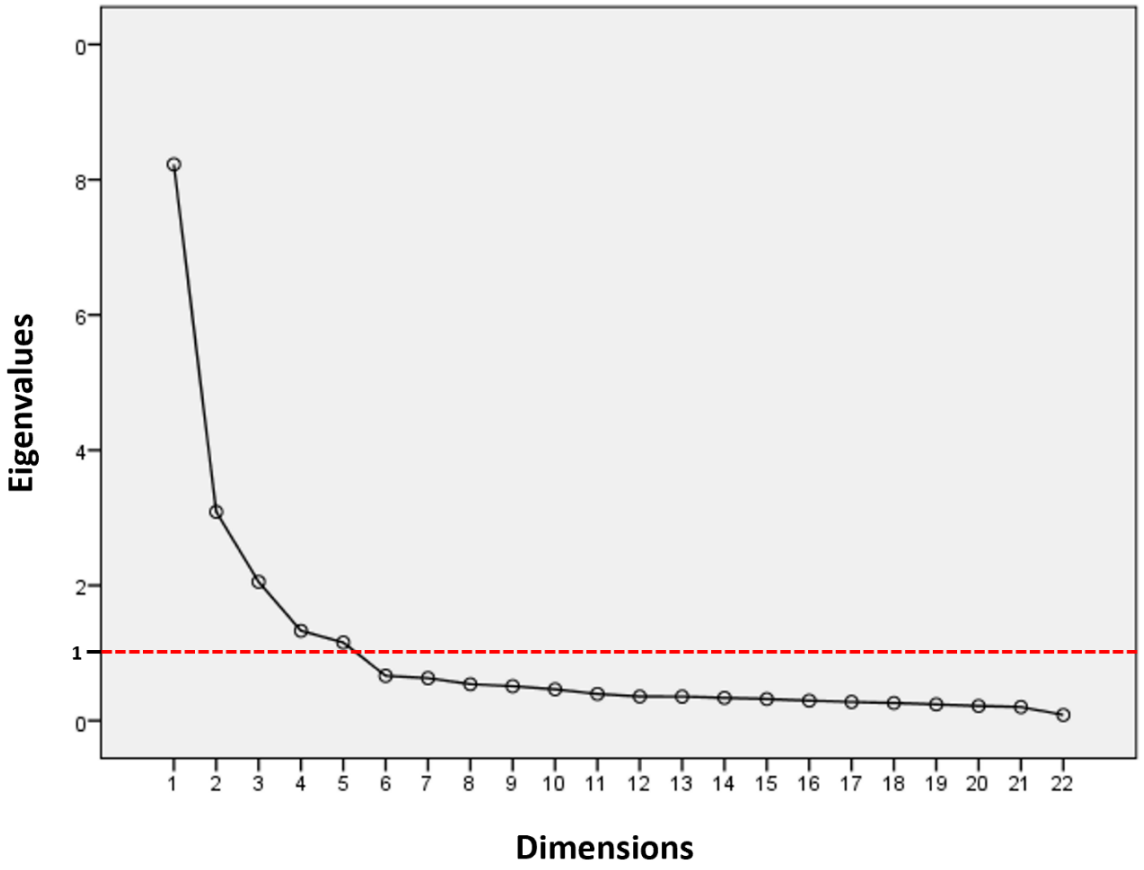


Table 9

Exploratory Factor Analysis Result of the Occupational Identity

Dimensions and items		Factor loading			
		F1	F2	F3	F4
F1	**Role Recognition**				
OI-01	When introducing myself, I am happy to mention the industry related to my major.	0.798			
OI-02	There are admirable role models in the industry related to my major.	0.789			
OI-03	I understand the differences between my major and other majors in terms of professional image and work significance.	0.737			

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OI-04	I care about the social comments on the industry related to my major.	0.623			
F2	**Professional Efficacy**				
OI-05	My industrial skills enable me to be competent in my teaching work.		0.696		
OI-06	My professional abilities are recognized by industry professionals.		0.842		
OI-07	I have no communication barriers when interacting with industrial professionals.		0.852		
OI-08	I usually exhibit confidence when participating in industry-related activities.		0.841		
OI-09	I have good connections with people within the industry.		0.620		
F3	**Community Cohesion**				
OI-10	The school-enterprise cooperation framework provides satisfactory learning opportunities.			0.727	
OI-11	The industry can provide good job opportunities for my students.			0.702	
OI-13	I am able to obtain the necessary resources for teaching from collaborative enterprises through school-enterprise cooperation.			0.842	
OI-14	If needed, industry experts will actively participate in my classroom teaching.			0.862	
F4	**Work Engagement**				
OI-18	Although I am a vocational teacher, I believe that I am also a part of the industry.				0.688
OI-19	I will be mindful of my words and actions, so as to establish a good professional image in front of students.				0.677
OI-20	I believe that my development is closely linked to the development of the industry related to my major.				0.781
OI-22	I am willing to strengthen cooperation with partner enterprises in curriculum development.				0.711
OI-23	I am willing to work with partner enterprises to jointly cultivate talents that meet the needs of enterprise positions.				0.771

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The Confirmatory Factor Analysis Result

Statistical data description for the second-round data collection. The group of teachers participating in this questionnaire-based factor analysis primarily originates from secondary vocational schools and higher vocational colleges in the Pearl River Delta region and its surrounding areas. A total of 326 questionnaires were collected, with 303 (92.9%) deemed valid after screening and 23 considered invalid. Specifically, there were 108 (35.6%) teachers from secondary vocational schools, 166 (54.8%) from higher vocational colleges, and 29 (9.6%) from the vocational universities. In terms of gender distribution, male teachers account for approximately one-third, totaling 100 (33%), while female teachers number 203 (67%). The age range is wide, spanning from 24 to 60 years old, with an average age of approximately 37.38 years; similarly, teaching experience ranges from half a year to 40 years, with an average teaching tenure of 10.75 years.

Regarding educational background, the surveyed teachers generally possess high educational levels, primarily at the undergraduate level or above. Among them, 98 (32.3%) hold bachelor's degrees, 163 (53.8%) hold master's degrees, and 35 (11.6%) hold doctoral degrees, while only 7 (2.3%) hold associate degrees. This highlights the dominance of master's degree holders within the field of vocational education. In terms of certificate holdings, apart from the requisite teacher's qualification certificates, 201 (66.3%) teachers hold other professional certificates, accounting for nearly two-thirds of the total.

In terms of professional titles, teachers with intermediate titles constitute the largest

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group, numbering 116 (38.3%); conversely, those with senior titles are the scarcest, with only 16 (5.3%). Additionally, there are 44 (14.5%) teachers without titles, 56 (18.5%) with junior titles, and 71 (23.4%) with senior vice titles. Concerning monthly income, the majority of teachers' salaries fall within the ranges of 5001-8000 yuan, 8001-12000 yuan, and 12001-18000 yuan, with specific counts of 93 (30.7%), 82 (27.1%), and 54 (17.8%) individuals, respectively. Comparatively, fewer teachers earn below 3000 yuan, between 3001-5000 yuan, or above 18000 yuan, with respective counts of 9 (3%), 35 (11.6%), and 30 (9.8%).

The result of the Confirmatory Factor Analysis.

Step1: First-Order CFA Analysis of Dual Professional Identities

This study employs AMOS24 software to conduct a Confirmatory Factor Analysis (CFA), analyzing 36 items derived from the Dual Professional Identities model for vocational teachers based on 303 sample data points obtained through Exploratory Factor Analysis (EFA). Guided by the EFA results and theoretical insights, this research posits that the four dimensions within the Instructional Identity scale and the four dimensions within the Occupational Identity scale are each highly interrelated. Consequently, a first-order four-factor model is initially constructed for the CFA. The results of this first-order CFA are presented in Table 10.

For Instructional Identity, the model's fit indices meet the criteria for good fit, indicating that the revised model exhibits satisfactory fit. The standardized path diagram (Figure 9), generated using AMOS software, displays the standardized regression coefficients, correlation coefficients, and R^2 values.

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Similarly, for Occupational Identity, the model's fit indices also meet the criteria, with the revised model demonstrating good fit (Table 10). The standardized path diagram for the revised Occupational Identity model (Figure 10), obtained through AMOS software, shows the standardized regression coefficients, correlation coefficients, and R^2 values.

The first-order CFA provides initial clarity on the structural dimensions of Instructional Identity and Occupational Identity. As illustrated in Figures 9 and Figure 10, some indicators are not optimal, such as λ values not exceeding 0.70 and R^2 values not surpassing 0.50.

Furthermore, the correlation coefficients among the four latent variables within Instructional Identity are notably high (ranging from 0.61 to 0.84), and similarly, those within Occupational Identity are also substantial (ranging from 0.50 to 0.83). These findings further suggest the possibility of a higher-order factor structure for both Instructional Identity and Occupational Identity.

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Table 10

Fit indices for the First-order Confirmatory Factor Analysis of the Dual Professional Identities Model

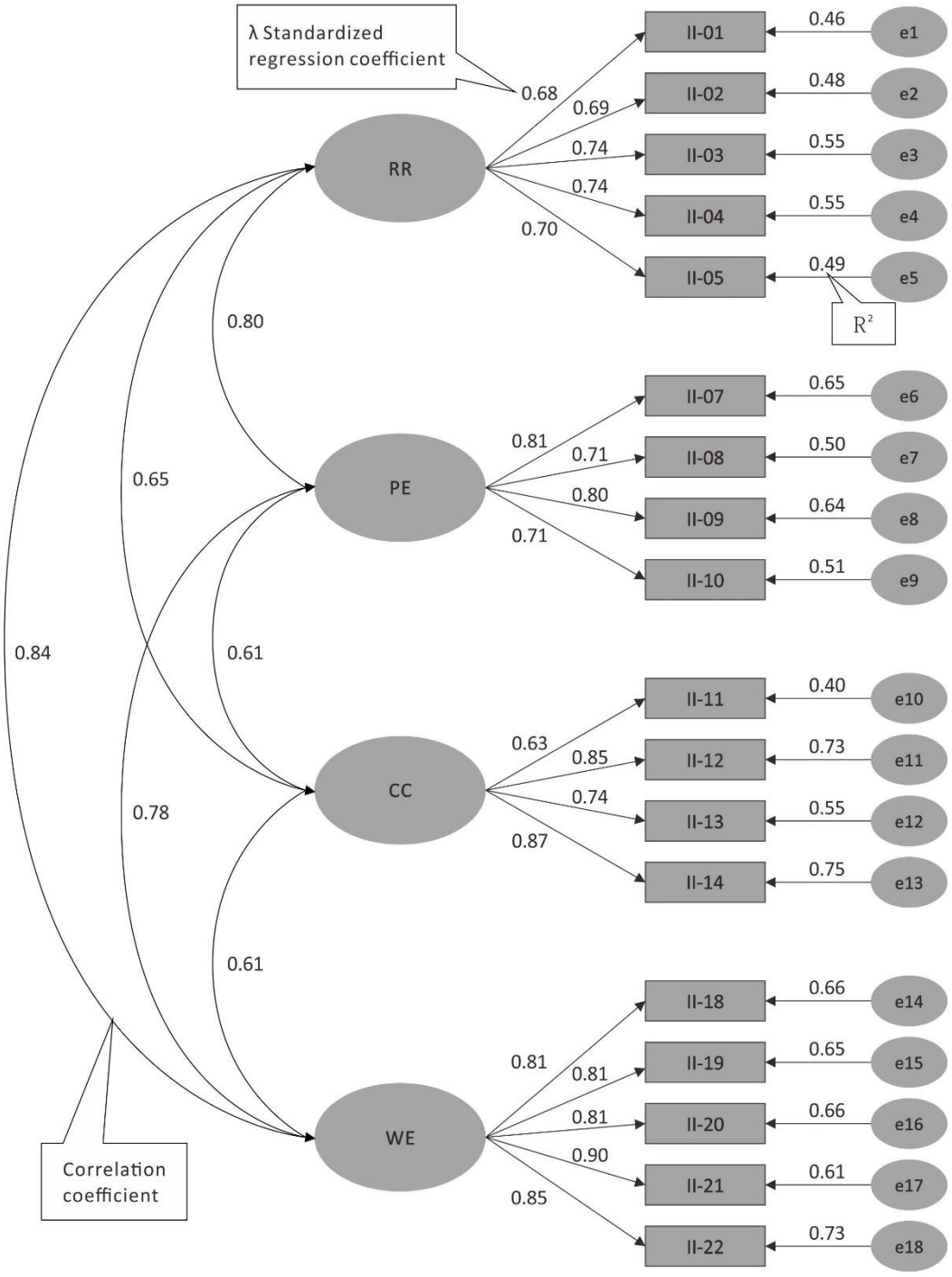
Identities		**Instructional identity**		**Occupational Identity**	
Fit-indices	Standard	Measured Value	Judgment	Measured Value	Judgment
x^2/df	<3	2.869	Pass	2.595	Pass
RMR	⩽0.05	0.05	Pass	0.039	Pass
RMSEA	<0.08	0.079	Pass	0.073	Pass
GFI	>0.9	0.881	Pass	0.893	Pass
AGFI	>0.8	0.837	Pass	0.858	Pass
IFI	>0.9	0.936	Pass	0.947	Pass
TLI	>0.9	0.921	Pass	0.937	Pass
CFI	>0.9	0.935	Pass	0.947	Pass
PGFI	>0.5	0.644	Pass	0.669	Pass
PNFI	>0.5	0.739	Pass	0.767	Pass
PCFI	>0.5	0.764	Pass	0.792	Pass

Note. RMR = Resting Metabolic Rate, RMSEA = Root Mean Square Error of Approximation, GFI = Goodness of Fit Index, AGFI = Adjusted Goodness of Fit Index, IFI = Incremental Fit Index, TLI = Tucker-Lewis Index, CFI = Comparative Fit Index, PGFI = Parsimony Goodness of Fit Index, PNFI = Parsimony Normed Fit Index, PCFI = Partial Least Squares Path Modeling for Confirmatory Factor Analysis

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Figure 9

Estimated Standardized Path Coefficients for the Final First-Order Confirmatory Factor Model of Instructional Identity

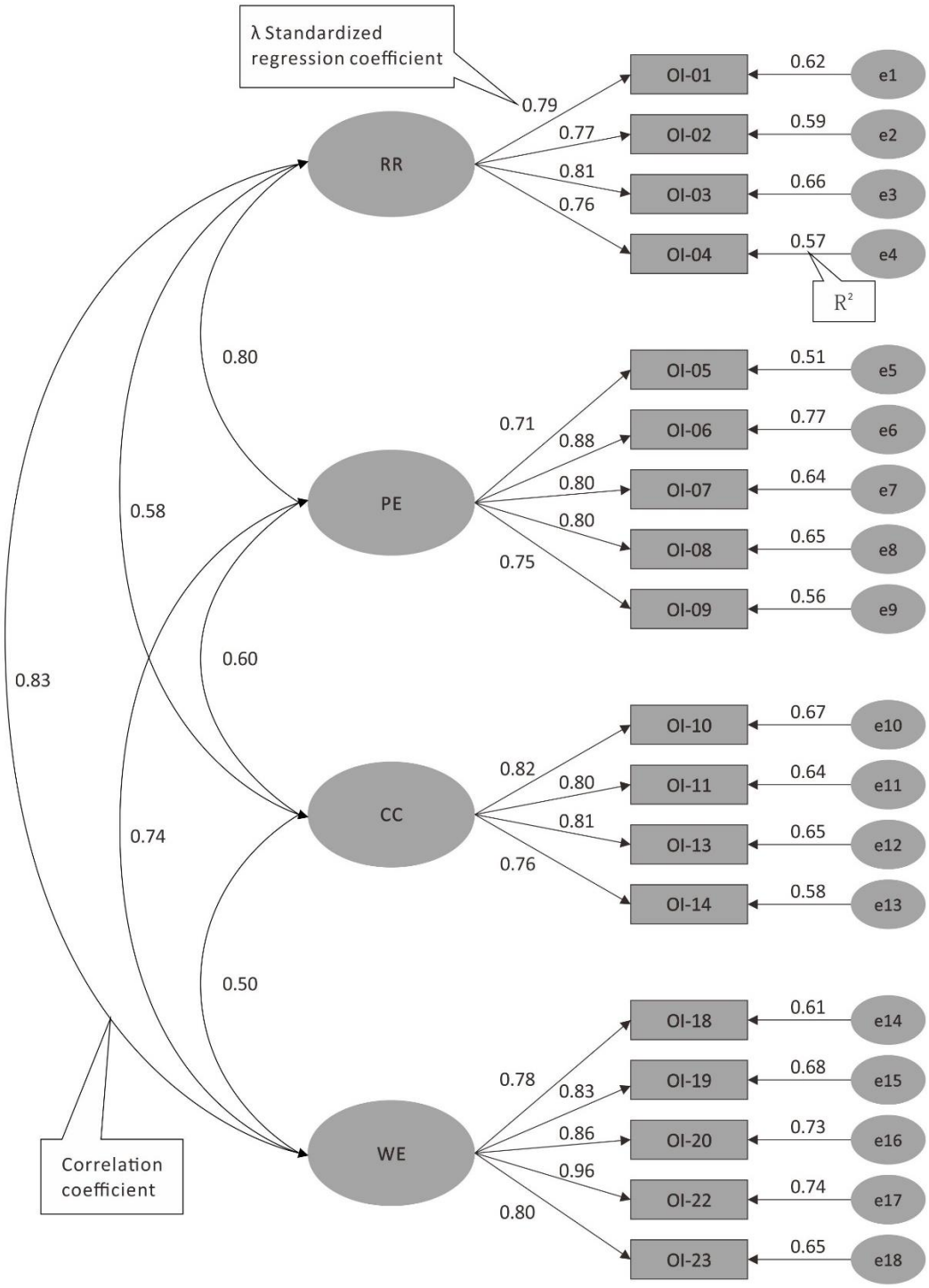


Note. RR=Role Recognition; PE=Professional Efficacy; CC=Community Cohesion; WE= Work Engagement

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Figure 10

Estimated Standardized Path Coefficients for the Final First-Order Confirmatory Factor Model of Occupational Identity



Note. RR=Role Recognition; PE=Professional Efficacy; CC=Community Cohesion; WE= Work Engagement

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Step 2: Second-Order CFA Analysis of Dual Professional Identities. Based on both theoretical insights (Fu et al., 2013) and the results of the first-order confirmatory factor analysis (CFA), which revealed notably high correlation coefficients among the four latent variables within Instructional Identity (ranging from 0.61 to 0.84) and Occupational Identity (ranging from 0.50 to 0.83), it is indicated that both Instructional Identity and Occupational Identity may possess higher-order factor structures. Consequently, this study constructs second-order four-factor CFA models for Instructional Identity and Occupational Identity, respectively. The models are fitted using AMOS software, with the revised model fit indices presented in Table 11.

Table 11

Fit indices for the Second-order CFA of the Dual Professional Identities Model

Identities		**Instructional identity**		**Occupational Identity**	
Fit-indices	Standard	Measured Value	Judgment	Measured Value	Judgment
x^2/df	<3	2.666	Pass	2.612	Pass
RMR	⩽0.05	0.041	Pass	0.042	Pass
RMSEA	<0.08	0.074	Pass	0.073	Pass
GFI	>0.9	0.883	Pass	0.892	Pass
AGFI	>0.8	0.845	Pass	0.858	Pass
IFI	>0.9	0.941	Pass	0.946	Pass
TLI	>0.9	0.930	Pass	0.936	Pass
CFI	>0.9	0.941	Pass	0.946	Pass
PGFI	>0.5	0.666	Pass	0.678	Pass
PNFI	>0.5	0.766	Pass	0.778	Pass
PCFI	>0.5	0.793	Pass	0.803	Pass

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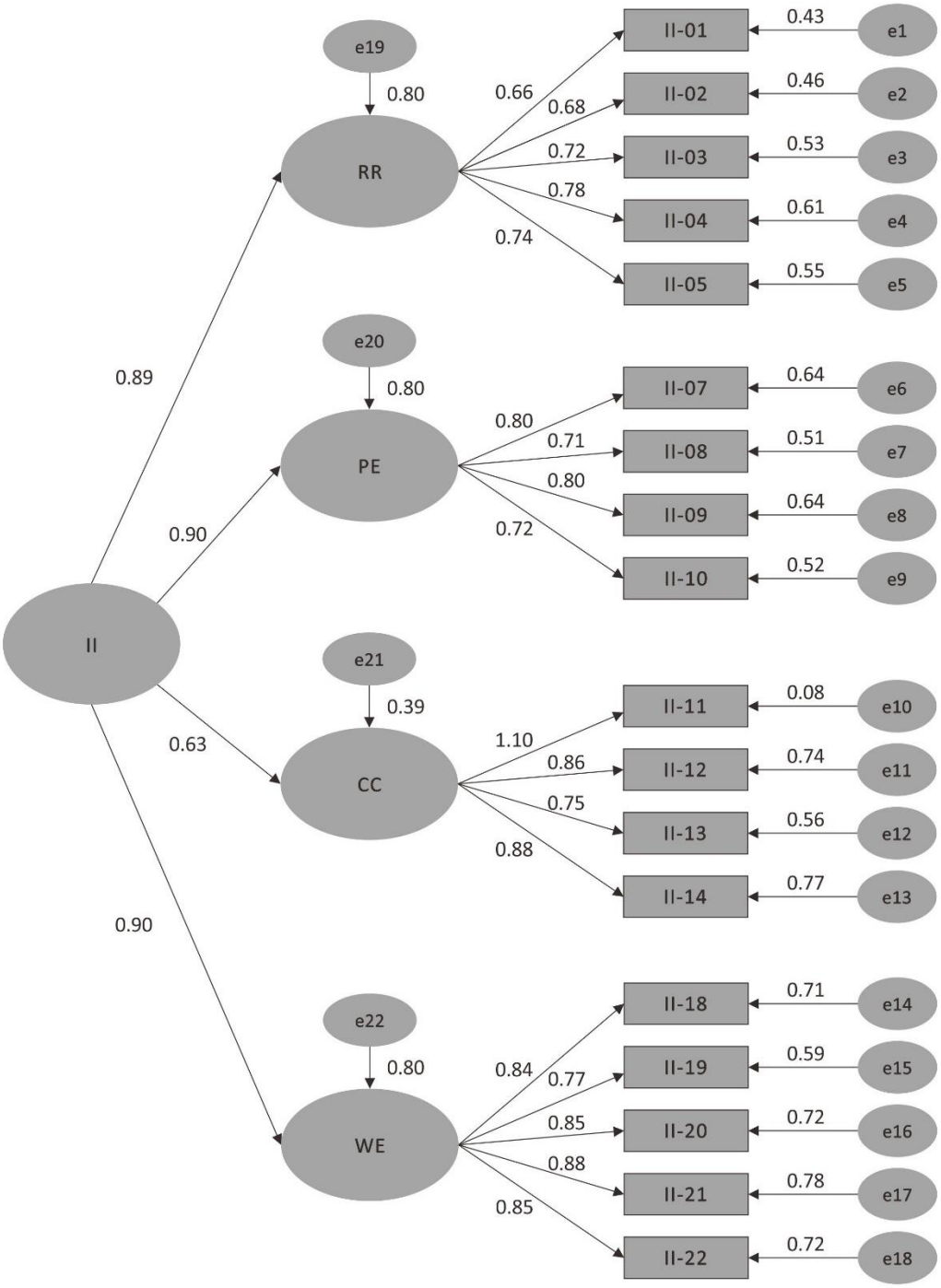
For Instructional Identity, the fit indices are all within acceptable ranges. Specifically, indices such as IFI = 0.941, TLI = 0.930, and CFI = 0.941 exceed the required thresholds, while RMR = 0.041 and RMSEA = 0.074 are below the required values. These results suggest that the obtained model is ideal, with the four latent variables converging into a second-order structure. Ultimately, the Instructional Identity model is a second-order structural model comprising four dimensions, with the first-order factors being Role Recognition (RR), Professional Efficacy (PE), Community Cohesion (CC), and Work Engagement (WE). All item standardized regression weights on each factor are above 0.60, further validating the multidimensional hypothesis of Instructional Identity.

For Occupational Identity, Table 11 indicates that the fit indices are also within acceptable ranges. Specifically, indices such as IFI = 0.946, TLI = 0.936, and CFI = 0.946 exceed the required thresholds, while RMR = 0.042 and RMSEA = 0.073 are below the required values. These results suggest that the obtained model is ideal, with the four latent variables converging into a second-order structure. Thus, the Occupational Identity model is a second-order structural model comprising four dimensions, with the first-order factors being Role Recognition (RR), Professional Efficacy (PE), Community Cohesion (CC), and Work Engagement (WE). All item standardized regression weights on each factor are above 0.60, further validating the multidimensional hypothesis of worker identity.

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Figure 11

Estimated Standardized Path Coefficients for the Final Second-Order Confirmatory Factor Model of Instructional Identity

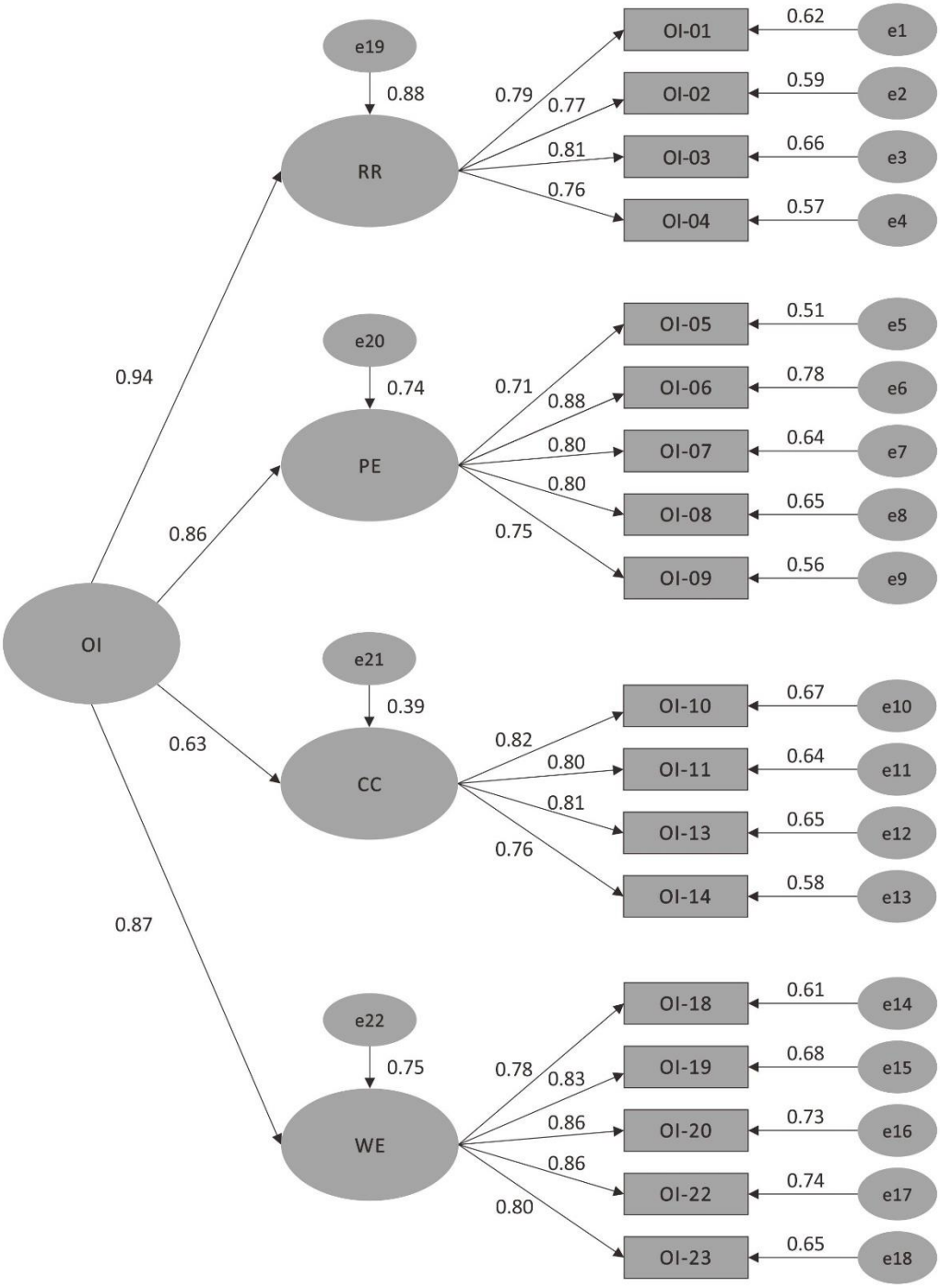


Note. RR=Role Recognition; PE=Professional Efficacy; CC=Community Cohesion; WE=Work Engagement

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Figure 12

Estimated Standardized Path Coefficients for the Final Second-Order Confirmatory Factor Model of Occupational Identity



Note. RR=Role Recognition; PE=Professional Efficacy; CC=Community Cohesion; WE=Work Engagement

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Assessment of DPI-VT Scale's Reliability. The internal consistency reliability (Cronbach's Alpha) was employed to assess the reliability of the scale. The Cronbach's Alpha coefficient for the entire scale of Dual Professional Identity was 0.970. Specifically, the overall Cronbach's Alpha coefficient for the Instructional Identity subscale was 0.940, with individual dimension coefficients of 0.853, 0.843, 0.852, and 0.918, all exceeding the standard threshold of 0.8. For the Occupational Identity subscale, the overall Cronbach's Alpha coefficient was 0.943, with individual dimension coefficients of 0.861, 0.889, 0.871, and 0.919, also surpassing the 0.8 benchmark. These results indicate that the dual professional identity scale possesses high reliability (Table 17 in the Appendices).

Assessment of DPI-VT Scale's Validity.

Content Validity. Initially, the study's initial scale was developed based on relevant domestic and international research, coupled with existing teacher professional scales and face-to-face interviews. During the development process, this study enlisted the expertise of three educational domain experts and ten frontline educators from vocational institutions to evaluate and refine the questionnaire items. Prior to the commencement of the formal survey, a pilot investigation was conducted to assess the questionnaire's content alignment with real-world situations. Furthermore, the study utilized sample data from frontline teachers to conduct additional validation reviews and incorporated pertinent feedback to refine and improve the scale. The resulting four-dimensional structures for both Instructional

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Identity and Occupational Identity were endorsed by five doctoral experts in applied psychology and education. The scale's design and development processes ensured that the questionnaire content was practical and that each item possessed high representativeness. Consequently, the scale demonstrates robust content validity.

Structural Validity. To assess the structural validity of this study, we employed the critical ratio method and correlation analysis. According to the critical analysis, there were significant differences between the high and low scoring groups ($p < 0.001$), indicating that each item possessed good discriminatory power (The Independent sample T-Test, Table 22). The results of the correlation analysis, as presented in Tables 11 and 12, revealed that each dimension of Instructional Identity and Occupational Identity was significantly correlated with the overall construct and exhibited higher correlations than those between the individual dimensional factors.

This suggests that the dimensions of Instructional Identity and Occupational Identity possess a certain degree of independence while still reflecting the content of the overall construct. Furthermore, based on the results of Confirmatory Factor Analysis (CFA), the second-order one-factor and first-order four-factor structural model constructed in this study exhibited fitting indices that met the standards and outperformed other model structures. This further demonstrates the good structural validity of the DPI-VT scale. In summary, the DPI-VT scale possesses well-defined structural validity.

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Table 12

Correlations Analysis between Various Dimensions and Factors of Instructional Identity of Chinese Vocational teachers

Construct	**1**	**2**	**3**	**4**	**5**
1. Role Recognition	1				
2. Professional Efficacy	0.666***	1			
3. Community Cohesion	0.563***	0.654***	1		
4. Work Engagement	0.723***	0.695***	0.574***	1	
5. Instructional Identity	0.879***	0.840***	0.792***	0.887***	1

Notes. * = p<0.05， ** = p<0.01， *** = p<0.001。

Table 13

Correlations Analysis between Various Dimensions and Factors of Occupational Identity of Chinese Vocational teachers

Construct	**1**	**2**	**3**	**4**	**5**
1. Role Recognition	1				
2. Professional Efficacy	0.707***	1			
3. Community Cohesion	0.513 ***	0.557 ***	1		
4. Work Engagement	0.732***	0.686 ***	0.458***	1	
5. Occupational Identity	0.871***	0.884 ***	0.746 ***	0.860***	1

Notes: * = p<0.05， ** = p<0.01， *** = p<0.001。

Initial Descriptive Analysis of Variables' Correlational Relationships

Measurement Scale. As mentioned in the methodology section, this study employed the Brief Resilience Scale (BRS) developed by Smith et al. (2008) for path

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analysis. The reliability coefficient of the scale was 0.942 tested based on the data-set of 303 samples.

Considering that previous research has demonstrated the impact of Gender on identity (Naukkarinen & Bairoh, 2021) and resilience (Kogar & Uslu, 2021), this study treats Gender as a control variable.

Descriptive Statistical Analysis. Table 14 presents the results of the mean values, standard deviations, and correlation analysis for the variables under the Dual Professional Identities of vocational teachers. As evidenced by the table, there is a significant correlation between Entry routes and Instructional Identity (β = -0.131, p < 0.05). Additionally, Instructional Identity is significantly correlated with Resilience (β = 0.681, p < 0.001), and Occupational Identity also exhibits a significant correlation with Resilience (β = 0.691, p < 0.001). These correlation analysis results provide partial preliminary data support for the subsequent path analysis.

Table 14

Descriptive statistical analysis of the variables

Variables	M	SD	1	2	3	4	5
1. Entry Routes	1.84	1.045	1				
2. Education	2.75	0.684	0.148**	1			
3. Instructional Identity	4.14	0.624	-0.131*	-0.041	1		
4. Occupational Identity	4.10	0.620	-0.094	-0.015	0.932***	1	
5. Resilience	3.88	0.783	-0.038	0.009	0.681***	0.689***	1

Note: N=303, M = Mean, SD = Standard Deviation。*** = p < 0.001,** = p < 0.01, * = p < 0.05

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This study also examined the correlations between each dimension. As these correlations are not directly related to the validation of the 12 hypotheses in this study, the two descriptive analysis tables showing the correlations among various dimensions are presented in the Appendix for reference.

Path analysis and Hypothesis Validation

Direct Effect Testing. Using SPSS 24 software, we tested all the constructs, with the hypothesis results presented in Table 15. This study posits that Entry routes and Education individually influence vocational teachers' professional identity. When Instructional Identity is considered as the dependent variable, and Gender is controlled as a covariate in the regression equation, the independent variables of Entry routes and Education are added in the second step of regression. The results, while controlling for Gender, indicate that Entry routes is significantly negatively correlated with Instructional Identity ($\beta = -0.081$, $P < 0.05$, Model M4). Since H1 predicted a significant positive correlation between Entry Routes and Instructional Identity, H1 is not supported. Education shows a non-significant negative correlation with teacher identity ($\beta = -0.036$, $P = 0.490$, Model M5), thus H3 is not supported. Similarly, when Occupational Identity is the dependent variable, and Gender is controlled, the results of adding Entry routes and Education in the second step of regression show that Entry routes has a weakly significant negative correlation with Occupational Identity ($\beta = -0.060$, $P < 0.10$, Model M6). Although the P-value is less than 0.1, H2, which

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hypothesized a significant positive correlation, is not supported. Education is negatively but non-significantly correlated with Occupational identity (β = -0.011, P = 0.831, Model M7), hence H4 is also not supported.

Furthermore, this study suggests that both Instructional Identity and Occupational Identity impact Resilience. With Resilience as the dependent variable and Gender controlled, the results of adding the mediator variables of Instructional Identity and Occupational Identity in the second step of regression show that both Instructional Identity (β = 0.850, P < 0.001, Model M8) and Occupational Identity (β = 0.866, P < 0.001, Model M9) are significantly positively correlated with Resilience. Both H5 and H6 are supported.

Additionally, this study hypothesizes that Entry routes and Education influence Resilience. With Resilience as the dependent variable and Gender controlled, the results of adding Entry routes and Education in the second step of regression indicate that Entry routes have a non-significant negative effect on Resilience (β = -0.034, P = 0.426, Model M2), while Education has a non-significant positive effect (β = 0.013, P = 0.839, Model M3). Both H7 and H8 are not supported.

Indirect Effect Testing. This study proposes that Instructional Identity and Occupational Identity mediate the relationships between Entry routes, Education, and Resilience. The mediation analysis follows the three-step approach of (Baron & Kenny, 1986). Following these steps, the results are presented in Table 15. The first two steps of the mediation analysis, conducted during the direct effect testing, revealed that Entry routes have a significant negative impact on both Instructional

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Identity and Occupational Identity, while Education has no significant impact on either. Thus, the relationship between the independent variables and the mediators is not supported.

Nevertheless, this study proceeded with the third step of the analysis. The results, after including Entry routes, Education, Instructional identity, and Occupational Identity in the regression equation, show that in Models M10 and M11, Instructional Identity (β = 0.858, P < 0.001, Model M10) and Occupational Identity (β = 0.869, P < 0.001, Model M11) are significantly positively correlated with Resilience. Meanwhile, the effect of Entry routes on Resilience becomes non-significantly positive (β = 0.035, P = 0.269, Model M10; β = 0.018, P = 0.569, Model M11). Although this does not prove a significant mediation effect, it suggests a potential reversal effect of identity in the relationship between Entry routes and Resilience, indicating a potential mediation effect. Models M12 and M13 further show that Instructional Identity (β = 0.852, P < 0.001, Model M12) and Occupational Identity (β = 0.866, P < 0.001, Model M13) remain significantly positively correlated with Resilience, while the positive effect of Education on Resilience is enhanced but remains non-significant (β = 0.044, P = 0.359, Model M12; β = 0.023, P = 0.631, Model M13). This indicates that the mediation effect of Education on Resilience through identity is not significant. To further validate the mediation effects, this study employed the PROCESS macro suggested by Hayes (2013), utilizing the bootstrap estimation method to assess the mediation model. The results of the bootstrap estimation, based on 5,000 samples, are presented in Table 15.

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Table 15

The results of the hierarchical regression analysis

	Resilience									Instructional Identity		Occupational Identity	
	M1	M2	M3	M8	M9	M10	M11	M12	M13	M4	M5	M6	M7
Control Variable													
Gender	-0.177^{+}	-0.183^{+}	-0.183^{+}	-0.105	-0.062	-0.099	-0.059	-0.107	-0.063	-0.097	-0.083	-0.142^{+}	-0.133+
Independent Variable													
Entry routes		-0.034				0.035	0.018			-0.081*		-0.060^{+}	
Education			0.013					0.044	0.023		-0.036		-0.011
Mediator													
Instructional Identity				0.850***		0.858***		0.852***					
Occupational Identity					0.866***		0.869***		0.866***				
R^2	0.011	0.013	0.011	0.468	0.476	0.471	0.477	0.470	0.477	0.022	0.006	0.020	0.010
ΔR^2	0.008	0.007	0.005	0.465	0.473	0.465	0.472	0.465	0.472	0.016	-0.001	0.014	0.004
F	3.459	2.045	1.745	132.136	136.489	88.566	90.897	88.326	90.836	3.446	0.852	3.133	1.569

Note. N=303. *** = $p < 0.001$,** = $p < 0.01$, * = $p < 0.05$, + = $p < 0.1$.

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The findings indicate a significant indirect effect of Instructional Identity on the relationship between Entry routes and Resilience (Effect size = -0.0697, with a 95% confidence interval of [-0.1355, -0.0088], excluding "0"). However, since H9 posited a positive correlation, it was not supported by the results.

The indirect effect of Occupational Identity on the relationship between Entry routes and Resilience was not significant (Effect size = -0.0524, with a 95% confidence interval of [-0.1196, 0.0078], including "0"), thus H10 was not supported. Similarly, the indirect effect of Instructional Identity on the relationship between Education and Resilience, although significant (Effect size = -0.0310, with a 95% confidence interval of [-0.1324, 0.0646], including "0"), did not align with the direction predicted by Hypothesis H11, hence H11 was not confirmed. Lastly, the indirect effect of Occupational Identity on the relationship between Education and Resilience was also significant (Effect size = -0.0097, with a 95% confidence interval of [-0.1094, 0.0855], including "0"), but did not support H12 due to the inclusion of zero in the confidence interval.

Table 16

Bootstrap test results for mediation effects

Independent Variables	Mediator	Mean Effect	Boot SE	LL 95% CI	UL 95% CI
Entry routes	Instructional Identity	-0.0697	0.0324	-0.1355	-0.0088
Entry routes	Occupational Identity	-0.0524	0.0319	-0.1196	0.0078
Education	Instructional Identity	-0.0310	0.0500	-0.1324	0.0646
Education	Occupational	-0.0097	0.0500	-0.1094	0.0855

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Note. N = 303; The control variable = Gender; The bootstrap sample size = 5000; LL = Lower Limit; UL = Upper Limit; CI = Confidence Interval.

Finding of the Study

DPI-VT Scale Validation

The DPI-VT (Dual Professional Identity of Chinese Vocational Teachers) Scale was developed to address the primary research question of this study.

Initially, an item pool was established based on existing literature and scales. Through a series of semi-structured interviews, these initial items underwent revision and optimization, and the dimensions of the scale were preliminarily outlined. Subsequently, quantitative research methods were employed to refine the scale's structure, ensuring its reliability and validity.

This meticulous process led to the primary outcome of the study: the creation of two sub-scales, the Instructional Identity sub-scale and the Occupational sub-scale. Each sub-scale consists of 18 items, collectively forming a comprehensive assessment tool for evaluating the Dual Professional Identities of teachers in Chinese vocational education.

Both sub-scales encompass four dimensions, which were named after a thorough initial screening, synthesis, and thematic analysis. While the dimensions share a common naming convention, the item designs within each sub-scale are markedly distinct. This divergence arises from the subtle yet significant differences in

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how Instructional and Occupational Identities are perceived and measured by vocational education teachers. Consequently, the two sub-scales feature unique item compositions, tailored to capture the nuances of each identity.

Finding of Antecedent Consequences Analysis

The validation of the hypothetical theoretical model addresses the second, third, and fourth research questions of this study. The following presents the results pertaining to the hypothesis testing:

H1 is not supported: There is a significant negative correlation between Entry routes and Instructional Identity.

H2 is not supported: There is a negative correlation between Entry routes and Occupational Identity, but there is no statistically significant relationship between the two variables.

H3 is not supported: There is a positive correlation between Education and Instructional Identity, but the there is no statistically significant relationship between the two variables.

H4 is not supported: There is a negative correlation between Education and Occupational Identity, but the there is no statistically significant relationship between the two variables.

H5 is supported: There is a significant positive correlation between Instructional Identity and Resilience.

H6 is supported: There is a significant positive correlation between

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Occupational Identity and Resilience.

H7 is not supported: There is a positive correlation between Entry routes and Resilience, but the there is no statistically significant relationship between the two variables.

H8 is not supported: There is a positive correlation between Education and Resilience, but the there is no statistically significant relationship between the two variables.

H9 is not supported: Instructional Identity mediates the relationship between Entry routes and Resilience, but exhibiting a significant negative correlation.

H10 is not supported: Occupational Identity does not mediate the relationship between Entry routes and Resilience, exhibiting a significant positive correlation.

H11 is not supported: Instructional Identity does not mediate the relationship between Education and Resilience, exhibiting a significant positive correlation.

H12 is not supported: Occupational Identity does not mediate the relationship between Education and Resilience.

Theoretical Model Validation

In conclusion, through the process of hypothesis testing and the resultant findings, this study has made final adjustments to the theoretical framework of the initial hypotheses. In the ultimately confirmed theoretical framework, the retained variables are Entry Routes, Instructional Identity, Occupational Identity, and Resilience (see Figure 13). Although the hypothesis regarding the impact of Entry

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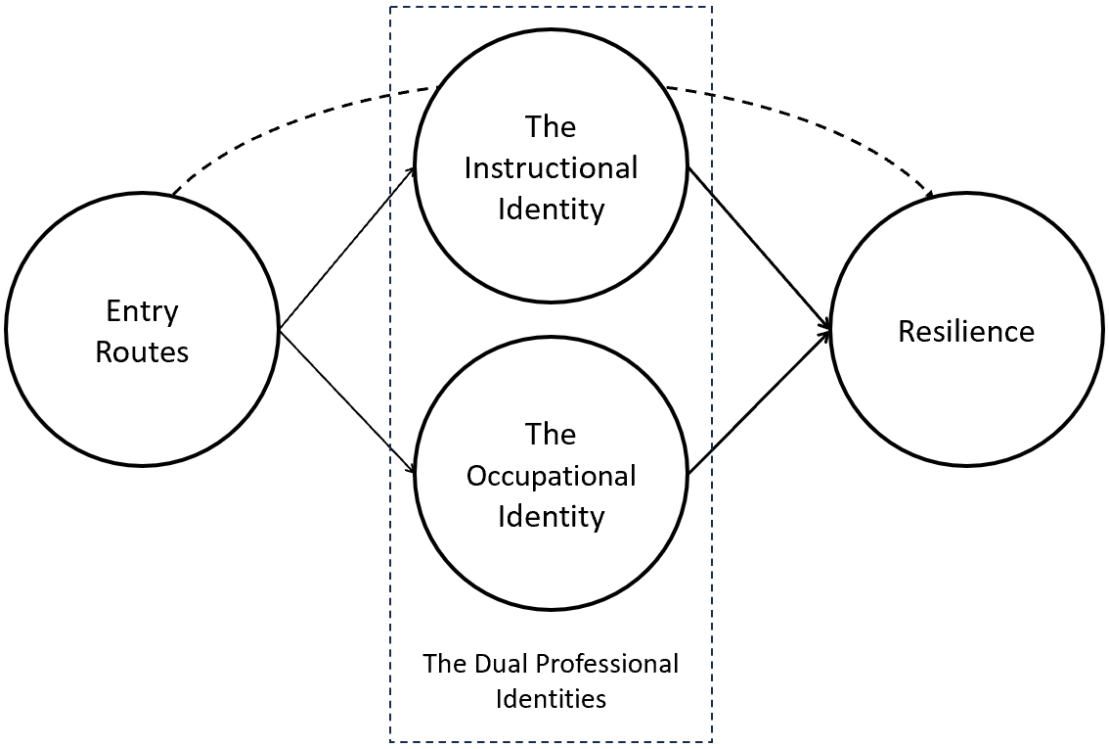
Routes on Instructional Identity was not supported, the data revealed a significant negative effect, thus establishing the correlation structure. Furthermore, a weak but significant negative correlation (β = -0.060, P < 0.10) was observed between Entry Routes and Occupational Identity. Although this does not align with the initial hypothesis, it still demonstrates an inverse relationship between Entry Routes and Occupational Identity. In testing for mediation effects, the data indicated that Instructional Identity exerts a mediating effect between Entry Routes and Resilience. Although this did not support the initial hypothesis H9, a significant negative correlation objectively exists. Lastly, both Instructional Identity and Occupational Identity exhibited significant positive correlations with Resilience, thereby establishing the correlation relationship between Resilience and The Dual Professional Identities.

A in-depth explanation of the interpretations of the hypothesis verification results and their implications for teacher management practices will be provided in "Discussion" section of this study.

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Figure 13

The Validated Theoretical Framework



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Chapter 5: Discussion

Chapter Overview

This chapter is dedicated to examining the theoretical framework underlying the formation of Dual Professional Identities among vocational teachers, as revealed by this research. It delves into an in-depth analysis of the relationships between the variables involved, as well as the challenges encountered during the study.

The investigation builds on the significant factors that shape these dual identities, exploring their intricate connection to the vocational teachers' work environment and the efficacy of school-enterprise collaboration. Through the development of 36 items related to Dual Professional Identity, each tailored to this unique context, this chapter integrate demographic data to further dissect these influential elements. This chapter commences with an overview of the research results, highlighting prevalent issues in the development and nurturing of "Dual-qualified" teachers in Chinese vocational education. Subsequently, this study explores the constituents of Dual Professional Identities within our research framework and, using Entry routes and Education as independent variables and Dual Professional Identities as a mediating variable, uncover issues related to teacher resilience.

The four dimensions of Vocational teachers' Dual Professional Identities

This section delves into the pivotal findings regarding vocational teachers across four dimensions of professional identity: Role Recognition, Professional

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Efficacy, Community Cohesion, and Community Engagement. The discussion encompasses the factors that influence their Instructional Identity and Occupational Identity.

Four dimensions influencing the formation of vocational teachers' Dual Professional Identities:

Role Recognition (RR)

Role Recognition marks the initial step in the formation of identity. As evident from the scale developed in this study, the perception of Professional Roles can be segmented into distinct perspectives.

Vocational teachers must first comprehend their professional roles, encompassing both the role of a vocational educator and the role of their majors within the societal division of work. The role of a vocational teacher is distinct from that of other types of educators, differing significantly in teaching environments, educational methodologies, competency requirements, student orientations, and instructional content. When exploring the "professional role within the industry" for vocational teachers, it is essential to consider the majors they teach. Vocational institutions resemble a condensed microcosm of society, housing diverse majors, each with its own laboratory designed to mimic authentic production and service scenarios in enterprises. Students' uniforms are modeled after corporate attire, creating an environment where numerous enterprises seemingly operate within the campus. Some vocational institutions offer over 80 different majors. By integrating the majors of

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vocational teachers with their work environment, the most immediate "industry difference" they encounter stems from the "major difference" within the school. After gaining a profound understanding of their professional identity, vocational teachers assess their profession, potentially leading to both positive and negative emotions (which may also vary over time and context). Only when positive emotions are abundant and stable does professional identity emerge. Thus, observing whether they introduce their professional identity in social settings and care about societal evaluations of their profession can infer their favorable impression of their professional role. Furthermore, in both vocational education and the industry, individuals set directions for their career development by establishing "Role Models." This behavior reflects vocational teachers' passion for their profession, beliefs, and aspirations for progress. In the quantitative research phase, this study also incorporated vocational teachers' appreciation of the direction of national educational reform into the dimension of professional role identity. This indicates that, from a macro perspective, an individual's identification with the direction of professional development can also serve as evidence for the formation of professional identity.

In summary, the three levels of personal cognition and emotional development—recognition of differences, establishment of favorable impressions towards the profession, and formation of professional beliefs and ideals—can measure the degree of identification with vocational teachers' Instructional Identity and Occupational Identity.

The research confirms issues raised during initial scale development about

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vocational teachers' Occupational Identity constituents. Specifically, assessing their industry-related role differs from assessing their school teacher role, as in reality, their sole professional role is as a school teacher, while their occupational role is tied to their related professional duties. They use this role to deepen industry understanding and enhance teaching quality. Thus, assessment items for vocational teachers' Occupational Identity should consider their work environment and responsibilities, a principle that also applies to designing items related to other items of teachers' Occupational Identity.

Professional Efficacy (PE)

Competence serves as a pivotal guarantee for an individual's work effectiveness. The determination of "whether one is competent for a job" encompasses multiple facets. First and foremost, competence necessitates acceptance, or even passion. Only through acceptance or passion can one possess the motivation to learn. The transition from "being able to do" to "doing well" represents a process. Higher competence indicates better performance, which in turn reflects a greater degree of passion for the work. This passion is intricately linked to the establishment of professional identity. Consequently, "professional expertise" emerges as a key term within this dimension. The expression of competence can also be delineated into several distinct levels.

Initially, it entails possessing the "ability to work." For school teachers, this ability pertains to teaching and conveying knowledge. As for vocational teachers, they

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must also possess the competence to excel in industry-specific job roles. Regarding the development of these two competencies, the Ministry of Education in China has outlined a clear standard framework. Specifically, for teachers in vocational high schools, the *"Professional Standards for Teachers in Secondary Vocational Schools (Trial)"* (MOE, 2013) (hereinafter referred to as the "Professional Standards") stipulates that all in-service teachers must undergo regular professional training. They are expected not only to adhere to lofty professional ethics but also to stay abreast of the times and master the professional knowledge and skills aligned with their job requirements. The Professional Standards elaborate on the professional competencies required for vocational high school teachers, categorizing them into seven domains, including educational and teaching abilities, classroom management skills, practical training guidance abilities, as well as autonomous learning and innovation capabilities.

The seven categories of vocational teachers' competencies pertain to "measurable and evaluable" teaching abilities, encompassing the contents outlined in items II-06, II-07, II-08, II-09, and OI-05 of the scale. However, possessing competence does not necessarily equate to having a "professional identity." Some vocational teachers are inherently endowed with strong learning abilities, enabling them to achieve a slightly higher proficiency level in any skill acquisition compared to the general populace. This allows them to exhibit their talents in the teaching process. Nonetheless, this does not imply that their talents are a result of possessing an occupational identity, nor does it guarantee that such talents will facilitate the formation of an Occupational Identity. For instance, YS, a doctoral graduate from a

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university ranked within the top 100 globally by QS, commenced her career in a higher vocational college by teaching coffee making. She swiftly mastered the skill and was adept at delivering classroom instruction. Yet, when inquired about whether she identified herself as a "coffee maker" at that time, her response was negative. Later, when she transitioned to teaching wine culture and tasting, and was asked again if she had a vocational identity as a "wine taster" or "sommelier," her answer was affirmative. Hence, the formation of identity is predicated on the recognition of professional roles, echoing the issues we discussed in the first dimension.

Furthermore, the formation of "identity" stems from the positive feedback received from the collective towards the individual. In the quantitative aspect of this study, "students' appreciation of teachers" is categorized under the dimension of teachers' Professional Efficacy. Similarly, "industry recognition of teachers" mentioned in OI-06, which assesses vocational teachers' Occupational Identity, also falls within the dimension of Professional Efficacy. This recognition encompasses feedback from students on teachers' classroom teaching proficiency and feedback from professionals on teachers' professional skill levels. Such positive feedback instills a sense of self-efficacy in teachers, as Bandura (1977) posits that encouragement and positive feedback can enhance an individual's self-efficacy. Individuals who believe in their ability to succeed are more likely to invest effort and persist in the face of challenges.

Additionally, the assessment of vocational teachers' Occupational Identity can be conducted by observing their demeanor during participation in industry activities.

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Firstly, the ability to effectively communicate with professionals on topics within their professional domain signifies the vocational teacher's Professional Efficacy. This sense of efficacy originates from personal professional competence. Competent vocational teachers can engage in exchanges with industry professionals regarding specialized knowledge. Secondly, it stems from the vocational teacher's familiarity with the industry. Communication among industry professionals, whether discussing technical expertise or other industry-related topics (such as gossip, jokes, etc.), often bears strong industry-specific attributes. In other words, only those who maintain long-term connections with the industry can "understand" their communication style, "comprehend" their content, and grasp the hidden meanings within their words. The study reveals that respondents with extensive industry experience tend to excel in such communications, and each instance of such communication reinforces their Occupational Identity. This "reinforcement" effect may be minimal or nonexistent for individuals already working within the industry. However, for vocational teachers, such smooth communication represents affirmation of their abilities by both themselves and professionals, as well as acceptance by the industry community. Thus, this cross-boundary, smooth communication related to their teaching programs impacts vocational teachers' Occupational Identity. In other words, the greater the vocational teachers' communication skills or the fewer obstacles they encounter in communication, the higher their Occupational Identity.

Beyond the quality of communication, the psychological state of vocational teachers during social interactions with professional groups also correlates with their

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Occupational Identity. When participating in industry events, some vocational teachers may appear reserved, shy, and socially anxious, manifested in their reluctance or fear to initiate communication with industry professionals. Conversely, some vocational teachers may appear at ease, demonstrating curiosity about professional topics, being talkative, and willing to establish connections with strangers. This social demeanor reflects the vocational teachers' willingness to integrate into professional groups. This study posits that the more confident vocational teachers are when participating in industry events, the higher their Occupational Identity. In Chinese culture, the saying "not considering oneself an outsider" aptly captures this state of integration into a group. Of course, a willingness to engage socially does not necessarily imply that an individual possesses an Occupational Identity related to that group. This phenomenon can also be interpreted as an inherent "outgoing" personality trait of such individuals. Nevertheless, even so, when participating in professional exchanges, the willingness to actively integrate and demonstrate confidence during social interactions reflects an attitude and ability. Therefore, it can be understood that the more confident vocational teachers are when interacting with professionals, the higher their Occupational Identity.

The above two points highlight the proactive attitude and ability of vocational teachers to integrate when interacting with the industry and industry professionals. This efficient social approach and positive social demeanor yield rich rewards for vocational teachers. For instance, they not only gain more industry information and grasp the direction of industry development but also establish extensive industry

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networks and further obtain industry resources through these connections. Evidently, interpersonal relationships are derivatives of effective communication. Stronger relationships with industry professionals and a larger industry "social circle" influence vocational teachers' Occupational Identity. The status of vocational teachers within the industry aligns with the Chinese cultural saying of "being well-connected on all sides." This "being well-connected" is formed outside the school, in environments that are secondary to their familiarity. Many vocational teachers, in the course of their work, often exhibit a lack of confidence due to their distance from the industry. This applies not only to recent graduates without industry experience but also to those vocational teachers who have previously worked in the industry. Since leaving the industry, their primary focus has shifted to teaching within schools, and their estrangement from the industry gives them a sense of being "forgotten" by it, leading to a feeling of loss. This sense of loss is not solely attributed to their inability to keep pace with industry developments in terms of professional competence. Rather, it stems more from their abilities and values not being recognized or affirmed by "authoritative" professionals or the community. Thus, whether it's the quality of communication with professionals, their mindset during communication, or the size of their relationship network, all reflect whether vocational teachers and their abilities are accepted and affirmed by the industry. The degree of this "acceptance" and "affirmation" directly impacts their level of Occupational Identity.

Community Cohesion (CC)

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The influence of community environmental factors on identity formation is significant. The environmental factors uncovered in this study can be categorized into six sub-dimensions: interpersonal relationships, teaching resources, promotional system, learning opportunities, employment prospect, and industrial assistance.

Interpersonal relationships are a sensitive topic in vocational institutions. Setting aside potential personal grievances among teachers and between teachers and leaders, teachers and leaders essentially have a co-opetitive relationship. To achieve cooperation, teachers form teams and collaborate on common projects. However, they also compete fiercely for promotion opportunities or limited teaching resources. Even during cooperation, due to differences in participation and enthusiasm, issues often arise where some contribute more while others contribute less, leading to tacit contradictions. The existence of small interest groups among teachers is not uncommon. Therefore, the harmony of the interpersonal relationships within the school that an individual teacher is in is closely related to their sense of belonging to this group, which in turn correlates with their professional identity. Teachers are peers to each other, while they are in a led-leader relationship with leaders. Thus, this study first explores the relationships among teachers, assessed through "satisfaction with relationships" as an overall evaluation of the relational atmosphere, without specifying the type or context of the relationships. This "relationship" can be understood as a superficially maintained one, reflecting an individual's general feelings within the school's interpersonal network. Regarding the relationship between teachers and leaders, from the teachers' perspective, it is more about feedback on the

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fairness of leaders' administrative methods in teaching and personnel management. In vocational institutions, apart from their own efforts, teachers' development is also influenced by school leaders' leadership styles, resource allocation, and handling of detailed matters. The measurement of the relationship between teachers and leaders is based on whether teachers are "convinced" by leaders' management skills (fairness) and character. Undoubtedly, these two relationships constitute the primary interpersonal network for individual teachers in schools, and the harmony of this network significantly impacts their professional identity.

Notably, after exploratory factor analysis, the observation point of "relationships with industry professionals" was categorized under "Professional Efficacy" rather than "Community Cohesion" My explanation is that maintaining relationships with industry professionals requires certain professional competencies. This ability to maintain relationships, or the relationships maintained by such abilities, does not necessarily create favorable environmental conditions for the development of vocational teachers. Therefore, to more closely observe whether the relationship between vocational teachers and occupational workers contributes to the teachers' developmental environment, it is crucial to see if this relationship brings substantial emotional value and material conditions. Thus, in this scale, observation points derived from relationships that are beneficial to vocational teachers' development have been retained. It is worth noting that in this study, the relationships between vocational teachers and occupational workers are all established within the school-enterprise cooperation framework. Therefore, in the items designed for this study, the

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school-enterprise cooperation framework replaces "individuals in the industry" as the main entity providing development resources for vocational teachers. These industrial resources from the school-enterprise cooperation framework facilitate teachers' teaching, provide opportunities for teacher learning and student employment, and thus become important factors in helping teachers form their Occupational Identity. Research shows that the more resources vocational teachers can obtain from these aspects, the greater the likelihood of their Occupational Identity formation. Returning from the school-enterprise cooperation framework to the internal school environment, we cannot ignore the resources schools provide for teachers' teaching. These teaching resources are a major component of teachers' teaching tools and were the most frequently mentioned topic during the interviews in this study. Therefore, the extent to which schools provide resources for teachers' teaching and development is also related to their instructional identity.

In the discussion of interpersonal relationships, I mentioned the management level of leaders. In Chinese vocational institutions, the management level of school leaders determines the formulation and implementation of school policies. Among the numerous management systems in schools, the ones most closely related to teachers' development are the teacher evaluation system and promotion system, which affect teachers' social status and income levels. Therefore, this study also sets the fairness evaluation of the promotion system by vocational teachers as an observation point for assessing their Instructional Identity. In vocational education, teachers often compare themselves with peers of similar abilities within the same school and in other similar

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schools. The fairness of the system lies in rewarding those who put in the effort. During the research process (especially during interviews), I found that although this topic was frequently mentioned, most teachers were dissatisfied, mainly due to the system's "complexity," the lack of "transparency" in the evaluation process, and the failure to "recognize" some achievements. These negative emotions have a detrimental effect on the formation or maintenance of teachers' Instructional Identity.

In summary, community cohesion which is conducive to the development of vocational teachers has a significant impact on the formation of their professional identities. This study's exploration of the "Cohesion" focuses on what vocational teachers can "obtain" from it, rather than superficially discussing the quality of the environment or respondents' views on the current environmental situation. This study believes that this "sense of gain" is the emotion closest to the needs of vocational teachers and thus has a greater impact on the degree of their professional identity.

Work Engagement (WE)

After conducting exploratory factor analysis, several items related to organizational belonging, professional commitment, professional faith, responsibility, professional dedication, and professional behavior tendency were grouped together. In the Initial Scale Design, most of these items were categorized under the dimension of Professional Commitment. However, under the new classification, Value Adherence and Professional Commitment are insufficient to fully encapsulate the meaning of these items. Based on the connotations expressed by these items, the researcher

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believe that using Work Engagement as the dimension name would provide a more appropriate and unified summary.

Work Engagement, initially proposed by Kahn (1990), is defined as the state in which "organizational members exercise control over themselves to integrate their selves with their work roles." Schaufeli et al. (2002, 2006) further refined work engagement into three dimensions: Vigor, Dedication, and Absorption. Vigor refers to employees exhibiting high energy and resilience in their work, being willing to exert effort without easily feeling fatigued; Dedication signifies employees' enthusiasm and sense of meaning in their work, perceiving their contributions as important to the organization and others; Absorption indicates employees' full concentration and immersion in their work. In other words, Work Engagement represents the Psychological Conditions of Personal Engagement and Disengagement at Work.

According to the Conservation of Resources (COR) theory, individuals tend to acquire, retain, and protect resources. Stress arises when resources are threatened or when individuals fail to gain resources after investing substantial resources. Therefore, resource acquisition and enhancement are core motivational phenomena of work engagement. Work engagement is not only positively influenced by job resources (e.g., job autonomy, feedback, social support) and personal resources (e.g., self-efficacy, optimism) but also exerts a positive impact on these resources, forming a resource spiral.

From a content perspective, the items identified within this dimension all fall under the scope of Work Engagement. For instance, Vigor encompasses the efforts

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vocational teachers are willing to invest in their work. In the school environment, this manifests as enhancing professional competence through lifelong learning, while in industry-related activities, it is evident in vocational teachers' willingness to participate in cooperative projects within the School Enterprise Cooperation Framework, strengthen collaboration, and actively achieve common goals to establish an effective Community of Practice. Dedication encompasses vocational teachers' firm belief in their teaching roles, recognition of industry values, willingness to contribute to collective construction efforts, and affirmation of the importance of their work for societal and industry development. "Absorption" encompasses vocational teachers' focus on their work, their strong sense of responsibility for promoting students' comprehensive development, and their "role model" work attitude. They not only uphold the school's reputation and image but also present a positive professional image to students.

Naturally, the items in the scale designed by Schaufeli et al. (2002, 2006) on Work Engagement do not align perfectly with those in our scale. This study borrows the conceptual framing of Work Engagement from Schaufeli et al.'s research to establish it as a dimension in our scale. Within this dimension, there are five items measuring Instructional Identity and five items measuring Occupational Identity. These items, derived from literature analysis and interviews with vocational teachers, underwent exploratory factor analysis and confirmatory factor analysis, proving their acceptable reliability and validity in measuring vocational teachers' Instructional Identity and Occupational Identity in the Chinese vocational education context.

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It is noteworthy that the keyword "sense of belonging," which frequently emerged during the qualitative research phase, underwent significant refinement in the Exploratory Factor Analysis (EFA). Specifically, the item pertaining to a sense of belonging to the school (II-17) was eliminated, while the item related to a sense of belonging to the industry (OI-18) was reclassified under the dimension of "Work Engagement." This outcome suggests that item II-17 was semantically redundant with item II-01 in expressing a sense of belonging and was consequently removed during the principal component analysis. Conversely, item OI-18, which encapsulates the aspiration of vocational college teachers to become integral members of their respective industries, was appropriately categorized under "Work Engagement," reflecting its inherent conceptual alignment.

Work engagement holds significant importance for both organizations and individuals. It enhances work efficiency, drives the achievement of organizational goals, promotes personal career development, and strengthens team cohesion. To enhance employees' work engagement, organizations can adopt a series of measures, such as clarifying work goals and expectations, providing training and development opportunities, creating a favorable work environment, offering positive feedback and reward mechanisms, and encouraging employee participation in decision-making processes.

In summary, the Vocational Teachers Dual Professional Identities Scale consists of two subscales: the Vocational Teachers' Instructional Identity Scale and the Vocational Teachers' Occupational Identity Scale. These two subscales share the same

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dimensions in design. This design aims to observe whether individuals with different demographic characteristics exhibit significantly different performances in Instructional Identity and Occupational Identity. If Vocational Teachers' Instructional Identity or Occupational Identity were studied independently, there is a strong possibility that both scales would present entirely different dimension designs. The items related to Instructional Identity in our scale are primarily derived from existing scales, reflecting the widespread research on teachers' professional identity and the availability of rich reference cases and theoretical support. In contrast, the items concerning vocational teachers' Occupational Identity are largely based on the researchers' empirical accumulation and in-depth interviews with 15 vocational teachers. These teachers, with extensive vocational education experience and profound reflections on identity, provided valuable data for designing the items related to vocational teachers' Occupational Identity. Although mature scales for Occupational Identity exist in the theoretical realm, they are not particularly relevant to this study. In this research, Occupational Identity for vocational teachers represents a Trans-professional Identity, distinct from the Occupational Identity of a specific profession in the conventional sense or the future Occupational Identity for students. The researchers have repeatedly emphasized that, in formulating items for vocational teachers' Occupational Identity, they should not be viewed as full-time industry professionals. This approach aligns with the actual situation, where they are teachers in schools. Therefore, the items measuring their Occupational Identity should originate from their environment and relate to their current work status.

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The Vocational Teachers' Entry Routes, Education, Dual Professional Identities and Their Resilience

The Entry Routes and the Dual Professional Identities (H1 and H2)

If there is a significant negative correlation between entry routes and instructional identity (H1) among teachers in vocational education, it becomes imperative to delve deeper into the specific categories of entry routes and their implications. In the research questionnaire, entry routes were classified into four distinct categories:

1. Teacher originating from a non-vocational institution;
2. Individual with experience in an industry pertinent to their major;
3. Individual with experience in industries unrelated to their major;
4. Graduate.

These four variables are considered ordinal, based on their degree of relevance to the experiences typically encountered by vocational teachers.

For example, recent graduates lack exposure to relevant industries, teaching experience, and work experience in other fields, thus positioning them as having the least relevant experience compared to vocational teachers. Conversely, individuals who have previously served as teachers possess "teaching experience," inherently aligning their experiences more closely with those of vocational teachers.

Under this premise, it was concluded that entry routes with less relevant experience to vocational teaching exhibit higher levels of instructional and

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occupational identity. Conversely, those with prior relevant experience demonstrate lower levels of instructional and occupational identity specific to vocational teachers.

This finding may appear counterintuitive to conventional beliefs. However, the explanation resides in the fact that individuals with an already established identity encounter greater challenges in reshaping their identity model, as elucidated in Edmond's (2017) paper. As university graduates, they approach new identity models with a more open and receptive mindset upon entering the profession, facilitating the forging of a new identity.

In view of this phenomenon, if a significant negative correlation is observed between entry routes and the dual professional identities of vocational teachers, several key management implications emerge.

Need for training and support: This negative correlation may indicate that teachers entering vocational education through non-traditional pathways require additional training in teaching skills, guidance on teaching methods, and instillation of teaching philosophies to help them better integrate into the teaching role and enhance their instructional identity.

Career development planning: Vocational education institutions, in managing teachers, need to consider the career development needs of teachers from different entry routes. For those with lower instructional identity, personalized career development plans may be necessary, including providing more opportunities for teaching practice, participating in teaching seminars and exchange activities, to enhance their teaching confidence and sense of belonging.

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Adjustment of incentive mechanisms: To elevate teachers' instructional identity, vocational education institutions may need to adjust incentive mechanisms to ensure all teachers feel the value and importance of teaching work. This can include establishing teaching awards, providing opportunities for publishing teaching research results, and giving positive feedback in teaching evaluations.

Recruitment and selection strategies: When recruiting new teachers, vocational education institutions may need to focus more on candidates' teaching potential and identification with the teaching role, rather than solely on their industry experience or professional skills. Assessing candidates' teaching abilities and instructional identity through interviews, teaching demonstrations, and other means can ensure the selection of suitable candidates for teaching positions.

Attention to teachers' mental health: Lower instructional identity may be associated with teachers' mental health issues. Therefore, vocational education institutions need to pay attention to teachers' psychological states, providing necessary psychological support and counseling to help them establish a positive teaching mindset and identity.

The negative correlation between entry routes and instructional identity poses multifaceted challenges and requirements for the management of vocational education teachers. To enhance teachers' instructional identity and overall teaching quality, vocational education institutions need to comprehensively consider teachers' entry backgrounds, training needs, career development, incentive mechanisms, recruitment strategies, and mental health issues, and take corresponding measures to address them.

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The study also reveals that there is a negative but non-significant correlation between entry routes and occupational identity of vocational teacher (H2). Vocational teachers who had prior personal experience in professions similar to teaching before their employment may encounter certain difficulties in integrating into and identifying with the industry identity related to the skills they teach. This could be attributed to the gap between their preformed career expectations and the realities of teaching practice, the challenges faced during the role transition process, the solidification of industry perceptions, and the limitations of personal experience in teaching applications. Consequently, their Occupational Identity recognition tends to be relatively low. However, this relationship is influenced by various factors such as individual differences among teachers, teaching styles, professional attitudes, among others, rendering it statistically insignificant.

The Education and Dual Professional Identities (H3 and H4)

The absence of a significant positive correlation between the educational level of vocational education teachers and their instructional identity, as well as the lack of a significant negative correlation between their educational background and occupational identity, holds several profound implications for the management of vocational education teachers:

The Value of Diverse Educational Backgrounds. Given that educational level does not directly determine teachers' identity, vocational education institutions should prioritize the diverse educational backgrounds of teachers during recruitment,

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encompassing various disciplinary expertise, practical experiences, and industry knowledge. This diversity can introduce rich perspectives and methodologies into teaching, thereby fostering comprehensive student development.

Multifaceted Construction of Identity. The formation of teachers' identity is a complex process that extends beyond educational level. Management should consider multiple factors such as teachers' personal experiences, career development paths, and work environments, providing diverse opportunities for identity construction. For instance, organizing teaching seminars, industry exchange activities, and mentoring programs can help teachers deepen their understanding and identification with the teaching profession.

Personalized Career Development Planning. In light of the nonsignificant negative correlation between educational background and occupational identity, management can design more flexible career development paths for teachers. Rather than overemphasizing educational consistency, personalized career plans should be tailored to teachers' interests, strengths, and career goals, encouraging them to realize their self-worth across different domains and positions. This includes not only formal education but also experiential learning, peer mentoring, and engaging teachers in meaningful professional practices that reinforce both their instructional and occupational identities.

Strengthening the integration of Practice and Teaching. While educational level is not the sole determinant of teachers' identity, practical experience is crucial for their growth. Management should encourage teachers to actively participate in

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practical teaching, industry internships, and other activities that integrate theoretical knowledge with practical application. This enhances their teaching skills and industry knowledge, thereby bolstering their sense of identity and job satisfaction.

Establishing a Comprehensive Evaluation System. In terms of teacher evaluation, management should establish a comprehensive system that assesses not only teaching outcomes and academic achievements but also professional ethics, teamwork capabilities, innovation, and other aspects. Such a system provides a more holistic view of teachers' overall qualities and identity, offering fair and objective feedback and support for their career development.

The Dual Professional Identities and Resilience (H5 and H6)

The existence of positive correlations between both instructional identity and occupational identity with resilience holds profound implications for the management of teachers in vocational education, manifesting specifically in the following aspects:

Strengthening Instructional Identity as a key to enhancing resilience. The positive correlation between instructional identity and resilience indicates that teachers with a strong sense of identification with their teaching roles are more likely to demonstrate perseverance and resilience when confronted with challenges and difficulties in teaching. Therefore, in the management of vocational education teachers, it is crucial to prioritize and implement measures to strengthen teachers' instructional identity. This can be achieved through regular professional training, teaching seminars, experience-sharing activities, and other initiatives that help

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teachers deepen their understanding and identification with the teaching profession, thereby enhancing their resilience and enabling them to better navigate various teaching challenges.

Cultivating Occupational Identity to boost teachers' Resilience. The positive correlation between Occupational Identity and Resilience reveals the impact of teachers' overall identification with their profession on their attitude towards occupational stress and challenges. Teachers with a strong sense of occupational identity are more likely to view occupational stress as an opportunity for growth and approach it with a positive and resilient attitude. Consequently, vocational education administrators should strive to cultivate teachers' occupational identity by organizing industry exchange activities, providing access to cutting-edge industry information, showcasing career development prospects, and other means to enhance teachers' sense of identification and belonging to vocational education, thereby bolstering their professional resilience.

Synergistic effect of Dual Professional Identities on teachers' comprehensive development. The combined effect of instructional identity and occupational identity promotes teachers' comprehensive development. When teachers have a profound identification with their teaching roles and a clear understanding of the industry related to their teaching specialization, they are better able to integrate industry elements into their teaching, making the content more practical and closely aligned with industry changes. This, in turn, enhances students' professional literacy and skill levels. Therefore, vocational education administrators should encourage

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teachers to pay attention to and enhance their dual identities simultaneously, fostering personal and professional synergistic development.

Providing personalized support and development opportunities for teachers. Given the positive correlations between instructional identity, occupational identity, and resilience, vocational education administrators should attend to the individual differences of each teacher and provide personalized support and development opportunities. By understanding teachers' career development needs, interests, personality traits, and other factors, tailored training plans and incentive measures can be formulated to help teachers achieve self-growth and career development more effectively.

The Education/Entry Routes and Resilience (H7 and H8)

In the field of vocational education, we observe two intriguing phenomena. On the one hand, the proximity of pre-employment personal experience to the teacher identity theoretically enables teachers to adapt more quickly to the teaching environment and role requirements, thereby possessing stronger resilience. On the other hand, teachers with higher levels of education are likely to have more solid knowledge, skills, and cognitive abilities, which also contributes to demonstrating stronger resilience when facing teaching challenges. However, data indicates that the relationship between these two factors and teachers' resilience is not as significant as expected. This may be due to various factors at play, including individual differences, the diversity of work environments, the influence of career development stages, the

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importance of practical experience, and the multidimensional nature of resilience, which offset the positive effects of these factors on resilience.

In response to these phenomena, comprehensive measures need to be taken in vocational education management practices to enhance teachers' resilience. Firstly, pre-service training and practical teaching sessions should be strengthened to help teachers understand the characteristics and requirements of teaching work, grasp necessary teaching skills and management methods, and accumulate experience and improve abilities in practice. Secondly, continuous professional development opportunities and personalized support should be provided to meet the needs of different teachers and stimulate their work enthusiasm and motivation. At the same time, it is necessary to create a good working environment, encourage cooperation and exchange among teachers, provide necessary teaching resources and support, reduce teachers' workload and pressure, and pay attention to their mental health status. In addition, resilience training should be strengthened to help teachers understand the concept and importance of psychological resilience and master methods and techniques for improving it. Through these comprehensive measures, teachers' resilience can be comprehensively enhanced, enabling them to better cope with teaching challenges and promote career development.

Dual Professional Identities' Mediating Effect Between Education/Entry Routes and Resilience (H9, H10, H11, H12)

The mediation effect of instructional identity on the relationship between entry

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routes and resilience, along with its significant negative correlation, implies several key points for the management of teachers in vocational education:

The entry routes Influences Instructional Identity: like the H1, different entry routes into vocational teaching may lead to variations in teachers' perceptions and identification with their instructional identities. For instance, teachers who transition directly from industry to education may exhibit a less strong sense of Instructional Identity compared to those who enter through traditional routes such as graduating from teacher education programs. These differences can subsequently impact teachers' resilience levels.

The moderating role of Instructional Identity on Resilience: Instructional identity serves as a mediator in the relationship between entry routes and resilience, suggesting that the influence of entry routes on resilience is not direct but rather indirect, mediated through the variable of instructional identity. Consequently, even if teachers come from diverse entry pathways, they may demonstrate higher resilience if they are able to establish a strong sense of instructional identity.

Management strategies should prioritize the cultivation of Instructional Identity: given the crucial role of instructional identity in fostering resilience, management strategies for vocational education teachers should prioritize how to help teachers establish and maintain a strong sense of instructional identity. This may involve providing targeted training, mentoring programs, professional development opportunities, and other initiatives aimed at enhancing teachers' sense of identification and pride in their teaching roles.

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For H10, H11, and H12, the research results indicate that there is no mediation effect present.

In practice, the pathway into the profession may influence teachers' resilience through various means, with professional identity being just one potential factor. Other factors, such as work environment, colleague support, and personal coping strategies, may also exert significant impacts on resilience. Therefore, professional identity does not emerge as a significant mediator between the pathway into the profession and resilience, nor does it demonstrate a significant positive correlation.

Educational background may provide teachers with certain teaching knowledge and skills, but the formation of teacher identity and the enhancement of resilience are influenced by multiple factors. Teacher identity is only one aspect of the relationship between educational background and resilience, and it is insufficient to serve as a sole mediator exerting a significant positive influence. In practice, teachers' resilience depends more on how they cope with challenges, adjust their mindset, and obtain support in actual teaching.

Similar to H11, professional identity may be influenced by educational background, but the enhancement of resilience is a complex process involving the interaction of multiple factors. Professional identity is just one potential factor and is insufficient to serve as a significant mediator between educational background and resilience. In practice, teachers' resilience is more influenced by their experiences, support systems, and coping strategies in their actual work.

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The Deficiency of Community of Practice

This study confirms the existence value of the School-enterprise Cooperation Framework as a Community of Practice within vocational institutions. The framework is deemed "valuable" because its implementation as a true Community of Practice significantly fosters the development of vocational teachers' Dual Professional Identities. The formation of identity is intricately linked to practices within the community. Viewing this process as one of Professional Learning, the three essential elements of a Community of Practice—Joint-enterprise, Shared repertoire, and Mutual engagement—point to a collective intelligence production process emphasizing contextualization, collaboration, and self-organization. This process, as described by Wenger's theory, is known as "legitimate peripheral participation." However, the study finds, particularly during the qualitative research phase, that the School-enterprise Cooperation Framework experienced by respondents does not yet conform to the fundamental characteristics of a Community of Practice.

The Lack of the "Legitimacy"

"Legitimate peripheral participation" is a central concept and defining feature of situated learning theory, describing a specific mode and process of learning. It refers to learners who are "legitimate" participants within the community, rather than passive observers, and whose activities are situated within the community's work context. In the context of the school-enterprise cooperation framework, learning should be defined as the professional learning of vocational teachers through their

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participation in industry and enterprise practices in their capacity as teachers. The learning pathway theoretically follows the "peripheral" principle, where vocational teachers, as novice learners, partially and incompletely participate in community activities, emphasizing a dynamic progression from the periphery to the core. "Participation" implies that vocational teachers should learn from experts and peers through interactions in authentic knowledge-generating contexts.

The study's findings reveal that teachers' "legitimacy" within the school-enterprise cooperation framework is questioned. In a Community of Practice, "legitimacy" signifies that learners have entered the practice community, are accepted by its members, and can engage in practical activities alongside them. However, in reality, their acceptance by enterprises is low. One respondent even stated, "I don't think enterprises welcome our participation in their practices." Another mentioned, "Enterprises see our teachers' practical involvement as causing them trouble." The China Vocational Education Society (2023) also highlighted in its *"Evaluation Report on the Development of Vocational Education in China 2023"* that the level of Chinese enterprises' participation in vocational education still requires improvement. Without assured "legitimacy," meaning vocational teachers as potential learners are not formally accepted by industries and enterprises, neither "peripherality" nor "participation" can be effectively implemented. In practical management, while school-enterprise cooperation agreements establish mutual commitments for teachers' enterprise practices, when vocational teachers arrive at their positions, there are no effective mechanisms in place to facilitate their participation. These mechanisms

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include work allocation, mentoring systems, performance evaluation systems, and reciprocal recognition of workload (i.e., teachers' workload in enterprises should be reciprocally recognized as equivalent to their school workload).

Professional learning within a Community of Practice is a holistic and dynamic process. "Legitimate peripheral participation" is an integrated concept that cannot be dissected into separate elements like "legitimate," "peripheral," and "participation" for understanding; all three elements are indispensable. The learning environment is not a static situation but a dynamic process. Through long-term "legitimate peripheral participation," learners gradually transition from novices to proficient or expert members. For vocational teachers, learning practical experiences and skills within the community of practice is their primary goal. Ideally, the School-enterprise cooperation framework is a "circle" composed mainly of teachers and industry professionals, along with other stakeholders. Within this circle, learners gradually acquire the beliefs and behaviors embodied by the community through participation in its socio-cultural practices. This study places vocational teachers within the context of the school-enterprise cooperation framework. The four dimensions and related items developed to measure vocational teachers' instructional identity and occupational identity highlight the urgency of professional learning within the structured form of a community of practice. Only through the transition of vocational teachers as professional learners from the "periphery" to the "core" can their "Professional Identity" be fully formed. This study not only reaffirms the role of the learning mechanism of a Community of Practice in shaping professional identity

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but also explores the factors influencing vocational teachers' Instructional Identity and Occupational Identity within the School-enterprise Cooperation Framework in the context of China's economic and social backdrop. The findings provide clear guidance on how to construct an effective School-enterprise cooperation framework in the field of vocational education.

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Chapter 6: Managerial Implication

Chapter Overview

Vocational teachers' Dual Professional Identities formation and reinforcement stand as both the cornerstone for enhancing vocational education quality and cultivating high-quality skillful talents, as well as a pivotal driver for national vocational education reforms and sustained economic and social development. In the face of rapid technological advancements and continuous industrial structural adjustments, vocational education encounters unprecedented challenges and opportunities. To navigate these challenges and capitalize on the opportunities, this report summarizes core strategies for fostering and reinforcing Dual Professional Identities among secondary and higher vocational teachers, aligning closely with the latest national vocational education reform policies. It seeks to establish a comprehensive and systematic framework to promote such identity formation and reinforcement through wakening teachers' role awareness, improving training systems, fostering learning communities, and strengthening supportive measures. This holistic approach is tailored to guide the professional growth of vocational teachers, nurturing talents who meet market demands with innovative and practical capabilities, thereby offering robust talent support for the nation's economic and social development.

Enhancing Role Awareness

The primary task in strengthening the Dual Professional Identities of

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vocational teachers is to enable them to deeply understand and internalize their role positioning, achieving a transformation from traditional "teachers" to "educators + technicians" with dual roles. To this end, researcher suggests that managers of vocational institutions reinforce professional role awareness through policy learning, forming master teacher teams, engaging in teaching research, scientific research, and case studies of professional development achievements, formulating personalized career planning, and strengthening the construction of teachers' ethics and professional conduct:

Firstly, researcher recommends that managers of vocational institutions organize vocational teachers to systematically study China's vocational education policies over the past five years, deepening their understanding of these policies. These policies include but are not limited to comprehensive reform policies such as the *"Action Plan for Improving the Quality and Excellence of Vocational Education (2020-2023)"* (MOE et al., 2020) and the *"Opinions on Deepening the Reform of the Modern Vocational Education System"* (CPC Central Committee & the State Council, 2022); policies related to ideological and political education in courses, such as the *"Implementation Outline for Patriotism Education in the New Era"* (CPC Central Committee & the State Council, 2019) and the *"Work Plan for Comprehensively Promoting the Construction of 'Great Ideological and Political Courses'"* (MOE et al., 2022); policies related to professional construction and standards, such as the *"Pilot Program for Implementing the 'Diploma + Multiple Vocational Skill Level Certificates' System in Institutions"* (MOE et al., 2019), the *"Selection and*

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Management Measures for High-Level Vocational Schools and Professional Construction Projects with Chinese Characteristics (Trial)" (MOE & MOF, 2019), and the *"Implementation Plan for Vocational Education Textbook Development during the 14th Five-Year Plan"* (MOE, 2021); policies related to the construction of the teaching staff, such as the *"Implementation Plan for Deepening the Reform of the Construction of 'Dual-qualified' Teachers in Vocational Education in the New Era"* (MOE, 2019) and *"Teachers' Digital Literacy"* (MOE, 2023); policies related to educational informatization, such as the *"Education Informatization 2.0 Action Plan"* (MOE, 2018), *"China's Education Modernization 2035"* (CPC Central Committee & the State Council, 2019), and the *"Action Plan for the Integrated Development of Virtual Reality and Industry Applications (2022-2026)"* (MOE et al., 2022); policies related to industry-education integration, such as the *"Implementation Plan for the Empowerment and Enhancement Action of Industry-Education Integration in Vocational Education (2023-2025)"* (NDRC et al., 2023); and policies related to vocational education laws, such as the *"Vocational Education Law of the People's Republic of China,"* (NPC Standing Committee, 1996) , etc. These documents are important files selected by researchers from policy documents issued by the Chinese government on vocational education reform in the past five years. They have significant guiding significance for the development direction of vocational education. By comprehensively studying national vocational education policies, vocational teachers can regain an understanding of the important position and future development direction of vocational education in China's current educational

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landscape.

Secondly, to create the “Role model” effect, it is suggested to support the establishment of school master teacher teams, provide financial support to these teams, and establish an assessment mechanism. Currently, "master’s studios" are set up at various levels in vocational institutions. These "studios" are relatively loosely managed and lack clear performance evaluation indicators. Many "master teacher studios" and "expert studios" are only nominally existing. Some studios established for off-campus "master teachers" are rarely visited by these "teachers," so apart from just being in name, they do not play any role as role models.

The main tasks of on-campus "master teacher studios" and "expert studios" include leading teams in pedagogical research and innovation, such as developing teaching materials, developing courses, and training new teachers; achieving the inheritance of abilities in professional connotation construction, such as inheriting experience in guiding student competitions and inheriting abilities in preparing for and participating in teaching competitions. The main tasks of off-campus "master teacher studios" and "expert studios" are to introduce enterprise resources for learning and professional development tasks, provide teachers with cutting-edge industry skill training, and create better enterprise practice mechanisms for school teachers. Practice has shown that "role models" should not only be able to create value for the school themselves but also have an exemplary role, that is, use their abilities to lead the development of other teachers, thereby gaining the admiration and trust of young teachers.

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Thirdly, it is suggested to encourage teachers to study professional books and frontier literature, especially paying attention to the latest research results in vocational education both domestically and internationally. Apart from the latest published theoretical research publications, these results importantly include achievements related to professional construction and case analyses of these achievements. These achievements include but are not limited to: provincial and national teaching achievement award works, works from teaching ability competitions, works from innovation and entrepreneurship competitions, planning textbooks, and national-level online courses. By deeply studying these achievements and conducting profound case analyses of them, the goal of broadening vocational teachers' horizons and enhancing their theoretical literacy and practical abilities can be achieved. At the same time, teachers should be guided to pay attention to the dynamics of industries related to their teaching majors and understand industry development trends, so as to better integrate teaching content with actual needs.

Fourthly, it is suggested that educators formulate personalized career plans, merging their individual interests, professional backgrounds, and the school's development needs to devise both short-term and long-term career growth strategies. By setting stage goals, vocational teachers can clarify the development path of their professional roles, set different development goals for different stages of their careers, and motivate them to continuously grow in teaching practice, achieving dual improvements in personal professional abilities and school development goals. At the

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same time, teachers should be encouraged to actively participate in teaching research and reform, continuously improving their teaching and research abilities. Currently, schools have established "Teacher Development Centers" with the aim of promoting teachers' career development. However, the establishment of these "centers" still cannot meet the individualized needs of teachers' development, and their functions need to be further expanded and refined.

Finally, it is suggested to strengthen the construction of teachers' ethics and professional conduct, making it an important part of teachers' professional development. Through the organization of educational ethics activities, the establishment of exemplary role models, and other initiatives, we can guide teachers in fostering proper educational concepts and bolstering their sense of responsibility. At the same time, the professional ethics education and supervision of teachers should be strengthened to ensure that they adhere to professional ethics norms and set a good example for students.

Improving the Teacher Training System

The direct function of the teacher training system is to enhance the professional competencies of vocational teachers. This process, which is oriented towards developing vocational teachers' competence, attitude, and knowledge base, holds decisive significance for the quality of vocational education (Atchoarena, 2002). It is crucial to optimize the training mechanism and institutional construction, establish a multi-level and multi-form training system, and ensure the relevance and

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practicality of training content. Clear definitions of training objectives, content, methods, and evaluation standards, as well as other key elements, are essential to guarantee the standardization and efficiency of training activities. Additionally, supervision and evaluation of training institutions should be strengthened to ensure the quality and effectiveness of their training programs. To this end, researchers recommend that managers of vocational institutions adopt the following comprehensive measures to strengthen teachers' dual-ability cultivation:

Firstly, it is imperative to ascertain the "learning willingness" and "learning needs" of vocational teachers. To achieve this goal, managers should employ a series of quantitative analysis techniques and tools for in-depth exploration. These tools encompass KSAO analysis (covering Knowledge, Skills, Attitudes, and Other characteristics), competency model analysis, task analysis, performance gap analysis, and learning style analysis (Tan, 2011). Through these analytical methods, an accurate assessment of teachers' learning characteristics and training needs can be achieved. This process not only aids in a more comprehensive understanding of teachers' actual circumstances but also provides a scientific basis and robust reference for formulating personalized training programs and corresponding support measures. Furthermore, to ensure the accuracy of training directions, training plans should be developed in conjunction with the results of "Typical job task analysis" conducted in partner enterprises. This system enables precise identification of each teacher's training needs and bottlenecks in their development process, thereby providing a solid foundation and reference for formulating more personalized training programs and support

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measures.

Secondly, it is essential to establish a dual teacher training system that spans both pre-service and in-service stages. Teacher professional development is a continuous and complex process that necessitates the organic integration of pre-service and in-service training to form a comprehensive educational system. Research by Walshe (1998) indicates that relying solely on pre-service training is insufficient to meet the comprehensive needs of teacher professional development; continuous in-service training is necessary to ensure the ongoing updating and enhancement of teachers' abilities. Additionally, CEDEFOP (1994) highlights the lack of practical industry experience among some teachers, particularly those in vocational education institutions. Nanga (2007) further emphasizes the importance of vocational skills training in facilitating students' smooth transition to their careers.

Scholars such as Zheng (2020) argues that the essence of vocational education is cross-boundary education. In Europe, the training system for vocational teachers exhibits a dual-system characteristic, with universities, teacher training institutions, enterprises, and vocational education institutions all actively participating. The practical training model in Germany is a typical example, emphasizing cooperation with enterprises and considering practical training as an integral part of teacher education (Klinzig, 1995). This model provides valuable insights, suggesting that teacher training should focus on the close integration of theory and practice. As a mentor in the Master's Program in Vocational and Technical Education at the School of Tourism Management, South China Normal University, the researcher has achieved

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remarkable results by introducing skills training for postgraduate students. The skills training curriculum includes practical training in common skills in tourism education, such as restaurant service, wine service, cocktail mixing, wine tasting, coffee making, baking, etc., as well as competition coaching for vocational college students participating in skills competitions. Through these two types of skills learning, postgraduate graduates can independently teach a vocational skills course upon entering vocational colleges and play a crucial role in vocational students' competition coaching. In practice, through deep cooperation with eight vocational institutions, the researcher actively introduces demo courses from enterprise mentors. Through these industry mentors' demonstrations, not only students but also vocational teachers learn about and understand the trends in industry skill development, enhancing their interest in participating in industry skills learning and increasing their affection for the industry and occupational identities.

To enhance the skills training of teachers in normal universities, it is imperative to further refine the training system and embrace a stratified and categorized training strategy. This entails designing multi-tiered and diversified training programs tailored to teachers' developmental stages and professional backgrounds, ensuring that each teacher can avail themselves of training resources precisely aligned with their unique needs. These programs are suggested to be grounded in experiential learning method (McMarthy, 2010), which, as opposed to traditional instructional modes, advocate for a practice-centric approach that encourages students to integrate theoretical knowledge into practical contexts (Robert

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et al, 2010). Such an immersive learning experience, where teaching is seamlessly integrated into real-world work settings, fosters a stronger sense of professional identity among students (Kolb and Kolb, 2014).

With the rapid development of information technology, the introduction of online educational resources has become an important way to broaden teacher training channels. We can leverage modern information technology to develop or introduce high-quality online educational resources, such as MOOCs, micro-courses, virtual simulation (VR, AR, MR, etc.) experiments, etc., to provide teachers with flexible and diverse learning pathways and personalized learning support services. Of course, while introducing these resources, we should also strengthen their management and evaluation to ensure their quality and effectiveness.

However, in the field of vocational teacher training in China, despite the establishment of national vocational education teacher training bases and provincial-level vocational teacher training bases, the existing training channels are still inadequate compared to the enormous demand for enhancing vocational teachers' professional competencies driven by economic and social development. Currently, secondary vocational teachers mainly rely on general training channels provided by ordinary universities, lacking a long-term, targeted, and normalized teacher training system specifically for them. Meanwhile, higher vocational teachers face neglect of their job-specific technical and teaching abilities due to the excessive emphasis on doctoral degrees as a hiring requirement in higher vocational colleges.

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Thirdly, to ensure the effectiveness of teacher training, it is particularly important to establish an efficient and comprehensive system for assessing development needs and providing feedback and tracking. The construction of this system should revolve around two core components. Firstly, comprehensive feedback and tracking mechanism must be established. This mechanism aims to comprehensively and deeply understand teachers' actual needs in professional competence development through diversified data collection methods such as questionnaires, in-depth interviews, and teaching observations. Questionnaires can quantitatively reflect teachers' satisfaction with training content and the applicability of training methods, providing solid data support for subsequent improvements. In-depth interviews can delve into teachers' specific needs and expectations for training programs, revealing the challenges and confusions they encounter in actual teaching processes. Teaching observations can intuitively showcase teachers' performance in teaching practice, thereby more accurately assessing the effectiveness of training. These methods complement each other, forming a comprehensive and in-depth feedback and tracking network. Secondly, after collecting teachers' feedback and suggestions, it is necessary to respond promptly and establish a closed-loop mechanism for continuous improvement. This requires us to timely organize and analyze this information, optimize training courses and teaching methods based on teachers' actual needs, and enhance the relevance and practicality of training resources. Through continuous adjustments and improvements, we can ensure that training programs and support measures remain closely linked to teachers' actual needs,

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thereby enhancing the effectiveness and relevance of training.

Lastly, to enhance the professional competencies of secondary and higher vocational teachers, we should integrate normalized teacher education throughout their entire careers. This includes not only providing initial training for new teachers but also offering regular normalized education and teaching skills training for in-service teachers. Simultaneously, we should strengthen the management and evaluation of normalized teacher education efforts to ensure their quality and effectiveness, thereby promoting the comprehensive enhancement and development of secondary and higher vocational teachers' professional competencies. For instance, as a curriculum development leader in multiple vocational institutions, the researcher has established Pedagogical Labs in each institution, regularly leading teaching teams in studying theories and policies related to vocational education. Through such measures, we can construct a more comprehensive and effective teacher training system, providing robust support for teachers' professional growth. By establishing Pedagogical Labs in eight vocational colleges nationwide, researcher has provided continuous foundational training in educational theory to teachers in the Hospitality Management major. This initiative has enabled teachers who have never been exposed to educational theories such as teaching modes, teaching strategies, and learning methods to quickly acquire relevant teaching skills, thereby enhancing the quality of their classroom teaching. This measure has also significantly improved teachers' performance in teaching skills competitions. In schools with Pedagogical Labs, they have won one first prize and one third prize in national teaching ability competitions,

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six first prizes and three second prizes in provincial teaching ability competitions, and one provincial first prize in the young teachers' competition in the past two years.

Constructing an Intra-School Professional Learning Community and Creating a Conducive Development Environment

In the exploration of enhancing teachers' professional competencies, the majority of educators emphasize the significance of the school's developmental environment. They believe that a conducive atmosphere and a space favorable for professional growth are crucial for teachers to fully engage in their professional development. To foster such an environment, the establishment of a teacher learning community is seen as an effective platform, particularly for teachers in secondary and higher vocational education, where its promotional effects are especially prominent. To achieve this goal, it is first necessary to adopt modern means and apprenticeship programs to alleviate teachers' workloads, allowing them more time and energy to devote to professional learning. Additionally, drawing on Robson's (1998) perspective, strengthening legislation and financial support to improve teachers' salaries is also a vital measure in creating a favorable atmosphere.

On this basis, schools should further strengthen brand building, especially the development of “Branded Majors” and “Gold-standard teaching teams”. This includes establishing interdisciplinary communication platforms, encouraging teachers from different professional backgrounds to engage in cross-disciplinary exchanges, and promoting knowledge integration and innovation through activities such as academic

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salons and teaching seminars, thereby enhancing teachers' comprehensive qualities and interdisciplinary teaching abilities. At the same time, schools should enhance their support and guidance for interdisciplinary exchanges, providing teachers with necessary resources and conditions.

Furthermore, reinforcing team collaboration and sharing teaching resources are also key. Schools should establish teaching resource libraries and sharing platforms, encouraging teachers to share resources such as teaching designs, cases, and courseware to achieve optimal allocation and efficient utilization of teaching resources. Simultaneously, strengthening the management and maintenance of teaching resource libraries to ensure their quality and usability is an important aspect of safeguarding the effectiveness of resource sharing. Emphasis should also be placed on the "Golden-standard Teacher" program, changing the previous unfair distribution system where "teachers work and leaders take the credit," and acknowledging the work contributions of teachers. A fair, impartial, and transparent teacher evaluation and promotion system should be created. To allow teachers sufficient time and space to participate in learning community activities and self-improvement learning, schools should arrange teaching tasks and workloads reasonably, reserving ample time for teachers. Additionally, necessary physical and virtual spaces should be provided to support teachers in online collaboration and exchange, thereby creating a good learning atmosphere and conditions. Schools should implement policy-based rewards and incentive mechanisms, offering material and spiritual rewards and incentives, such as promotion in professional titles, research funding, and honorary titles, to

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teachers who actively participate in training and achieve significant results. These measures can stimulate teachers' intrinsic motivation and enthusiasm, promoting their continuous improvement in professional competence.

Constructing a Highly Integrated and Cohesive School-Enterprise Cooperative Community of Practice

Hu (2021) stated that there are four areas for improvement of cooperation between vocational institutions and cooperated enterprises. The first one is the need for more effective communication, meaning that what both parties can provide is not necessarily what their partner wants. The second problem is the lack of "synergic awareness", meaning that both parties do not share the same goal; the third problem is the lack of mutual recognition, meaning that both parties do not fully understand their partners' social value, vocation, and mission. The last deficiency is the need for a collaborative ambiance, meaning mutual trust is absent. The school-enterprise cooperation framework is a community of practice in which both parties can achieve their shared goals. That is why his research project suggests embedding the school-enterprise cooperation framework into the community of practice approach. It tries to figure out the collaborative mechanism during the professional learning process within the community of practice.

To deepen the cooperation between enterprises and schools and enhance the depth and breadth of mutual understanding, it is crucial to enable enterprises to fully grasp the essence of school-enterprise cooperation and its strategic value for their

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long-term development. (Bolli. Bolli et al., (2018) believes that the effectiveness of school-enterprise cooperation depends on three factors, namely: employer involvement in the definition of qualification standards, employer involvement in deciding the timing of curriculum updates, and the combination of workplace training with classroom education (Bolli et al., 2018). To this end, enterprises can select professionals with both graduate degrees and rich work experience as "dedicated liaisons" for school-enterprise cooperation and arrange for them to receive systematic training in vocational institutions. This training should cover core content such as the school's Key Performance Indicators (KPI) evaluation system, talent cultivation models, teaching and research directions, and achievement construction mechanisms, aiming to optimize various specific aspects of school-enterprise cooperation by deeply understanding the school's actual needs and combining them with the enterprise's own resource advantages.

On this foundation, vocational colleges should also attract outstanding high-skilled talents from enterprises to serve as teaching positions in secondary vocational schools. This move can not only stimulate the enthusiasm of school teachers to learn about enterprise production processes and practical experiences but also build an interpersonal network extending to the industry for school teachers, expanding their future practice spaces. For the "dedicated liaisons" from enterprises involved in school-enterprise cooperation, their dual professional identities should also be strengthened: they must adhere to their industry professional identities while also embracing the role of educators, undertaking the sacred mission of teaching,

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imparting knowledge, and resolving doubts, serving as the cornerstone for deep integration between schools and enterprises.

To further strengthen school-enterprise cooperation and actively explore a stable joint cultivation system, teachers' practical operation skills and technological innovation capabilities should be enhanced through enterprise practice, project collaboration, technological research and development, and other avenues. Teachers should be encouraged to actively participate in enterprise production practices and R&D activities, keeping up with industry dynamics and technological frontiers to ensure that teaching content is closely linked to market demands. At the same time, broadening school-enterprise cooperation channels and teachers' horizons is crucial. Teachers should proactively explore cooperation opportunities with external institutions such as enterprises, research institutions, and sibling colleges, broadening their knowledge horizons and grasping the latest industry trends through industry-academia-research cooperation, academic exchanges, joint projects, and other forms to enhance their personal practice and innovation abilities. During the collaboration with eight vocational colleges in China, the researcher led the establishment of a "Cross-Enterprise Joint Training Center," drawing on the German dual-system model and playing the role of an industry association. By collaborating with nearly 300 catering enterprises, the center conducted surveys to coordinate enterprises' job skill requirements and translated these requirements into teaching content integrated into the talent cultivation plans of vocational colleges. The "Cross-Enterprise Joint Training Center" compensated for the schools' deficiencies in enterprise operation

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management and the enterprises' shortcomings in knowledge conversion within this practice community, serving as a bridge connecting schools and enterprises.

Clarifying personal development needs and target positioning is a compulsory course for every teacher. Based on the research results of "typical work task analysis" conducted by enterprises, teachers should actively examine their current professional competence status, combine it with school development goals and personal career planning, and precisely position the specific needs and goals of their professional development, laying a solid foundation for formulating individualized learning and improvement plans.

In terms of teacher team construction, emphasis should be placed on introducing diversified talent resources, especially "dual-qualified" teachers and industry experts with enterprise backgrounds and technological innovation capabilities, to optimize the structure of the teaching team and enhance overall quality. Exploring the establishment of flexible and diverse teacher employment mechanisms, such as part-time teachers, visiting professors, and off-campus mentors, can attract more industry elites to participate in vocational education, enriching teaching resources and improving teaching quality and effectiveness.

Vocational institutions' requirements for teachers' practical training organization, enterprise communication and cooperation, and operational skills can be directly met by recruiting individuals with enterprise work experience to serve as professional course teachers. This necessitates diversified management of teacher entry thresholds, avoiding an overemphasis on "academic qualifications" or "PhD

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degrees," thereby promoting the improvement of the "Dual-qualified" teacher system. Furthermore, vocational institutions should actively sign professional co-construction agreements with multiple enterprises, building bridges for personnel exchanges. By regularly selecting and sending teachers to enterprises for vocational skills training and inviting enterprise experts to participate in school teaching, two-way interaction can be achieved. Enterprises should customize training plans based on the actual needs of participating teachers, adopting methods such as on-site observations and on-the-job operations to effectively enhance teachers' practical operation skills and ensure the effectiveness of school-enterprise cooperation.

In conclusion, the development of vocational teachers, particularly the formation and reinforcement of their Dual Professional Identities, is a complex and systematic engineering task that requires the joint efforts and collaboration of governments, schools, enterprises, and teachers themselves. By implementing and promoting core strategies such as enhancing role awareness, improving the training system, constructing effective intra-school learning community and cohesive community of practice, teachers' professional competence levels and comprehensive qualities can be effectively elevated. This, in turn, drives the formation and reinforcement of vocational teachers' Dual Professional Identities. In the future, efforts should continue to deepen vocational education reforms and innovative development concepts, constantly exploring and innovating new models and paths for teachers' professional development, strengthening international exchange and cooperation, absorbing international advanced experiences and practices, and

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continuously optimizing the structure and quality of the teaching team. At the same time, attention should also be paid to the deep integration and coordinated development of vocational education and industrial development, promoting the advancement of industry-education integration and school-enterprise cooperation to higher levels, and injecting new vitality and driving forces into the high-quality development of vocational education.

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Chapter 7: Conclusion

This chapter summarizes the present thesis. The researcher will emphasize the identified limitations and propose future research directions related to this topic.

Limitation

Limitations in Sample Size Across Different Types

In the sample of this study, although the interviewees can be categorized into several types based on demographic characteristics, the sample size for each type is relatively small. Certain background factors of the participants may significantly influence their professional identity as vocational teachers. These factors include: 1) the region where the participants are located. This is because the professional identity of vocational teachers may vary across different cultural and economic contexts. A limitation of this study is that most participants come from Guangdong and Guangxi provinces. These two provinces share cultural similarities but differ significantly in economic development. 2) Disciplinary differences. Disciplines are associated with industries, and the degree of integration between different industries and schools in school-enterprise collaborations varies. Most participants in this study come from hospitality-related majors, while those from engineering majors such as mechanics, engineering, electronics, and electrical engineering are insufficient. 3) The level of the school. Vocational teachers at different levels, including vocational high schools, higher vocational colleges, and vocational undergraduate institutions, face different job contents, work environments, set goals, and work pressures, which may

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differently influence the formation of their professional identity. The main sample of this study comes from secondary and higher vocational schools, while the sample from vocational undergraduate institutions is insufficient. These major background factors of the primary participants are worth exploring and analyzing in future research.

Cross Sectional Research Method

The second limitation of this study is the single time point of our investigation. Professional identity is a process of change and evolution (Gee, 2000). Therefore, even for the same group of participants, data collected at different time points would differ. Conducting a longitudinal study over three to five years would be more convincing. By collecting data at multiple time points, we could observe changes and developments in the dual professional identities of the same group of vocational teachers, revealing their underlying dynamic patterns and trends.

Other Potential Dimensions and Items

This study explores the dimensions and items of the scale based on existing theories and items. The qualitative research in the second phase of this study is also conducted based on the theoretical research in the first phase. To some extent, existing theories and scales have limited the researcher's conception in designing the interview outline and theoretical framework in the second phase. Therefore, the researcher suggests starting from more open-ended interviews to explore more potential

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dimensions and items. For example, in this study, some researchers emphasized the importance of income, as illustrated by statements such as:

"The salary level for teachers is low, and I think it's also low for students. However, in recent years, salaries in Guangzhou have actually increased a lot. Yes, I think they have increased significantly, much better than before."

Another example:

"Some teachers may feel that although their social status as teachers seems high, they are not satisfied with their salary income. They feel that their sense of fulfillment is low because their salary is relatively low."

However, since these ideas were not widely shared by other interviewees, "income level" was not set as one of the items. Different results might emerge if the sample size of the interviews were increased and the interview quality improved.

Future Research

The rapid development of vocational education provides a new research field for vocational education studies. Professional identity is closely related to teacher development and thus holds great potential for future research.

Research on Process Mechanisms

Since teachers' professional identity is a process of change, further research should explore how professional identity forms and develops. Educational research generally believes that teachers' professional identity is the internal motivation for

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teacher development, effectively promoting their professional growth and self-improvement. Therefore, exploring the formation process and development mechanism of professional identity is of great significance for the construction of the school's teaching staff. Meanwhile, further research is needed to fully reveal the intersectionality of vocational teachers' roles and the formation and (re)shaping process of their (dual) identities.

Related Potential Research Subjects

In the field of vocational education, research on "Dual Professional Identities" is not only significant for vocational teachers but also holds importance for other groups related to vocational education, such as vocational students. During their school years, they have the identity of students while also being required to have the identity of trade workers. On the wall of a vocational school in Guangzhou, there is a slogan that reads, "School is like work, and classes are like being on the job." This shows that shaping the Dual Professional Identities of vocational students is also necessary, which helps cultivate their craftsmanship spirit and enables them to quickly integrate into the industry's work environment after graduation. Another group worth studying is student-teachers in normal universities. Their career goal is to become vocational teachers. Before becoming vocational teachers, these students study for three years in normal universities, experiencing three stages: on-campus learning, vocational school internships, and thesis writing. During these three stages, does their professional identity change? Is their learning environment conducive to shaping their

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Dual Professional Identities? These questions are also worth further investigation by researchers.

Potential Theoretical Model

Lastly, theoretical research related to vocational teachers' Dual Professional Identities can be further expanded. This study combines vocational teachers' Dual Professional Identities with Teachers' Resilience to construct a new theoretical model. Besides, Dual Professional Identities can also be combined with other concepts. For example, Teachers' Self-efficacy has been proven to have a direct correlation with professional identity formation. Previous studies emphasize the importance of self-efficacy in teacher professional identity formation, stating that teachers' professional identity is formed through self-evaluation of their competence when acting as teachers (Day & Gu, 2007). Only by combining the concept of vocational teachers' Dual Professional Identities with more concepts related to vocational teachers' ability cultivation and career development, and demonstrating their theoretical models, can we find approaches to vocational education management in a broader space. Therefore, apart from Self-Efficacy, it is also feasible to combine Dual Professional Identities with concepts such as Digital Literacy, Artificial Intelligence, and Burn-out to expand the application scope of Dual Professional Identities.

In conclusion, there is still considerable potential for exploring the implications of dual professional identities in the field of vocational education. This topic not only deserves my sustained efforts in the future but also necessitates a

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comprehensive understanding of the underlying theory, as it provides a foundational framework for our inquiry. The methodology employed in this doctoral thesis serves as a robust starting point, paving the way for subsequent research to delve deeper into the nuances of dual professional identities within a broader scope.

Furthermore, I anticipate that the research findings from this thesis will have significant policy implications, informing the development of more inclusive and supportive educational policies that acknowledge and address the unique challenges faced by individuals with dual professional identities. Ultimately, the insights gained from this research endeavor will translate into practical applications, enhancing the practice of vocational education by fostering environments where educators can thrive in their multifaceted roles. By opening a window for further exploration, I am hopeful that this work will catalyze a wave of research that bridges theory, methodology, policy, and practice in the realm of dual professional identities.

Conclusion

The high level of Dual Professional Identities represents a high standard of vocational teachers' quality. The formation and persistence of Dual Professional Identities may be impeded or empowered by factors from the two environments, the school and the cooperated enterprises in which vocational teachers are involved. The consolidated “Membership” could effectively increase the well-being of the teachers (Toubassi et al, 2023) and the prestige of the professional image perception (Hamilton, 2013) of vocational teachers compared to either general schoolteachers or trade

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workers and enhance their professional status and work motivation.

This study has developed a scale for measuring vocational teachers' Dual Professional Identities (DPI-VT Scale) through qualitative and quantitative research methods. After reliability and validity verification, the scale has proven to possess good reliability and validity. By combining the entry routes and the academic degree level as independent variables, the Instructional Identity and Occupational Identity of vocational teachers as mediator, and Resilience as dependent variable, a path analysis has been done and the result demonstrated various correlative relationship between variables.

This research is conducted in the context of Chinese vocational education, and the findings reflect the current situation of Chinese vocational education. Therefore, it provides certain guidance for the construction of teaching staff in the context of Chinese vocational education. The theory of Vocational Teachers' Dual Professional Identity and the developed scale proposed in this study can be used to measure the instructional identity and occupational identity of vocational teachers, respectively. The research findings reflect the uniqueness of vocational teachers' professions within the framework of school-enterprise collaboration. Therefore, when setting the items for the instructional identity and occupational identity scales, we did not entirely copy the item design of teachers' professional identity in general schools or professional identity in other professional contexts. Instead, while referencing existing theories and scales, we fully considered the factors of Chinese vocational education and school-enterprise collaboration in designing the items. The item design in the Occupational

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Identity scale is somewhat innovative and holds practical significance for evaluating the "dual-qualified" teaching staff in vocational colleges.

The development of Chinese vocational education has entered a fast track since 2020. Education policies related to vocational education emerge one after another. Among them, policies on "Dual Qualified Teacher" (Shuang-shi) are core issues for the development of vocational teachers and thus deserve attention from the theoretical community.

Over a three-year period, this study progressed through distinct stages: the first year focused on learning and training with taught programs, the second on initiating research, and the third on conducting the research in full. The onset of the pandemic necessitated a shift to online courses during the teaching phase, but with the invaluable guidance of two supervisors, the research was successfully completed despite numerous challenges and uncertainties. This study serves as the foundation for my exploration of vocational teachers' professional identities. The insights gained will be further refined in subsequent research, with the ultimate goal of developing a robust academic theory that can provide significant guidance on teacher development issues.

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Appendices

Appendix A: English-Chinese Translation Glossary of Questionnaire

NO.	中文（Chinese）	English（英语）
1	**问题一：您的性别是？** ✓ 男 ✓ 女	Question 1: What is your gender? ✓ Male ✓ Female
2	**问题二：您的年龄是？（ ）**	Question 2: What is your age?
3	**问题三：您所在的区域：** 区域列表	Question 3: Your region:
4	**问题四：在成为职业院校教师之前，您是：** ✓ 在与我教授的专业相关的行业中工作过 ✓ 应届毕业生 ✓ 在于我教授的专业不相关的行业中工作过 ✓ 普通院校（非职业院校）的教师	Question 4: Before becoming a teacher in a vocational school, you were: ✓ Have worked in industries related to my major ✓ Graduate ✓ Have worked in industries unrelated to my major ✓ Teachers from non-vocational institution
5	**问题五：您的最高学历是？** ✓ 高中、中专及以下 ✓ 大专 ✓ 本科 ✓ 硕士研究生 ✓ 博士研究生	Question 5: What is your highest level of education? ✓ High school, technical secondary school and below ✓ Junior college ✓ Undergraduate program ✓ Master's degree candidate ✓ Doctor
6	**问题六：您目前的教师身份是：** ✓ 学校在职 ✓ 企业兼职	Question 6: What is your current teacher identity ✓ School in-service teacher ✓ Part-time teacher
7	**问题七：您目前的职称是？** ✓ 无 ✓ 初级职称 ✓ 中级职称 ✓ 高级职称 ✓ 正高级职称	Question 7: What is your current job title? ✓ no title ✓ junior titles ✓ intermediate title ✓ senior vice titles ✓ Senior professional title
8	**问题八：您目前主要教授的科目是？** ✓ 公共基础课 ✓ 专业课	Question 8: What are the main subjects you are currently teaching? ✓ Public fundamental courses ✓ Practical courses

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9	**问题九：您的教龄是？(　)**	Question 9: How long have you been teaching?
10	**问题十：您目前所在的职业院校属于哪个层级？** ✓ 中等职业学校 ✓ 高等职业学校（大专） ✓ 应用型本科院校中的职业教育部分	Question 10: Which level is your current vocational school? ✓ Vocational high school ✓ Higher vocational college ✓ Vocational university
11	**问题十一：您是否拥有除教师资格证外的其他职业资格或职业技能等级证书？** ✓ 是 ✓ 否	Question 11: Do you have any other professional qualifications or vocational skill certificates other than the teacher qualification certificate? ✓ Yes ✓ No
12	**问题十一-1：如果拥有，请列举您的其他职业资格或证书：[请在此区域内作答]**	Question 11-1: If yes, please list your other professional qualifications or certificates:
13	**问题十二：您目前的平均税后月收入范围是？** ✓ 3000 元以下 ✓ 3001-5000 元 ✓ 5001-8000 元 ✓ 8001-12000 元 ✓ 12001-18000 元 ✓ 18000 元以上	Question 12: What is your current average monthly after-tax income range? ✓ Below 3000 yuan ✓ 3001-5000 yuan ✓ 5001-8000 yuan ✓ 8001-12000 yuan ✓ 12001-18000 yuan ✓ Above 18,000 yuan

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Appendix B: English-Chinese Translation Glossary of DPI-VT Scale

Vocational teachers Instructional Identity Scale

No.	中文（Chinese）	English（英语）
F1	**角色认可**	**Role Recognition**
II-01	我为自己是一名职业教育教师而自豪。	I am proud to be a vocational teacher.
II-02	在做自我介绍的时候，我常会提到我是一名职业教育的老师。	I often introduce myself by saying, "I am a vocational teacher."
II-03	在职业教育领域，有值得我敬佩的楷模。	In the field of vocational education, there are role models that I admire.
II-04	我了解职业院校教师与普通教育教师的区别。	I understand the difference between vocational teachers and general education teachers.
II-05	我关注社会舆论对于职业教育的评价。	I care about the social comments on vocational education.
F2	**职业效能**	**Professional Efficacy**
II-07	在我的课堂上，我能有效地应对不同的学生群体，因材施教。	In my classroom, I can effectively manage different groups of students and develop teaching strategies tailored to their actual situations, providing individualized instruction.
II-08	我可以在日常教学中熟练地运用各种教学设备。	I can skillfully utilize various teaching equipment in my teaching.
II-09	在应对教师工作时，我通常都表现得很自信。	I usually demonstrate confidence when dealing with teaching tasks.
II-10	我的工作得到学生的认可。	My students recognize my work.
F3	**社群凝聚力**	**Community Cohesion**
II-11	我对同事间的人际关系感到满意。	I am satisfied with the interpersonal relationships among my colleagues.

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II-12	我学校的领导层领导有方，秉公办事，且重视教师发展。	Our school leadership is effective, values teacher development, and handles matters fairly.
II-13	我们学校的资源、设备齐全，能满足教学需要。	Our school provides sufficient teaching resources and facilities, and the environment is conducive to teaching and learning.
II-14	我们学校职称评定机制和晋升机制客观公正。	In our school, the evaluation of professional titles and the promotion mechanism is objective and fair.
F4	**工作投入**	**Work engagement**
II-18	我会注意自己的言行，不给学校形象带来不良影响。	I am mindful of my words and actions, and will not bring any negative impact to the image of the school.
II-19	我认为我个人的职业生涯发展和学校的发展紧密相关。	I believe that my development is closely linked to the development of the teaching community and the school.
II-20	我相信终身学习的重要性，并会继续提升我的专业能力。	I hold the belief in lifelong learning and strive to continuously improve my professional competence.
II-21	我有责任促进学生的全面发展。	I have a responsibility to promote the comprehensive development of students.
II-22	我愿意为学校发展贡献我的智慧和能力。	I am willing to contribute my wisdom and strength for the better development of my school.

Vocational teachers Occupational Identity Scale

No.	**中文（Chinese）**	**English**
F1	**角色认可**	**Role Recognition**
OI-01	在做自我介绍的时候，我乐意提及与我专业相关的行业。	When introducing myself, I am happy to mention the industry related to my major.
OI-02	在与我的专业相关的行业中，有值得我敬佩的楷模。	There are admirable role models in the industry related to my major.

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OI-03	我了解我的专业和别的专业在职业形象和社会分工上的区别。	I understand the differences between my major and other majors in terms of professional image and work significance.
OI-04	我关注社会舆论对于与我的专业相关的行业的评价。	I care about the social comments on the industry related to my major.
F2	**职业效能**	**Professional Efficacy**
OI-05	我的专业技能让我能够胜任我的教学工作。	My industrial skills enable me to be competent in my teaching work.
OI-06	我的专业能力得到行业内人士的认可。	My professional abilities are recognized by industry professionals.
OI-07	我与行业人士交流的时候没有理解障碍。	I have no communication barriers when interacting with industrial professionals.
OI-08	当我参与行业活动时，我通常都表现得很自信。	I usually exhibit confidence when participating in industry-related activities.
OI-09	我与行业内的人士有着很好的联系。	I have good connections with people within the industry.
F3	**社群凝聚力**	**Community Cohesion**
OI-10	校企合作框架提供了令人满意的学习机会。	The school-enterprise cooperation framework provides satisfactory learning opportunities.
OI-11	行业会给我的学生提供良好的工作机会。	The industry can provide good job opportunities for my students.
OI-13	我能够从校企合作的企业处获得教学所需的资源。	I am able to obtain the necessary resources for teaching from collaborative enterprises through school-enterprise cooperation.
OI-14	如有需要，行业专家会积极参与我的课堂教学。	If needed, industry experts will actively participate in my classroom teaching.
F4	**工作投入**	**Work engagement**
OI-18	虽然我是一名职业教育教师，但是我认为我也属于行业的一份子。	Although I am a vocational teacher, I believe that I am also a part of the industry.
OI-19	我会注意自己的言行，从而在学生面前树立良好的职业工作者形象。	I will be mindful of my words and actions, so as to establish a good professional image in front of students.

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OI-20	我认为我个人的职业生涯发展和与我的专业相关的行业的发展紧密相关。	I believe that my development is closely linked to the development of the industry related to my major.
OI-22	我愿意与合作企业在专业建设方面加强合作。	I am willing to strengthen cooperation with partner enterprises in curriculum development.
OI-23	我愿意与合作企业培养适合企业岗位需求的人才。	I am willing to work with partner enterprises to jointly cultivate talents that meet the needs of enterprise positions.

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Appendix C: English-Chinese Translation Glossary of Resilience Scale (Smith et al., 2008)

No.	中文（Chinese）	English
R-1	I tend to bounce back quickly after hard times.	在经历困难时期之后，我往往能迅速恢复过来。
R-2	I have a hard time making it through stressful events.	我能够熬过有压力的事情。（反向题翻译成正向表达）
R-3	It does not take me long to recover from a stressful event.	我不需要花很长时间就能在经历了有压力的事情后恢复过来。
R-4	It is hard for me to snap back when something bad happens.	当不好的事情发生后，我能够迅速恢复过来。（反向题翻译成正向表达）
R-5.	I usually come through difficult times with little trouble.	我通常能轻松地度过困难时期。
R-6	I tend to take a long time to get over set-backs in my life.	我不需要很长时间就能从生活中的挫折中恢复过来。（反向题翻译成正向表达）

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Appendix D: The statistical data result of the Reliability and Validity of the DPI-VT Scale

Reliability test result of the DPI-VT Scale

Table 17

Reliability test of the Instructional Identity Sub-scale

Dimension	Cronbach's Alpha	Number of Item
Role Recognition	.853	5
Professional Efficacy	.843	4
Community Cohesion	.852	4
Work Engagement	.918	5
Instructional Identity	.940	18

Table 18

Reliability test of the Occupational Identity Sub-scale

Dimension	Cronbach's Alpha	Number of Item
Role Recognition	.861	4
Professional Efficacy	.889	5
Community Cohesion	.871	4
Work Engagement	.919	5
Instructional Identity	.943	18

Table 19

Reliability test of the Dual Professional Identities

Dimension	Cronbach's Alpha	Number of Item
The Dual Professional Identities	.970	36

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Descriptive Statistical Analysis of Variables

Table 20

Descriptive Statistical Analysis of Variables (Instructional Identity)

Variables	**Mean**	**Variance**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1. Entry Routes	1.840	1.045	1							
2. Academy Degree Level	2.750	0.684	0.148*	1						
3. Role Recognition	4.160	0.735	-0.117*	-0.097	1					
4. Professional Efficacy	4.187	0.662	-0.096	0.025	0.666***	1				
5. Community Cohesion	3.753	0.819	-0.102	-0.015	0.563***	0.564***	1			
6. Work Engagement	4.397	0.718	-0.126*	-0.035	0.723***	0.695***	0.574***	1		
7. Instructional Identity	4.141	0.624	-0.131*	-0.041	0.879***	0.840****	0.792***	0.887	1	
8. Resilience	3.878	0.783	-0.038	0.009	0.545***	0.653***	0.573***	0.571***	0.681***	1

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Table 21

Descriptive Statistical Analysis of Variables (Occupational Identity)

Variables	Mean	Variance	1	2	3	4	5	6	7	8
1. Entry Routes	1.840	1.045	1							
2. Academy Degree Level	2.750	0.684	0.148*	1						
3. Role Recognition	4.222	0.750	-0.075	0.007	1					
4. Professional Efficacy	4.067	0.714	-0.070	0.033	0.707***	1				
5. Community Cohesion	3.672	0.801	-0.022	-0.063	0.513***	0.557***	1			
6. Work Engagement	4.367	0.700	-0.144*	-0.030	0.732***	0.686***	0.458***	1		
7. Occupational Identity	4.097	0.620	-0.094	-0.015	0.871***	0.884***	0.746***	0.860***	1	
8. Resilience	3.878	0.783	-0.038	0.009	0.551***	0.657***	0.522***	0.580***	0.689***	1

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Independent-Samples T-Test result

Table 22
Independent-Samples T-Test

		Levene's Test		t-test for Means						
		F	Sig.	t	df	Sig. (2-tailed)	Avg. Diff.	SE Diff.	95% CI for Diff.	
									LL	UL
II-01	Equal Variances Assumed	28.889	.000	9.944	169	.000	1.253	.126	1.004	1.501
	Unequal Variances			9.977	130.207	.000	1.253	.126	1.004	1.501
II-02	Equal Variances Assumed	57.341	.000	11.275	169	.000	1.451	.129	1.197	1.705
	Unequal Variances			11.320	116.174	.000	1.451	.128	1.197	1.705
II-03	Equal Variances Assumed	71.998	.000	10.731	169	.000	1.289	.120	1.052	1.526
	Unequal Variances			10.781	105.247	.000	1.289	.120	1.052	1.526
II-04	Equal Variances Assumed	43.241	.000	10.596	169	.000	1.265	.119	1.029	1.501
	Unequal Variances			10.634	123.586	.000	1.265	.119	1.030	1.501
II-05	Equal Variances Assumed	79.558	.000	12.707	169	.000	1.533	.121	1.295	1.771
	Unequal Variances			12.767	103.658	.000	1.533	.120	1.295	1.771
II-07	Equal Variances Assumed	44.136	.000	11.645	169	.000	1.311	.113	1.089	1.534
	Unequal Variances			11.692	115.753	.000	1.311	.112	1.089	1.534
II-08	Equal Variances Assumed	19.967	.000	10.605	169	.000	1.113	.105	.906	1.321
	Unequal Variances			10.639	131.005	.000	1.113	.105	.906	1.320

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II-09	Equal Variances Assumed	55.663	.000	13.207	169	.000	1.417	.107	1.205	1.628
	Unequal Variances			13.262	114.403	.000	1.417	.107	1.205	1.628
II-10	Equal Variances Assumed	12.652	.000	9.697	169	.000	1.009	.104	.803	1.214
	Unequal Variances			9.728	131.925	.000	1.009	.104	.804	1.214
II-11	Equal Variances Assumed	12.897	.000	11.662	169	.000	1.229	.105	1.021	1.437
	Unequal Variances			11.690	144.873	.000	1.229	.105	1.021	1.436
II-12	Equal Variances Assumed	4.048	.046	13.010	169	.000	1.715	.132	1.454	1.975
	Unequal Variances			13.029	160.354	.000	1.715	.132	1.455	1.975
II-13	Equal Variances Assumed	6.934	.009	10.669	169	.000	1.400	.131	1.141	1.659
	Unequal Variances			10.687	157.563	.000	1.400	.131	1.141	1.659
II-14	Equal Variances Assumed	8.244	.005	13.123	169	.000	1.643	.125	1.396	1.891
	Unequal Variances			13.141	160.656	.000	1.643	.125	1.396	1.890
II-18	Equal Variances Assumed	51.149	.000	8.952	169	.000	1.034	.116	.806	1.263
	Unequal Variances			9.001	90.376	.000	1.034	.115	.806	1.263
II-19	Equal Variances Assumed	86.869	.000	13.811	169	.000	1.604	.116	1.374	1.833
	Unequal Variances			13.881	98.891	.000	1.604	.116	1.374	1.833
II-20	Equal Variances Assumed	31.163	.000	9.487	169	.000	1.011	.107	.800	1.221
	Unequal Variances			9.536	97.622	.000	1.011	.106	.800	1.221
II-21	Equal Variances Assumed	111.182	.000	11.570	169	.000	1.302	.113	1.080	1.524
	Unequal Variances			11.637	86.900	.000	1.302	.112	1.080	1.525
II-22	Equal Variances Assumed	107.845	.000	13.480	169	.000	1.430	.106	1.220	1.639
	Unequal Variances			13.552	93.541	.000	1.430	.105	1.220	1.639
OI-01	Equal Variances Assumed	90.211	.000	12.511	169	.000	1.418	.113	1.194	1.641

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	Unequal Variances			12.574	99.635	.000	1.418	.113	1.194	1.641
OI-02	Equal Variances Assumed	66.397	.000	10.720	169	.000	1.301	.121	1.061	1.540
	Unequal Variances			10.768	108.759	.000	1.301	.121	1.061	1.540
OI-03	Equal Variances Assumed	48.995	.000	12.002	169	.000	1.324	.110	1.106	1.541
	Unequal Variances			12.050	117.628	.000	1.324	.110	1.106	1.541
OI-04	Equal Variances Assumed	69.097	.000	11.703	169	.000	1.393	.119	1.158	1.628
	Unequal Variances			11.754	110.997	.000	1.393	.119	1.158	1.628
OI-05	Equal Variances Assumed	27.542	.000	9.065	169	.000	1.045	.115	.817	1.272
	Unequal Variances			9.103	113.127	.000	1.045	.115	.817	1.272
OI-06	Equal Variances Assumed	24.536	.000	13.450	169	.000	1.381	.103	1.178	1.583
	Unequal Variances			13.495	128.900	.000	1.381	.102	1.178	1.583
OI-07	Equal Variances Assumed	25.853	.000	11.865	169	.000	1.334	.112	1.112	1.556
	Unequal Variances			11.900	136.658	.000	1.334	.112	1.112	1.556
OI-08	Equal Variances Assumed	20.961	.000	12.636	169	.000	1.449	.115	1.223	1.676
	Unequal Variances			12.677	131.360	.000	1.449	.114	1.223	1.676
OI-09	Equal Variances Assumed	9.695	.002	13.493	169	.000	1.472	.109	1.257	1.687
	Unequal Variances			13.534	134.001	.000	1.472	.109	1.257	1.687
OI-10	Equal Variances Assumed	.549	.460	12.454	169	.000	1.423	.114	1.198	1.649
	Unequal Variances			12.477	155.330	.000	1.423	.114	1.198	1.649
OI-11	Equal Variances Assumed	.008	.930	11.586	169	.000	1.296	.112	1.075	1.516
	Unequal Variances			11.598	164.302	.000	1.296	.112	1.075	1.516
OI-13	Equal Variances Assumed	.064	.800	10.929	169	.000	1.318	.121	1.080	1.556
	Unequal Variances			10.940	164.674	.000	1.318	.120	1.080	1.556

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OI-14	Equal Variances Assumed	1.224	.270	12.824	169	.000	1.631	.127	1.380	1.883
	Unequal Variances			12.834	166.337	.000	1.631	.127	1.380	1.882
OI-18	Equal Variances Assumed	26.521	.000	10.841	169	.000	1.218	.112	.997	1.440
	Unequal Variances			10.873	135.290	.000	1.218	.112	.997	1.440
OI-19	Equal Variances Assumed	37.045	.000	8.748	169	.000	.953	.109	.738	1.168
	Unequal Variances			8.794	95.073	.000	.953	.108	.738	1.168
OI-20	Equal Variances Assumed	61.342	.000	11.090	169	.000	1.266	.114	1.041	1.491
	Unequal Variances			11.142	104.433	.000	1.266	.114	1.041	1.491
OI-22	Equal Variances Assumed	77.912	.000	13.606	169	.000	1.394	.102	1.192	1.597
	Unequal Variances			13.673	100.943	.000	1.394	.102	1.192	1.597
OI-23	Equal Variances Assumed	65.073	.000	11.836	169	.000	1.278	.108	1.065	1.491
	Unequal Variances			11.895	99.255	.000	1.278	.107	1.065	1.491

Notes. Levene's Test = Levene's Test for Equality of Variances; Sig. = Significance; df = Degree of Freedom; Sig. (2-tailed) = Significance (Two-Tailed); Avg. Diff. = Average Difference; SE Diff. = Standard Error of the Difference; LL = Lower Limit; UL = Upper Limit; 95% CI for Diff. = 95% Confidence Interval for Difference; t-test for Means = t-test for Equality of Means;

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