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## The impact of vocational college students' professional identity on academic achievement: Self-efficacy as a mediator

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### Abstract

To understand the current situation of the academic achievement of Chinese vocational college students in China. A questionnaire survey was conducted among 1560 students; the University Student Professional Identity Scale, General Self-Efficacy Scale, and Academic Achievement Scale were used as research tools. The responses were recorded using 5-point Likert-type scales. Propose research hypotheses based on structural models. We tested reliability and validity, difference analyses, correlation analyses, regression analyses, and mesomeric effect analysis. There are significant differences in academic achievement among students of different grades, but there is no significant difference in academic achievement among student cadres. The professional identity of vocational college students is significantly and positively predicted academic achievement; self-efficacy partially mediates between professional identity and academic achievement. Professional identity of vocational college students significantly and positively predicted. Academic achievement: self-efficacy partially mediates between professional identity and academic achievement. (1) There is a certain imbalance in the subjects and majors of the study in terms of gender; (2) The exploration of this study is mainly quantitative research, lacking qualitative research; (3) Due to the limitations of research time and method, this study only investigated the real situation for a certain period and lacked the process of long-term follow-up research. University administrators and professional teachers should improve the professional identity of vocational college students to enhance their self-efficacy, promote their academic achievement development, and enhance the vocational, educational, and technical nature of vocational education.

**Keywords:** Academic achievements, College entrance examination, Professional identity, Self-efficacy, Vocational college students, Vocational education.

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**Transparency:** The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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## 1. Introduction

With the popularization of higher education, China has built the largest higher education system in the world. Vocational college education plays a crucial role in the education industry. However, Chinese parents have an incorrect understanding of higher vocational education, believing that the higher vocational education is low-level education. Only by understanding the needs of social development and the future of higher vocational education could we promote the students' academic achievement, and enhance the vocational, educational, and technical nature of vocational education.

Vocational college students are prospective candidates for a particular vocational position in the future, and they must master excellent vocational skills to become a new force in all walks of life. Vocational college students typically possess a comparatively limited cultural knowledge base, necessitating their completion of the admission requirements of conventional undergraduate institutions. They differ from vocational and vocational high school students, with relatively poor hands-on ability and professional skills, severe learning difficulties, and a tendency to develop a sense of inferiority complex. For vocational college students, their parents, teachers, and students are concerned about their academic achievement.

Academic achievement is a direct reflection of students' learning effects in higher education institutions, and it is an effective indicator to evaluate the effectiveness of teaching and education in higher education. We can improve students' academic achievement scientifically and reasonably by identifying their major, enhancing their sense of self-efficacy, and influencing their academic emotions. A rational and correct understanding of academic achievements has essential practical and theoretical significance. This requires us to know which factors can affect students' academic achievement, how these factors affect academic achievement, and how to cultivate students to master vocational skills through these factors.

In 2022, with the reform of the college entrance examination, provinces adopting the "3+3" model: Beijing, Shanghai, Shandong, Zhejiang, Hainan, Tianjin; provinces adopting the "3+1+2" model: Liaoning, Fujian, Hubei, Hunan, Jiangsu, Guangdong, Hebei, Chongqing. With enrollment expansion in Chinese universities, the requirements for university majors are increasing. The classification of disciplines is becoming more detailed, and specialization is becoming stronger. This requires us to understand the degree of professional identity of Chinese vocational college students and whether the professional identity between different disciplines is as imagined.

Self-efficacy is an individual's speculation and judgment about their ability to complete a specific behavior, significantly impacting the results of that behavior. When people confirm their ability to exhibit this behavior, they will develop a high sense of self-efficacy. For example, when students participate in classroom activities, they not only know that they are actively participating in classroom activities but also know that this behavior can help them achieve good grades and feel that they have the ability to understand the content taught by the teacher in class; only then can they listen attentively. Therefore, students' self-efficacy will also play a decisive role in their academic achievements during their school years.

Putting together the above overview and this study has important cognitive and guiding significance for looking at the relationship between professional identity, self-efficacy, and academic achievement, as well as the factors that affect their academic achievement from the point of view of vocational college students. It provides a reference basis for improving academic achievement and promoting the development of higher vocational education.

## 2. Literature Review

The introduction of vocational education majors in China is divided into three categories: secondary vocational education majors, higher vocational education specialty majors, and higher vocational education undergraduate majors, which revised in 2022.

**Table 1.**  
The introduction of vocational education majors.

Vocational education majors	Major categories	Number of majors
Secondary vocational education majors	19	361
Higher vocational education specialty majors	19	748
Higher vocational education undergraduate majors	19	273

It can be seen from [Table 1](#) that there are the same major categories in different vocational education majors, but the number of majors in higher vocational education specialty majors is higher than that in secondary vocational education majors and higher vocational education undergraduate majors.

There needs to be a unified theoretical concept and definition for the global study of professional identity. Most scholars have studied occupational recognition. [Holland \[1\]](#) pointed out that occupational recognition is an individual's cognitive state of their career interests, talents, and goals, and he believed that occupational recognition is relatively stable. [Salling Olesen \[2\]](#) defined professional identity as an individual's subjective feeling, which is the degree of consistency and balance that an individual feels in reality about the profession. According to [Qin \[3\]](#), professional identity is a dynamic process of acceptance and recognition of the profession, which is specifically manifested in the internal acceptance, recognition, and positive external behavior of the major in the learning process, accompanied by positive internal psychological emotions and a sense of appropriateness to the profession.

The concept of self-efficacy was first proposed by Bandura, an American social learning psychologist, in Social Cognitive Theory [\[4\]](#). Later, Bandura and his colleagues further refined the concept based on extensive experimental research, defining general self-efficacy as a general self-confidence that individuals have when challenged by new or

different environments and that can predict individual behavior in many different situations, and putting forward the self-efficacy theory.

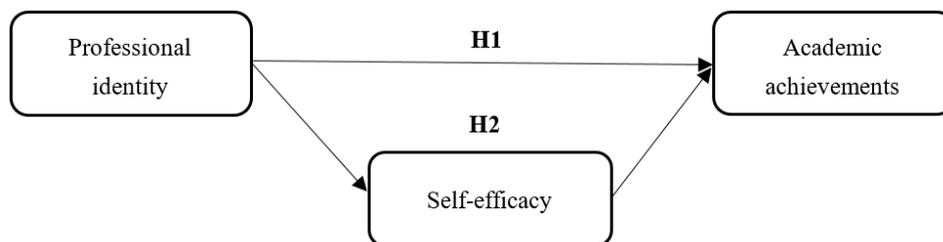
The concept of academic achievement can be traced back to 1966, when the American Council founded the Collaborative Institutional Research Program (CIRP) on Education. Zheng [5] proposed that academic achievement is learned through specific teaching or training and is a learning effect within a relatively straightforward and limited range. It is an important indicator for evaluating students' mastery of learning and can most directly reflect the extent to which students have mastered the curriculum. Over time, academic achievement becomes complex and dynamic, and academic achievement becomes a comprehensive concept divided into broad and narrow senses. Zheng [5] conceptual description of academic achievement is narrowly defined. Generally, Li, et al. [6] consider academic achievement a comprehensive quality and ability, which refers to the extensive development students acquire throughout the university stage. It includes both course learning achievements and various skills and abilities accumulated for a successful future career. Chen [7] pointed out that academic achievement refers to the comprehensive development of learners after a certain period of learning and training. Wang [8] considered academic achievement as a multidimensional concept that refers to the progress and improvement of various aspects of knowledge, ability, and quality acquired in a specific period.

In studying the relationship between professional identity and academic achievement, most scholars have an uneven understanding of professional identity. The research subjects are mostly professional workers. The research on higher vocational students' professional identity is still a scattered "point", but not a "surface", and especially the research related to other factors is even scarcer. Zhang and Cao [9] studied the impact of them from the perspective of business administration, marketing, and accounting; Li [10] conducted a questionnaire survey on 500 students from the standpoint of choosing professional volunteering to explore the correlation between professional identity and academic achievement of students with different skilled volunteering. The research showed that there are differences in professional identity among college students. The scores pertaining to each dimension, along with the scores related to academic achievement. Furthermore, there exists a notable positive association between professional identity and educational accomplishment. When studying the relationship between professional identity, self-efficacy, and academic achievement. Through Google Academic Search, we found a similar paper. He, et al. [11] aiming at undergraduates in applied psychology as the research object, adopted academic achievement points and major ranking as the measurement standards of academic achievement and studied the relationship among professional identity, self-efficacy, and academic achievement.

### 3. Methodology

#### 3.1. Research Design

According to the existing research results, with the theory of social cognition and the theory of self-efficacy, this study constructs a hypothesis model and puts forward the research hypothesis, as shown in Figure 1:



**Figure 1.**  
Research hypothesis framework.

*H<sub>1</sub>: Professional Identity of vocational college students can positively predict academic achievement.*

*H<sub>2</sub>: Partial mediating effect of self-efficacy of vocational college students between professional identity and academic achievement.*

#### 3.2. Sample and Data Collection

Data selection: The study used a random sampling method to select students from vocational colleges in four provinces of China, which are located in Shanghai, Guangdong, Chongqing Province, and Jiangsu Province. The four universities are all higher vocational colleges and face-to-face nationwide. Questionnaires were sent to 1560 students by email, and the teachers of the universities in their respective regions collected the questionnaires. All questionnaires were valid.

Among the 1560 student participants, 1363 (87.37%) were male students, and 197 (12.63%) were female students; among the majors, there were 1478 (94.74%) students majoring in science and engineering, 35 (2.24%) students majoring in economics and management, 20 (1.67%) students majoring in literature and history, and 14 (0.9%) students majoring in art.

Since the design data of this research is collected and processed anonymously, only used for research purposes, and does not involve serious ethics, after obtaining the approval of the institutional review board of the International College of Krirk University, the researchers obtained oral consent of school administrators, teachers, students, and their parents before conducting this research.

### **3.3. Research Instruments**

Academic achievement is a comprehensive quality or ability, which is the knowledge and ability that students have acquired through learning and training throughout their university years. It includes both the academic achievement during the school period and the abilities acquired during this period. From the perspective of students in higher vocational colleges, academic achievement places greater emphasis on the cultivation of professional knowledge and skills, enabling students to acquire the professional knowledge and abilities needed to engage in professional skills. This paper focuses on the embodiment of professional competencies acquired by vocational college students at the university level without considering objective academic performance. This study measures academic achievement using the "College Student Academic Achievement Scale" developed by Li, et al. [6], divided into four dimensions of interpersonal promotion, learning cognitive ability and communication ability and self-management ability, with a total of 19 items using 5-point Likert-type scales.

Professional identity is a dynamic process of accepting and recognizing the profession, which involves the recognition, understanding, and acceptance of the profession. It is manifested in the internal acceptance, recognition, and positive external behavior of the profession studied during the learning process, accompanied by positive psychological emotions and a sense of suitability for the profession. The measurement of professional identity is based on the "Professional Identity Questionnaire for College Students" compiled by Qin Panbo, divided into four dimensions.

Self-efficacy refers to the degree of confidence that people themselves can use the skills to complete a certain work behavior. It is the belief that individuals can organize and execute actions to achieve a specific achievement. The GSES developed by Schwarzer and Jerusalem [12] was used for the measurement of self-efficacy, with 10 items, using 5-point Likert-type scales.

All scales were scored on 5-point Likert-type scales, with 1 (very non-compliant), 2 (basically non-compliant), 3 (uncertain), 4 (basically compliant), and 5 (very compliant).

### **3.4. Analytical Method**

Statistical Product Service Solutions (SPSS) 22.0 and Analysis of Moment Structure (AMOS) 24 were used to verify the reliability and validity of the collected scale data and used a structural equation model to test the normal distribution of sample data.

## **4. Results**

### **4.1. Descriptive Analysis**

#### **4.1.1. Normal Distribution Test**

The research model can be tested and analyzed with structural equations or not, on the premise that the sample data show a normal distribution. The test for normality of the sample data includes mean, standard deviation, skewness, and kurtosis, and the theoretical median of the mean is 3. According to Kline [13], if the absolute value of the kurtosis coefficient of each variable is less than or equal to 8, and the absolute value of the skewness coefficient is not greater than 3, then the sample distribution follows a normal distribution.

In this paper, SPSS22.0 is used to calculate the mean value of each item of professional identity in the range of 3.721 to 4.261; the mean value of each item of self-efficacy was in the range of 3.978 to 4.235; the mean value of the academic achievement items ranged from 3.555 to 4.067. The absolute values of the peak of each variable were within the range of 0.006 to 3.105, and the absolute values of skewness were in the range of 0.285 to 1.607, indicating that the sample data follows a normal distribution.

#### **4.1.2. Reliability Analysis**

The reliability analysis of the sample data showed that the Composite Reliability (CR) values of the four dimensions of cognitive, affective, behavioral, and appropriateness for professional identity variables were 0.950, 0.954, 0.946, and 0.950, respectively; the CR value of the self-efficacy variable was 0.965; and the CR values of the four dimensions of academic achievement variables, namely interpersonal promotion, learning cognitive ability, communication ability, and self-management ability, were 0.870, 0.867, 0.869, and 0.873, respectively.

The CR values for each dimension of the three variables were larger than the good judgment criterion of 0.6 [14, 15], indicating that the overall reliability and internal consistency of the question items were high.

#### **4.1.3. Differential Validity Test**

The discriminant validity of the sample data was within the range of 0.338-0.909 for the professional identity variable and 0.096-0.788 for the academic achievement variable. The square root value of AVE for each dimension of the variable is greater than the phase relation value of its row and column, indicating that the measurement has good discriminative validity.

#### **4.1.4. Aggregation Effect**

Perform aggregation effect analysis on the sample data, and the average variance extraction (AVE) for the four dimensions of professional identity variables was 0.791, 0.723, 0.745, and 0.827, respectively; the average variance extraction (AVE) of self-efficacy was 0.733; the average extraction of variance (AVE) for the four dimensions of academic achievement variables: interpersonal facilitation, learning cognitive ability, communication ability, and self-management

ability was 0.574, 0.621, 0.571, and 0.584, respectively; the average variance extracted for each dimension of the three variables was greater than the good judgment criterion of 0.5 [15], which showed good convergent validity.

4.1.5. Fitness Test

AMOS24.0 was used to test the fitness of structural equation with Maximum likelihood estimation method.

**Table 2.**  
Adaptability indicators for professional identity measurement.

X <sup>2</sup>	DF	X <sup>2</sup> /DF	GFI	AGFI	NFI	IFI	CFI	RMSEA
1021.225	224	4.559	0.944	0.932	0.972	0.978	0.978	0.048

**Note:** DF: Degree of freedom, GFI: Goodness-of-fit index, AGFI: Adjusted goodness-of-fit index, NFI: Normed fit index, IFI: Incremental fit index, CFI: Comparative fit index.

From Table 2, the fitting effect of the measurement model is ideal for all fitness indicators. X2/DF = 4.559, which is lower than the upper limit of 5. The values of GFI, AGFI, NFI, IFI, and CFI, are all above 0.9, and the value of Root Mean Square Error of Approximation (RMSEA) is 0.048, which is less than the maximum upper limit of 0.10, so it can be seen that the measurement model is effective.

**Table 3.**  
Adaptability indicators for self-efficacy measurement.

X <sup>2</sup>	DF	X <sup>2</sup> /DF	GFI	AGFI	NFI	IFI	CFI	RMSEA
126.023	30	4.201	0.984	0.970	0.993	0.995	0.995	0.045

From Table 3, the fitting effect of the measurement model is ideal for all fitness indicators. X2/DF = 4.201, which is less than the upper limit of 5. The values of GFI, AGFI, NFI, IFI, and CFI, are all higher than 0.9, and the value of RMSEA is 0.045, which is less than the maximum upper limit of 0.10, so it can be seen that the measurement model is effective.

**Table 4.**  
Adaptability indicators for academic achievement measurement.

X <sup>2</sup>	DF	X <sup>2</sup> /DF	GFI	AGFI	NFI	IFI	CFI	RMSEA
702.657	142	4.948	0.957	0.942	0.958	0.966	0.966	0.050

From Table 4, the fitting effect of the measurement model is ideal for all fitness indicators. X2/DF = 4.948, less than the upper limit of 5. The values of GFI, AGFI, NFI, IFI, and CFI, are all higher than 0.9, the value of RMSEA is 0.050, which is less than the maximum upper limit of 0.10, so it can be seen that the measurement model is effective.

4.2. Difference Analysis

4.2.1. Grade Difference in Academic Achievement

The results of comparing academic achievement and the differences in various variables at grade level through one-way ANOVA are shown in Table 5.

**Table 5.**  
Grade difference in academic achievement.

Dimension	Grade	Number	AVE	Standard deviation	F	P
Interpersonal facilitation	First year	832	3.768	0.673	2.250	0.106
	Second year	604	3.771	0.735		
	Third year	124	3.910	0.794		
Academic cognitive ability	First year	832	3.572	0.715	6.689	0.001
	Second year	604	3.695	0.783		
	Third year	124	3.762	0.757		
Communication skills	First year	832	3.939	0.874	2.204	0.111
	Second year	604	3.919	0.932		
	Third year	124	4.105	0.979		
Self-management ability	First year	832	3.695	0.793	5.993	0.003
	Second year	604	3.829	0.922		
	Third year	124	3.898	0.950		
Academic achievements	First year	832	3.752	0.514	6.777	0.001
	Second year	604	3.809	0.531		
	Third year	124	3.927	0.559		

As can be seen from Table 5, there was a significant difference in academic achievement, cognitive ability, and self-management ability among different grades (p < 0.05). The academic achievements of students in different grades are generally as follows: third year, second year, and first year, where academic achievements of the third and second year are higher than those of the first year; In terms of academic, cognitive ability, and self-management ability, the third year is

higher than the second and first years, while there is no significant difference in the terms of interpersonal facilitation and communication skills in grade, ( $p > 0.05$ ).

**Table 6.**  
The differences of student cadres or No.

Dimension	Student cadres or no	Number	AVE	Standard deviation	T	P
Interpersonal facilitation	Yes	514	3.823	0.734	1.680	0.093
	No	1046	3.759	0.695		
Academic cognitive ability	Yes	514	3.676	0.781	1.523	0.128
	No	1046	3.615	0.731		
Communication skills	Yes	514	4.007	0.925	1.908	0.057
	No	1046	3.914	0.895		
Self-management ability	Yes	514	3.713	0.935	-1.551	0.121
	No	1046	3.788	0.821		
Academic achievements	Yes	514	3.811	0.572	1.164	0.245
	No	1046	3.777	0.502		

#### 4.2.2. The Differences in Academic Achievements of “Student Cadres or No”

It can be seen from Table 6, the independent sample t-test was used to compare the differences in the scores of each variable on whether or not they were student cadres. After testing, there was no significant difference in the scores of each variable, ( $P > 0.05$ ).

### 4.3. Effect Analysis

#### 4.3.1. Correlation Analysis of Various Variables

In this study, Pearson correlation analysis was used to explore the relationship between professional identity, self-efficacy, and academic achievement among vocational college students.

**Table 7.**  
Correlation analysis between various variables.

Variables	PI	SE	AA
PI	1		
SE	0.573**	1	
AA	0.484**	0.456**	1

Note: \*\*. At the 0.01 level (two-tailed), the correlations were significant. PI: Professional identity; SE: Self-efficacy; AA: Academic achievement.

As can be seen from Table 7, the correlations between the variables were compared by Pearson product-difference correlation, and it was tested that there is a significant positive correlation between professional identity on self-efficacy  $p < 0.05$  and on academic achievement  $p < 0.05$ ; there is a significant positive correlation between self-efficacy and academic achievement ( $p < 0.05$ ). According to the correlation analysis results, there is a positive correlation between the three variables, assuming that H1 is valid.

#### 4.3.2. Regression Analysis of the Variables

On the basis of correlation analysis, this paper discusses whether there is a predictive effect between professional identity, self-efficacy, and academic achievement, regression analysis was used.

**Table 8.**  
Regressive analysis.

Variables	Academic achievement	
Professional identity	0.365***	-
Self-efficacy	-	0.259***
F	477.619	409.007

Note: \*\*\*. There was a significant positive impact.

It can be seen from Table 8, professional identity has a significant positive impact on academic achievement, with a regression coefficient of 0.365, significance  $P < 0.05$ ; Self-efficacy has a significant positive impact on academic achievement, with a regression coefficient of 0.259, significant.

#### 4.3.3. Mesomeric Effect Test

This study first conducted a correlation and regression analysis between professional identity, self-efficacy, and academic achievement. To further explore the relationship of them, mediation analysis is carried out by using the process plug-in in SPSS. The results are as follows:

**Table 9.**  
The mediating role of self-efficacy.

Model assumptions	Point estimation	Standard error	95%CI	
			LLCI	ULCI
Professional identity→Self-efficacy→Academic achievement	Main effect			
	0.3650	0.0167	0.3322	0.3977
	Direct effect			
	0.1997	0.0193	0.1618	0.2376
Indirect effect				
	0.0768	0.0177	0.0519	0.1029

Note: LLCI: Lower limit of confidence interval, ULCI: Upper limit of confidence interval.

In this study, in order to explore the mediating role of self-efficacy between professional identity and academic achievement, the Bootstrap method was used to conduct the mediation effect analysis. The number of Bootstraps was set at 5000. The process was used to conduct the mediation effect analysis. It can be seen from Table 9, the main effect of 95% CI (LLCI = 0.3322, ULCI = 0.3977) was significant, the point estimation was 0.3650, and Standard Error was 0.0167; the direct effect of 95% CI (LLCI = 0.1618, ULCI = 0.2376) is significant, the point estimation was 0.1997, and Standard Error was 0.0193; the indirect effect of 95% CI (LLCI = 0.0519, ULCI = 0.1029) is significant, the point estimation was 0.0768, and Standard Error was 0.0177. Therefore, there is some mesomeric effect, and H2 is assumed to be true.

## 5. Conclusions and Discussion

According to the research hypotheses and the analysis of the research results, the following conclusions are drawn: (1) Professional identity of Vocational college students has a significant positive impact on academic achievement; (2) The self-efficacy of vocational college students has a partial mediating effect between professional identity and academic achievement.

### 5.1. The relationship between Professional Identity and Academic Achievement

Professional identity of vocational college students has a significant positive impact on academic achievement, which is consistent with our hypothesis, and this result is consistent with previous research [16]. It can be seen that the higher professional identity of vocational college students, the better their academic achievements; The lower the degree of professional identity, the lower the academic achievement.

### 5.2. The Mediating Effect of Self-Efficacy

There is a partial mediating effect of self-efficacy of vocational college students between professional identity and academic achievement, which is consistent with our hypothesis and also with previous research [11]. The higher professional identity of vocational college students, the more they can stimulate their interest in learning, enhances their self-efficacy, and improves their academic achievements. When the vocational students' professional identity is low, their self-efficacy will also be affected, which will have a negative impact on academic achievement.

## 6. Recommendations

Based on the above, we can promote vocational college students' full engagement in learning by improving their professional identity, which translates into a good sense of self-efficacy, thereby achieving higher academic achievements. This research provides some reference for the development of academic achievement of vocational college students.

At the school level, we should strengthen the professional knowledge, strengthen the construction of professional standards for vocational colleges, create a "leading model" for the development of characteristic majors in vocational colleges, and cultivate high-quality skilled talents in all aspects and multiple forms. We should strengthen the participation of multiple entities, such as enterprises and research institutions, establish a foothold in local areas and connect with industries, and accurately create distinctive educational content. We should also consider issues from the perspective of students and enhance the academic nature of the development of higher vocational education.

From the perspective of education administrators, we should respect students' wishes, encourage students to choose their own majors, continue to carry out career planning guidance, focus on cultivating students' awareness of career development, invite outstanding graduates back to school for exchange meetings, and deepen students' professional awareness, and knowledge. We should also organize competitions to stimulate students' professional identity, improve their self-efficacy, promote students' academic achievement and development, and enhance the professionalism of vocational college education.

From the level of professional teachers, elaborate on the origin, current situation, and development prospects of the subject, stimulate students' interest in learning, cultivate students' professional identity, cultivate students' independent learning consciousness, cultivate skilled talents with comprehensive vocational ability and competent for a specific position suitable for social development; focus on theory to serve practice, focus on application technology, organize teaching contents around course in teaching, so that students should master the technical skills required by the profession, have handson solid ability, master the technical principles and operate skillfully, "promote teaching and learning by competition", organize professional skills competitions in various forms, stimulate students' professional identity and enhance students'

sense of self-efficacy, promote students' academic achievement development, and enhance the technical development of vocational college education.

At the level of students, they should enhance the interaction between peers, actively integrate into the learning environment of professional knowledge for their selected majors, actively participate in professional knowledge learning activities, stimulate their own learning interests, take the initiative to carry out social practice activities, enhance their professional identity, and promote the development of academic achievement.

## 7. Limitations

This study explores and analyzes the current situation and correlations of professional identity, self-efficacy, and academic achievement among vocational college students through quantitative analysis, but there are still shortcomings in the research:

(1) There is a certain imbalance in the subjects of the study in terms of gender, and in the selection of majors, the sample size of science and engineering majors is relatively large, while other majors are relatively small, and these factors may make the sample obtained less balanced, which may have some influence on the results.

(2) The study is mainly quantitative in its exploration and lacks qualitative research. The advantage of quantitative research is that statistical analysis can be used to process and analyze the data to obtain objective and accurate results, and large-scale investigations and experiments can be carried out with certain representativeness; however, this also tends to ignore the complexity and diversity behind the research, making it difficult to gain a deeper understanding of the meaning and motivation behind the research, and there are certain limitations.

(3) Due to the limitations of research time and method, this study only investigated the real situation for a certain period and lacked the process of long-term follow-up research; subsequent research time can be extended to continuously track the survey and explore its continuous development process, changes, and trend analysis.

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