

# Construction of the Structural Model and Questionnaire Compilation for Professional Identity of Normal Students in Vocational Education

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**Abstract**—Teacher professional identity serves as a driving force for the professional growth of normal students in vocational education and is a crucial factor in ensuring the steady development of the vocational education teaching workforce. To develop a suitable questionnaire for assessing the professional identity of normal students in vocational education, a systematic analysis of existing literature on teacher professional identity was conducted. Drawing from the perspectives of "cognition-emotion-behavior," a theoretical framework for teacher professional identity was constructed, encompassing " professional cognition (professional role identity, occupational value identity) - professional emotion (professional belonging, professional efficacy) - professional behavior tendency (professional preparation behavior)." Following three rounds of questionnaire tests, the valid questionnaire data underwent mathematical statistics analysis including item analysis, exploratory factor analysis, confirmatory factor analysis, and correlation analysis. Through these analyses, the questionnaire items were refined, and the structure of teacher professional identity was validated. The research findings demonstrate that the measurement structure of the questionnaire on teacher professional identity for normal students in vocational education is reasonable, exhibiting validity and reliability that meet the standards of psychological measurement. This questionnaire serves as a reliable and effective tool for psychological assessment.

**Keywords**- teacher professional identity; normal students; vocational education; structural equation modeling

## 1. Introduction

In simpler terms, teacher professional identity involves contemplating and interpreting questions such as "What kind of teacher should I be?" and "How should I develop as a teacher?" (Beijaar, Meije & Verloo, 2004)<sup>[1]</sup>. As a normal student of vocational education, the developmental direction is to become a master teacher, which requires not only the development of craftsmanship skills but also the cultivation of qualities related to education and nurturing. Therefore, compared to regular normal students, normal students in vocational education need to balance the requirements of being a teacher and a vocational expert in their

professional growth. This group's understanding of the teaching profession should be more comprehensive. Based on the characteristics of normal students in vocational education as a group, this research aims to clarify the connotation elements and main characteristics of their professional identity and attempts to construct a structural model for normal students in vocational education' professional identity. This will provide a realistic basis for scientifically planning the professional development of normal students in vocational education and empower them to achieve high-quality growth.

## **2. MEASUREMENT MODEL ASSUMPTIONS FOR PROFESSIONAL IDENTITY OF NORMAL STUDENTS IN VOCATIONAL EDUCATION**

Teacher professional identity falls within the realm of vocational identity possesses intrinsic attributes associated with it. Professional identity is defined as "a relatively stable and enduring combination of attributes, beliefs, values, motives, and experiences through which individuals define their professional roles" (Ibarra, 1999)<sup>[2]</sup>.

Professional identity is highly malleable and can be shaped through engagement in profession-related activities or through interactions within the professional environment. Similarly, Chinese scholar Jiang Lin (2018)<sup>[3]</sup> views professional identity as a complex process in which "individuals continually assess whether they share an identity with a particular profession." It is a dynamic process that undergoes changes over time due to the joint influence of internal and external factor. Taking a comprehensive view of the research findings from domestic and international scholars, the meaning of teacher professional identity aligns fundamentally with the concept of vocational identity. It encompasses both outcome-oriented and process-oriented features. The outcome-oriented aspect is manifested in the cognitive assessment of personal perception towards the value of teaching profession, the sense of belonging to the teaching profession, and the experiential behavior devoted to the teaching profession. The process-oriented characteristic emphasizes the dynamic growth that occurs through the continuous interaction between the individual and the teaching profession. For example, some authors argue that teacher professional identity is both a relatively stable outcome and an ever-changing, positive, and ongoing process. It changes over time under the influence of personal and environmental factors. It is influenced not only by internal factors such as personal characteristics, learning history, past experiences, and beliefs of teachers but also by external factors such as professional background, mentor's knowledge and skills and educational attitudes, learning feedback, and school support<sup>[4] [5] [6]</sup> (Pille, Brok & Beijaard, 2013; Olsen, 2010; Michalinos Zembylas, 2003). Qoyyimah (2020)<sup>[7]</sup> propose that teacher professional identity refers to how teachers define their professional roles, indicating their level of intention to teach and reflecting their understanding of "what makes a good teacher." It provides teachers with a framework to interpret and evaluate past experiences and establish concepts of "how to survive, act, and understand their profession and their position in society" . According to Xue Jianping (2018)<sup>[8]</sup>, professional identity is a process involving the learning, establishment, and development of the teacher's role from a dynamic perspective. From a static perspective, it refers to the cognition, emotion, will, expectations, values, and professional behavior tendency of teachers toward their profession.

While scholars have different conclusions regarding the structure of professional identity, a careful examination reveals that previous research typically constructs the psychological structure of professional identity based on the perspectives of cognition, emotion, and behavior tendencies. This aligns with the conceptual definition of normal students in vocational education. Therefore, this study employs a three-dimensional perspective of "cognition-emotion-behavior" to analyze the key components of teacher professional identity. The proposed structural hypothesis of professional identity for normal students in vocational education, which consists of " professional cognition (professional role identity, professional value identity), professional emotion (professional belonging, professional efficacy) and professional behavior tendency (professional preparation behavior)."

### **3.QUESTIONNAIRE COMPILATION AND TESTING**

This study focuses on investigating the professional identity of undergraduate normal students in vocational education. Based on the objectives of their training and the current employment situation, the survey specifically targets vocational teachers in secondary vocational colleges. The initial questionnaire items were primarily derived from the Professional Standards for Teachers in Secondary Vocational Schools (Trial Implementation), Jiang Lin's Questionnaire on the Degree of Professional Identity Among College Students, Wei Shuhua's Teacher Professional Identity Scale<sup>[9]</sup>, and Li Xiaoying's Measurement Scale for Teacher Professional Identity<sup>[10]</sup>. The initial questionnaire is divided into three parts: basic information, 32 items related to teacher professional identity. Specifically, 6 items related to professional role identity (Code RI1-RI6), 6 items related to professional value identity (Code VI1-VI6), 8 items related to a sense of professional belonging (Code PB1-PB8), 5 items related to a sense of professional efficacy (Code PE1-PE5), 7 items related to professional preparation behavior (Code PPB1-PPB6).

The study comprised three rounds of testing and involved normal students in vocational education from six different majors at a specific undergraduate institution. The testing covered the third and fourth years of college. In the first round, we conducted a survey on 350 normal student and obtained 311 valid questionnaires. SPSS software was used to conduct item analysis and exploratory factor analysis. In the second round, we conducted a survey on 1157 normal student and obtained 1020 valid questionnaires. The main analysis of the valid questionnaire data in this stage was focused on reliability and validity.

### **4.ANALYSIS OF PRE-RESEARCH RESULTS FOR THE QUESTIONNAIRE**

#### **4.1 Analysis of Pre-Research Results for the Questionnaire**

Item analysis is conducted to assess the appropriateness and discrimination of the questionnaire items. This process involves examining the differences in responses between participants with high and low scores on each item or conducting homogeneity tests among the items. The results serve as a basis for selecting or modifying individual items (Wu, 2010)<sup>[11]</sup>. To ensure the rigor of the item analysis results, this study employed the critical ratio method and homogeneity test.

The critical ratio method used independent sample t-tests to evaluate the differences in item responses between the high-scoring group (top 27% in overall teacher professional identity scores) and the low-scoring group (bottom 27% in overall teacher professional identity scores). Items with average differences between the groups that did not reach a significance level of 0.05 and had critical ratios below 3.000 were excluded. The homogeneity test involved calculating the correlation coefficient matrix between the total teacher professional identity score and the scores of individual items. Items with correlation coefficients higher than 0.4 were considered to have good discriminant validity and were retained, while those below this threshold were eliminated. Based on the comprehensive project analysis, the items JS4, GS1, and GS3 were deleted, and the questionnaire items were reduced from 32 to 29.

#### 4.2 Exploratory Factor Analysis

Exploratory Factor Analysis aims to uncover the latent structure of the questionnaire and examine the validity of the measurement structure assumptions for professional identity of normal students in vocational education. After calculation, The KMO value of this questionnaire is 0.934, And  $\chi^2$  value is 4887.820 ( $p=0.000<0.05$ ), reaching a significant level. Next, the principal component analysis and varimax-rotation method were employed to determine the factor structure and items associated with each factor in the professional identity questionnaire of the normal students in vocational education. The criteria for retaining common factors were: the number of factors conforming to scree test, factor eigenvalues greater than 1, at least 3 items included in each factor, item factor loadings greater than 0.5, and communality greater than 0.2. Based on the above criteria, factor analysis was conducted to further eliminate 4 items (JZ2, JZ3, GS2, XW3), leaving 25 items.

Through exploratory factor analysis, it can be seen that the cumulative explanatory variance of public factors extracted from this questionnaire accounts for 64.88% of the total variance. This data is greater than 50%, meeting the minimum requirement of the percentage of variance determination method. The components extracted from the research can basically reflect the potential characteristics of professional identity of normal students in vocational education. After exploratory factor analysis, it was found that the questionnaire structure of the professional identity of normal students in vocational education is consistent with the research hypothesis. The results are shown in Table 1.

**Table 1.** Exploratory Factor Analysis Results of the Professional Identity Questionnaire of Normal Students in Vocational Education

Items	Component				
	1	2	3	4	5
<b>PPB7: Even when facing difficulties and challenges in preparing for vocational teacher positions, I believe I am willing to persevere.</b>	.750				
<b>PPB5: I actively seek opportunities for interviews for vocational teacher positions.</b>	.744				
<b>PPB1: I make plans and preparations for becoming a vocational teacher.</b>	.724				

<b>PPB2: Besides studying my major courses, I proactively learn professional knowledge related to vocational education.</b>	.665				
<b>PPB4: I continuously enhance my professional competence according to the requirements of the <i>Professional Standards for Secondary Vocational School Teachers</i>.</b>	.650				
<b>PPB6: I frequently exchange experiences of job-seeking for vocational teaching with people around me.</b>	.627				
<b>PE3: I believe I have a good understanding of professional knowledge and pedagogical knowledge.</b>		.826			
<b>PE4: I believe I have good mastery of teaching skills.</b>		.788			
<b>PE1: I have confidence in my ability to perform well as a vocational teacher.</b>		.768			
<b>PE2: I believe my personality, knowledge, and abilities are suitable for being a vocational teacher.</b>		.741			
<b>PE5: When dealing with teaching-related tasks or competitions, I usually display self-confidence.</b>		.721			
<b>RI1: I believe vocational teachers should possess good professional ethics.</b>			.837		
<b>RI2: I believe vocational teachers should have systematic professional knowledge and skills.</b>			.829		
<b>RI3: I believe vocational teachers play a crucial role in students' healthy growth.</b>			.662		
<b>RI6: I am willing to shoulder the responsibilities and obligations of a vocational teacher.</b>			.629		
<b>RI5: I can understand and internalize the values and practice guideline of the vocational teaching profession.</b>			.613		
<b>PB8: When someone unjustly criticizes the vocational teacher community, I feel personally insulted.</b>				.812	
<b>PB4: When others discuss topics related to vocational teachers, I feel it is relevant to me.</b>				.700	
<b>PB5: I am concerned about the development trends of the vocational teaching profession.</b>				.683	
<b>PB6: I am willing to communicate and engage with teachers from vocational schools.</b>				.554	
<b>PB7: I feel a strong connection to vocational education.</b>				.546	

<b>VI6: I believe the work of vocational teachers is crucial for promoting societal development.</b>					.833
<b>VI5: I believe the work of vocational teachers is important for fostering students' growth and development.</b>					.624
<b>VII: I believe engaging in vocational education work can fulfill my value for life.</b>					.593
<b>VI4: I believe becoming a vocational teacher allows me to utilize my abilities and strengths.</b>					.527
<b>Eigenvalue</b>	4.138	3.818	3.210	2.903	2.152
<b>Cumulative Explanatory Variance (%)</b>	16.55	31.82	44.66	56.27	64.88

## 5.FORMAL CONFIRMATION OF THE QUESTIONNAIRE AND RESULTS ANALYSIS

### 5.1 Structure Validity Analysis

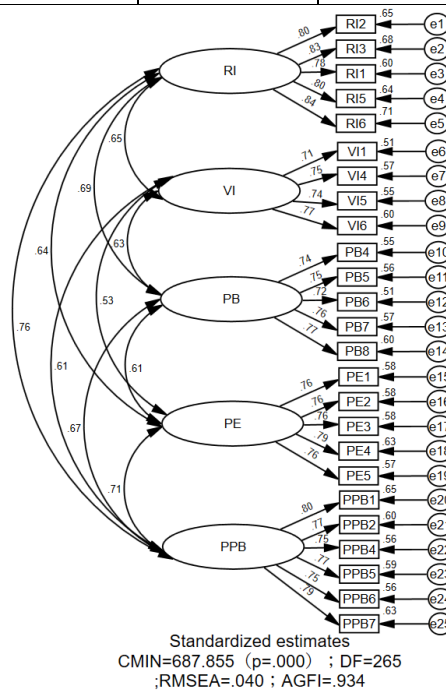
Through multiple attempts in exploratory factor analysis, the optimal factor structure for the Professional Identity Scale of normal students in vocational education has been determined. To further examine the alignment between the factor structure model of the scale and the actual test data, as well as the effectiveness of the five indicator variables in measuring teacher professional identity, the AMOS 26.0 software was used to perform confirmatory factor analysis. The sample data in the retest phase was found to conform to multivariate normality. Considering the random sampling method and the characteristics of the sample size in the study, the Maximum Likelihood method provided by the AMOS software was employed for model operation.

Based on the overall model fit test results, the absolute fit index, incremental fit index, and parsimonious fit index all exceed the acceptable fit criteria for the model. This indicates a strong fit between the hypothetical theoretical model and the actual data, demonstrating favorable external structural quality and high construct validity. After calculation, the combined reliability of the five potential variables of professional role identity, professional value identity, professional belonging, professional efficacy, and professional behavior tendency is 0.905, 0.833, 0.864, 0.877, and 0.899 (all higher than the standard level of 0.6). And the average variance sampling quantity is 0.656, 0.555, 0.559, 0.588, and 0.597 (all higher than the strict standard level of 0.5), all of which meet the standards of education Surveying. The results are shown in Table 2. The internal structure quality of the hypothetical theoretical model is considered ideal, as the observed variables effectively reflect the latent variable traits, and there is a significant and moderate to high correlation among the observed variables under the latent variables. Looking from another perspective, the measurement structure model of the professional identity of normal students in vocational education, as illustrated in Figure 1, reveals correlation coefficients between the five latent variables ranging from 0.53 to 0.76, all of which reach statistical significance. This suggests a significant and moderate to high covariance relationship among the five factors, further confirming the reasonable establishment

of the factor structure model for the professional identity of normal students in vocational education.

**Table 2.** Fitting Indicators for Confirmatory Factor Analysis

index		acceptable fit criteria	the Professional Identity Questionnaire of Normal Students in Vocational Education
absolute fit index	GFI	>.90	.946
	AGFI	>.90	.934
	RMSEA	<.08	.040
incremental fit index	NFI	>.90	.955
	IFI	>.90	.972
	TLI	>.90	.968
	CFI	>.90	.972
parsimonious fit index	PGFI	>.50	.771
	PNFI	>.50	.844
	PCFI	>.50	.858
	$\chi^2/df$	<3.00	2.604



**Figure 1.** Measurement Structure Model of the Professional Identity of Normal Students in Vocational Education

## 5.2 Reliability Analysis

In this study, the Cronbach's alpha coefficient was computed for both the total questionnaire and its various dimensions using data from the retest sample (n=1020) (Cronbach's alpha ranges from 0 to 1, with 0.7 generally considered an acceptable threshold, and values closer to 1 indicate better reliability). Additionally, split-half reliability and retest reliability (n=275) were calculated to assess the stability of the questionnaire. The Cronbach's alpha coefficient of the total questionnaire is 0.938, and the Cronbach's alpha coefficients at all levels of the questionnaire are between 0.823 and 0.898. The teacher professional identity questionnaire and its various dimensions for normal students in vocational education exhibited excellent internal consistency, indicating ideal reliability. During the retest, the total questionnaire demonstrated a retest reliability of 0.931, while the retest reliabilities of the questionnaire's different dimensions ranged from 0.830 to 0.891. The results are shown in Table 3. This indicates that the stability and consistency of both the total questionnaire and its dimensions meet the statistical requirements.

**Table 3.** Reliability Analysis Results of the Professional Identity Questionnaire of Normal Students in Vocational Education

	<b>Cronbach's alpha coefficient</b>	<b>split-half reliability</b>	<b>retest reliability</b>
professional role identity	.823	.779	.880
professional value identity	.891	.782	.830
professional belonging	.863	.855	.849
professional efficacy	.876	.841	.891
Professional behavior tendency	.898	.902	.865
teacher professional identity	.938	.885	.931

## 6. DISCUSSION AND CONCLUSION

Based on a comparison with previous research, it is observed that the professional identity structural elements of normal students in vocational education exhibit both universality and distinctiveness compared to general normal students or teachers. Overall, these five fundamental elements effectively capture and depict various aspects of professional identity for normal students in vocational education. They are in line with the integrated structure of cognition, emotion, and behavior tendency proposed by Li Xiaoying and are also consistent with other views on teacher professional identity structure, such as Wei Shuhua's four-factor professional identity structure, Sun Li's three-tier structure of professional identity, and Jin Zhezhu's seven-dimensional professional identity structure.

Specifically, let's first focus on the cognitive aspect. Cognition serves as the guiding force for emotions and the starting point for behaviors. Therefore, for individuals to identify with a specific profession and assess the similarity and degree they have with that profession, it is crucial for them to understand and comprehend the profession, as well as establish a clear professional identity at the cognitive level (Meijers, 1998; Fugate, 2004; Liu, 2014) <sup>[12]</sup> <sup>[13]</sup> <sup>[14]</sup>. Normal students in vocational education are generally considered as the reserve force of



vocational college teachers. This implies that normal students in vocational education need to understand the role positioning and professional value associated with vocational college teaching. Vocational college teachers are required to fulfill dual roles as teachers and mentors, balancing the task of imparting theoretical knowledge and practical skills. Consequently, normal students in vocational education not only need to develop into high-quality teaching professionals but also need to cultivate their technical skills as highly competent individuals. Therefore, normal students in vocational education have distinct perceptions and interpretations of their own teacher professional identity, which adds to the uniqueness of their professional identity.

Moving on to the emotional aspect, professional identity is subjectively expressed as a positive emotional experience. From a psychological perspective, teacher professional identity possesses a certain level of implicitness. It represents the self-judgment of normal students based on their internal scale. Therefore, emotional identity with the profession is an essential structural factor in studying teacher professional identity. Rough statistics show that professional emotions constitute the highest proportion and the most representative element among the dimensions of teacher professional identity structure studied in academia (Xue, 2018). However, normal students in vocational education are still considered "pre-service teachers" and lack real-life professional contexts, which may result in less intense emotional experiences regarding the teaching profession compared to in-service teachers. Therefore, in this study, the focus is on exploring professional belonging and professional efficacy, connecting them with familiar contexts for normal students in vocational education. This approach enables them to consider questions such as "Do they like and care about the profession of vocational college teaching? Do they have a sense of belonging?" and "Based on their actual circumstances, can they predict their suitability for the profession of vocational college teaching?" The aim is to provide authentic feedback on normal students' occupational emotions.

Lastly, at the level of professional behavior tendency when professional identity is internalized, it inevitably manifests in related professional behaviors, reflecting changes in the subject's relevant professional behaviors. Professional behavior tendency is formed under the internal drive of vocational cognition and occupational emotions. These three aspects are harmonious and mutually reinforcing. The professional identity of normal students in vocational education demonstrates a strong future orientation, and their behavioral manifestations primarily revolve around preparing and planning for future careers in vocational college teaching. Therefore, this study specifically focuses on the expression of professional behavior tendency through career preparation behaviors. These behaviors encompass normal students' job-seeking activities, preparations for job applications, and their continuous efforts to enhance their professional abilities based on the ideal teacher role.

In conclusion, the validity and reliability of the questionnaire on teacher professional identity among normal students in vocational education meet the standards of psychometrics, providing a valuable assessment tool for research on teacher professional identity among this group of normal students.

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