

A Research on the Relationship between Teachers' Support and Students' Academic Achievement in Higher Vocational Colleges

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Abstract

This paper aims to explore teachers' support and students' academic achievements. Because students' academic achievements are related to the quality of higher education, however, not all students' academic achievements are invested in learning activities independently, and a big factor in learning gains is students' social support. With reference to previous studies and existing literature, This study selects teacher support as the independent variable, vocational students' academic achievements as the dependent variable, students' academic self-efficacy and learning engagement as the mediation variables to build a research model to explore the chain mediation effect of teacher support on academic achievement through academic self-efficacy and learning engagement. In this study, 414 vocational college students in Chongqing were investigated by questionnaire. The reliability and validity of the questionnaire were consistent with the academic level, and were statistically tested by SPSS 25.0; The results show that: 1. Teacher support positively predicts vocational students' academic achievements; 2. Teacher support can indirectly predict the academic achievements of higher vocational students through academic self-efficacy; 3. Teacher support can indirectly predict the academic achievements of higher vocational students through learning engagement; 4. Academic self-efficacy - learning engagement plays a chain mediation role between teacher support and academic achievement. Finally, based on the conclusions of the study, this study puts forward specific suggestions for future research.

Keywords: Academic achievements, Academic efficacy, Learning engagement, Teacher Support.

1. Introduction

Education is very important for a country's long-term development, and it is a powerful driving force for human society to move forward. Higher vocational education shoulders the responsibility of cultivating highly skilled and versatile talents for the country. With China's economic development entering the fast lane, the country's demand for highly skilled talents is increasing, and the enrollment of colleges and universities is increasing. Higher vocational education is facing good opportunities for development, but also very serious challenges.

Tam(2002)The fundamental problem of education quality lies in how to ensure students' learning gains and personal growth, and improving college students' academic achievement level is considered as an effective measure to ensure the quality of higher education in today's era. Higher vocational education teachers often encounter that some students cannot achieve ideal academic results due to insufficient self-efficacy, lack of energy and other factor and The development of higher vocational education is hindered (Yu, 2019). In the current process of education management, students have low participation in learning and poor enthusiasm for learning, which makes it difficult for students to obtain direct emotional experience from learning, affecting students' enthusiasm and initiative in academic achievements. (Ma, 2018). Therefore, exploring the academic achievements and their influencing factors of higher vocational students and improving their core literacy level has always been one of the focuses of the education and psychology circles.

In recent years, a large number of empirical studies based on the theory of self-determination have found that self supporting teaching style can significantly and positively predict students' academic achievements. Most previous studies found that there was a significant positive correlation between teacher support and students' academic achievements (Chen Yanlei, &Guo Shaoyang, 2016), but some studies did not find a significant correlation between themSchuitema, Peetsma, & van der Veen(2016), which made the relationship between the two uncertain. It is worth further analyzing how much teacher support affects students' academic achievement, what factors affect the relationship between teacher support and academic achievement, and how teacher support affects academic achievement.

The main motivation and background of this paper is to study the variables that affect the academic performance of vocational college students (including teacher support, academic self-efficacy, learning engagement, etc.), so as to promote effective learning of higher vocational students and provide good development of higher vocational education.

2. Literate Review

Learning achievement is a variable state, which will be affected by the external school environment. Although academic achievement is crucial, not all students are engaged in learning activities independently. different Social support sources is beneficial to students' healthy development and academic achievements, but their relative importance is different.

2.1. Teacher support and academic achievement

In the school environment, teachers are organizers and implementer of teaching activities, and they have more direct and authoritative influence on students' learning motivation and task input. Hu , Yu , & Liu(2011) proposed that college students' social support status would affect their self-concept happiness by influencing their core self-evaluation rhythm and content. Wentzel, Russell, & Baker(2016) pointed out that teachers are the closest influencing factor of students' classroom motivation and learning behavior. Alfaro, Umana-Taylor, & Bamaca(2006) found that the influence of teachers on students' efforts and academic values is stronger than that of peers. Secondly, teacher support plays a more critical role in academic performance. DeGarmo & Martinez(2006)believed that compared with peer influence, teachers have a more direct impact on academic performance. In addition, Plunkett, Henry, Houlberg, Sands, & Abarca-Mortensen(2008)found that compared with parental and peer support, teacher support had the greatest impact on academic performance. In view of the uniqueness and importance of teacher support, this paper will take teacher support as a starting point to explore its impact on academic achievement.

this paper assumes that Higher vocational students' academic achievements can be positively affected by teachers' support (H1).

2.2. Mediation of academic self-efficacy

Revealing the internal mechanism of teacher support in the process of influencing vocational students academic achievements is crucial to Improve the level of vocational education.Is there any intermediary variable between teacher support and academic achievement of higher vocational students? Based on the self-efficacy theory and other relevant theoretical research perspectives, the author believes that teacher support of vocational students can influence academic performance through academic self-efficacy. Bandura & Cliffs(1987)believed that academic self-efficacy is an individual's recognition of their own ability, specifically, the learners' cognition of whether their ability can achieve their academic goals.Zimmerman, Bandura, & Martinezpons(1992) The research believes that students' self-efficacy can affect students' academic achievements. In addition, relevant empirical studies also support the above views,For example, Yi, Guo, &Yu(2017) believed that If higher vocational students have higher

academic self-efficacy, they will show higher learning goal setting, pay more attention to academic performance, invest more time in learning, and achieve higher results. Ji & Zhao (2008) this research believes that teacher support will affect vocational students' academic self-efficacy. Some scholars have found that teacher support can affect the learning self-efficacy of vocational college students, and this effect is positive. Skinner, Marchand, Furrer, & Kindermann(2008) Point out that students' sense of efficacy can be enhanced by teachers' support, autonomy and belonging. The research of Ryan & Patrick(2001) The research shows that teacher support can promote the establishment of harmonious and friendly teacher-student relationship between students and teachers.

Academic self-efficacy has been considered as a mediator of other motivation variables or social environment variables affecting academic performance. In the research of Ahmed, Minnaert, van der Werf, & Kuyper(2010), ability belief is considered as the intermediary variable in the interaction model between peer support, teacher support and academic performance, and the research results also found that the intermediary effect of ability belief is significant. Jiang, Liu, Zhen, Hong & Jin (2019) It is found that students' teacher support can affect students' math performance through mathematical self-efficacy. To sum up, this study assumes that teacher support of higher vocational students can affect students' academic achievement through academic self-efficacy (H2).

2.3. Mediation of learning engagement

Students' academic achievements and learning gains can be affected by learning engagement. Many researchers have explored the impact of learning engagement on academic performance, such as Greene, Miller, Crowson, Duke, & Akey(2004), Wang & Holcombe(2010) and others. Although the subjects involved in these studies are different, and the ways to measure academic performance are different, the conclusions they draw are relatively consistent: learning engagement can positively predict academic performance. For this reason, promoting learning engagement is often considered as an effective means to enhance students' academic gains.

According to Connell's self system theory, learning engagement is plastic and will be affected by both environmental factors and individual factors. Perceived teacher support is one of the key variables. Greene et al.(2004) .On the whole, teacher support is the emotional care and academic help provided by teachers for students. Teachers' support for students' basic psychological needs will have an impact on students' learning investment and academic achievements, and the impact is positive. It has been verified in many studies, such as those of Diseth, Danielsen, & Samdal(2012) and Ricard & Pelletier(2016).Jiang, Jiang, Du, Gu, &Sun (2018) 873 primary and middle school students were investigated with the Simple Perseverance Personality Questionnaire

and the Learning Involvement Scale. The results showed that fortitude personality positively predicted learning involvement and academic achievement; Teachers' structural support can affect students' learning engagement through academic self-concept.

According to existing research findings, this study assumes that Teacher support can influence academic achievements through the intermediary effect of learning engagement(H3).

2.4. Chain Mediation

Patrick, Ryan, & Kaplan(2007)The research shows that social learning environment variables (including teacher support, interaction encouragement, mutual respect encouragement and classmate support) affect students' learning engagement through the intermediary effect of academic self-efficacy partially or completely.In Ferrell(2012) research, It is assumed that learning environment variables can affect learning engagement through self-efficacy. The results showed that teacher support and peer support positively predicted self-efficacy, while self-efficacy positively predicted cognitive input.In the research of Wang & Eccles(2013), Perceived school environment (including structural support, providing selectivity, teaching adaptability, teachers' emotional support and peer emotional support) can affect the relationship between students' learning participation (including behavioral participation, emotional participation and cognitive participation) through academic self-concept.

Teachers' support to students can affect their academic academic record through the academic self-efficacy and learning engagement. The study found that academic self-efficacy can positively predict students' learning engagement. If students want to have high academic achievements, they have higher academic self-efficacy and need to set higher academic goals. In order to achieve these goals, they will spend more time on students and work harder. This finding reminds us that academic self-efficacy and learning engagement may also have chain mediating effects among teacher support and students' academic performance. Li & Bai (2018) obtained the above conclusions through empirical research on second year students, proving the existence of chain mediation among academic self-efficacy and learning engagement. Based on the above literature research, is there a chain mediation model among vocational college students? This paper mainly studies whether there is a chain intermediary model between vocational students' perception of teacher support and their academic achievements.

The above theoretical views, models and findings provide a theoretical and empirical basis for this paper to explore the intermediary model of vocational students' academic self-efficacy and learning engagement. Therefore, this paper assumes that the perceived teacher support of higher vocational students can affect students' academic achievements

through the chain mediation model of academic self-efficacy and learning investment. (H4).

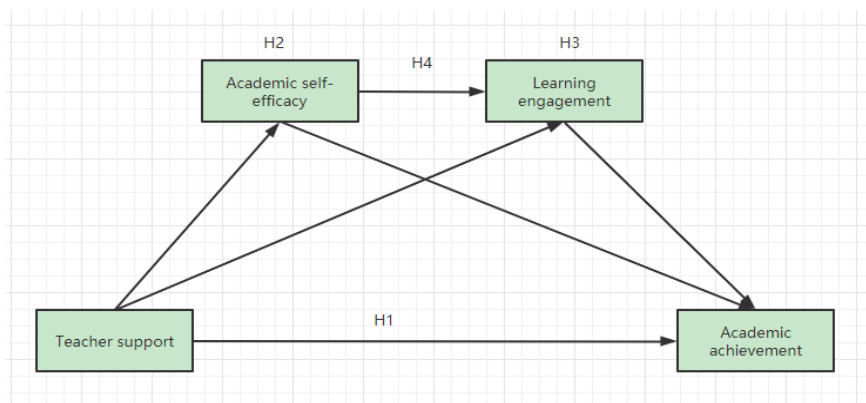
3. Research Design & Methodology

This chapter includes: 1. Research model; 2. Methodology & Sampling; 3. Research Tools, which are discussed as follows:

3.1. Research Model

This paper explores the impact of teacher support on students' academic achievements in higher vocational colleges.

Figure 1. Research Model



3.2. Methodology & Sampling

The data of this study comes from the author's questionnaire survey on students' learning in a vocational college in Chongqing in May 2022. This survey adopts the convenient sampling method. This paper conducts a survey on 414 samples, and 408 questionnaires are returned. After removing 21 invalid questionnaires (including those with missing values and those with the same answer for multiple consecutive questions), 387 sample data are retained. The effective utilization rate of the questionnaire is 93.5%. There are 268 female students and 119 male students.

3.3. Research Tools

The variables involved in this study were measured by teacher support scale, academic self-efficacy scale, learning engagement scale and academic achievement scale.

3.3.1. Teacher support scale of Higher Vocational College

According to the comprehensive consideration of the research content and purpose, the learning climate questionnaire (LCQ) used in the research of Stornes, Bru, & Idsoe(2008) and Sakiz(2007) is adopted in

this paper. The scale has a total of 10 items, including "independent support", "emotional support" and "ability support". Among them, teachers' independent support is measured by 4 questions, emotional support by 3 questions, and ability support by 3 questions. Using the 5-level Likert scale (1 = very inconsistent, 5 = very consistent), A high score indicates a stronger support from teachers, while a low score indicates a weaker support from teachers. As shown in Table 1, which are in line with the standards recommended by scholars,,as shown in Table 1, which meet the standards recommended by scholars. All standardized factor loads greater than 0.5, Fornell & Larcker(1981) which indicate that the scale has good reliability and validity.

3.3.2. Academic self-efficacy scale of Higher Vocational College

Students' Academic self-efficacy in this study measures students' perception of the ability to successfully complete learning tasks and achieve academic achievements, which is a general level of efficacy measurement. According to the comprehensive consideration of the research content and purpose, based on the scale designed by MSLQ、PALS and Greene et al.(2004), this study designed four topics, and adopted the 5-level Likert scale (1 = very inconsistent, 5 = very consistent). A high score express that academic self-efficacy is stronger, while a low score express that academic self-efficacy is weaker. As shown in Table 1, which meet the standards recommended by scholars.

3.3.3. Learning engagement Scale of Higher Vocational College Students

Learning engagement in the research refers to the sum of time and energy that students put into active learning, cooperative learning, student teacher interaction, peer interaction and extracurricular practical activities, and it is the sum of efforts made by students in learning behavior, emotion and cognition. According to the comprehensive consideration of research content and purpose, the scale of learning engagement used in this study is from the scale of learning engagement in Lam et al.(2014) and Skinner et al.(2008). The scale has 14 items, including three dimensions of "behavioral involvement", "emotional involvement" and "cognitive involvement".Their behavioral involvement was measured by 5 items, emotional involvement was measured by 3 items, and cognitive involvement was measured by 6 items. The 5-level Likert scale is used for measurement (1=very inconsistent, 5=very consistent). A high score express that learning engagement is greater, while a low score express that students have less learning engagement. in Table 1, which meet the standards recommended by scholars.

3.3.4. Academic achievement scale of Higher Vocational College Students

The academic achievement scale used in this study uses the academic achievement scale revised by Li Xianyin and Yang Na (2016). The scale

has 14 items in total, including four dimensions of "learning cognitive ability", "communication ability", "self-management ability" and "interpersonal promotion". Among them, learning cognitive ability includes 4 topics, communication ability includes 3 topics, self-management ability includes 3 topics, and interpersonal promotion includes 4 topics. The 5-level Likert scale is used for measurement (1=very inconsistent, 5=very consistent). A high score indicates that students get more academic achievements, while a low score indicates that students get less academic achievements. In this study, the author analyzed the academic achievement scale. As shown in Table 1, which are in line with the standards recommended by scholars.

Table 1. reliability and convergence validity

	Cronbach's Alpha	CR	AVE
Teacher support	0.92	0.94	0.61
Academic self-efficacy	0.86	0.86	0.61
Learning engagement	0.89	0.92	0.50
Academic achievement	0.90	0.95	0.58

4. Data Analysis & Discussion

In this study, the samples were tested according to the aforementioned research methods and tools. The collected data and discussions are discussed as follows:

4.1. Analysis Tools and Research Methods

In this study, SPSS25.0 and AMOS22.0 are used as the core data analysis software. Data analysis includes the following three steps: First, Using CFA to analyze the reliability and validity of the four scales. Secondly, Pearson correlation analysis was used to explore the relationship between teacher support, academic self-efficacy, learning engagement and academic achievement. This study uses Hayes & Preacher(2013) SPSS macro program process to verify the mediation hypothesis. Chardon, Janicke, Carmody, & Dumont-Driscoll(2016) This paper explores the relationship of teacher support, academic self-efficacy, learning engagement, and academic achievement. At the same time, it is not only limited to the relationship between the two, but also analyzes and explores the chain mediation.

4.2. Analysis of Research Results

4.2.1. Common method deviation test

Pre prevention and post inspection are adopted. Anonymous measurement and balanced questionnaire order shall be taken in

advance to reduce errors. Harman single factor test showed that the interpretation rate of the total variance of all items for one factor obtained was 29.74%, Because 40% of the reference standard value is greater than 29.74%, and there was no common method bias in the sample.

4.2.2. Basic statistics

First, the author uses descriptive statistics to analyze the M and SD of the four variables. Specifically, the score of teacher support is 3.38 ± 0.58 , which is near the "basically consistent" (3.00) and "very consistent" (4.00) of the topic options; The score of academic self-efficacy was 3.14 ± 0.59 , which was near the "basically consistent" (3.00) and "very consistent" (4.00) of the item options; The score of learning engagement is 3.29 ± 0.49 , which is between "basically consistent" (3.00) and "very consistent" (4.00) of the topic options; The score of academic achievement is 3.14 ± 0.60 , which is near the "general compliance" (3.00) and "compliance" (4.00) of the topic options. Secondly, the Pearson correlation test of four variables, four variables are significantly related to each other. Describe statistics and correlation analysis (see Table 2 for results). This result shows that the research hypothesis is supported by preliminary data and is suitable for further verification with path analysis.

Table 2. Statistics of basic information

Variable	Basic Statistics			Correlation coefficient		
	<i>M</i>	<i>SD</i>	<i>N</i>	Teacher support	Academic self-efficacy	Learning engagement
Teacher support	3.38	0.58	387	1		
Academic self-efficacy	3.14	0.59	387	0.35**	1	
Learning engagement	3.29	0.49	387	0.44**	0.58**	1
Academic achievement	3.14	0.60	387	0.30**	0.54**	0.68**

* $p < .05$; ** $p < .01$; *** $p < .001$.

4.2.3. Mediation effect test

Based on the three research hypotheses put forward in this paper, using the method of path analysis, This study explored that under the control of gender and grade variables, teacher support affects students' academic achievements through the chain mediation of academic self-efficacy to learning engagement.SPSS 25.0 macro program Process V4.0 was used to set Bootstrap sampling for 5000 times, and bootstrap

method was used to test the mediation effect. The confidence interval was set to 95%.

Under the control of gender and grade, teacher support significantly positively predicted academic achievement. The adjustment of the model $R^2=0.12$, $F=18.13$, $p<0.001$, which supported hypothesis 1. Under the control of gender and grade variables, This paper focuses on the analysis of academic self-efficacy and learning engagement, and studies the chain mediation of the above two variables in the research model. Regression analysis shows that higher vocational students' academic self-efficacy ($\beta=0.353$, $P<0.001$) and learning participation ($\beta=0.244$, $P<0.01$) can be positively affected by teacher support; Higher vocational students' learning engagement can be positively affected by academic self-efficacy ($\beta=0.398$, $P<0.001$); When the three variables of teacher support, academic self-efficacy and learning engagement are used to predict academic performance at the same time, academic achievement of higher vocational students can be positively predicted by academic self-efficacy and learning engagement ($\beta=0.039$, $\beta=0.049$, $P<0.01$). At this time, academic achievements cannot be affected by teacher support (see Table 3 for the results).

Table 3. Regression analysis among variables

Regression Equation		Overall fitting coefficient			Regression coefficient	Significance
Result variable	Predictive Variables	R	R ²	F	β	t
Academic self-efficacy	Gender	0.353	0.124	18.127	-0.080	-1.281
	Grade				-0.016	-0.456
	Teacher support				0.353	7.23***
Learning engagement	Gender	0.630	0.396	62.725	-0.023	
	Grade				-0.005	
	Teacher support				0.224	6.2925***
	Academic self-efficacy				0.398	11.378***
Academic achievement	Gender	0.709	0.503	77.035	0.101	2.451
	Grade				0.035	1.520
	Teacher support				-0.024	-0.676
	Academic self-efficacy				0.039	5.1751***
	Learning engagement				0.049	12.086***

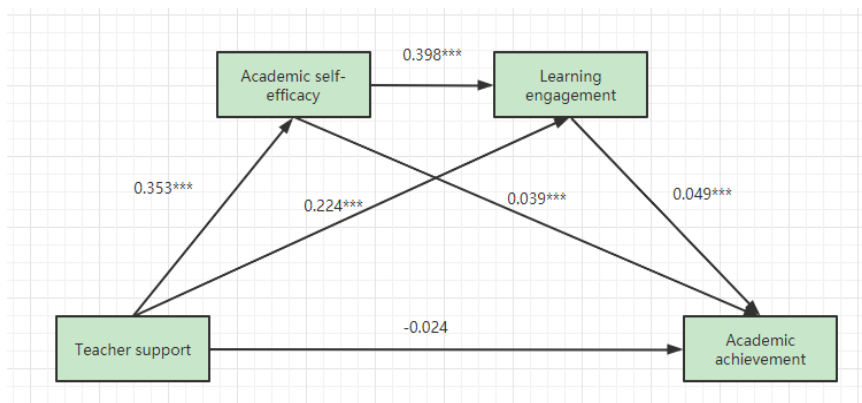
The mediating effect was further tested by SPSS process guidance method. Teacher support influences academic achievement through the mediating effect of academic self-efficacy and learning engagement, which is proved to be true, and the mediating effect value is 0.29. For convenience, suppose that teacher support is X, academic achievement is Y, academic self-efficacy is M1, and student engagement is M2. Specifically, the mediation effect is generated through three mediation chains: the first path, indirect effect 1 from $X \rightarrow M1 \rightarrow Y$ (effect value=0.071), Bootstrap 95% confidence interval does not contain 0, 95% C.I.= (0.037,0.114), the value does not include 0. The research results show that M1 has a significant mediation effect; In the second path, the indirect effect 2 composed of $X \rightarrow M2 \rightarrow Y$ (effect value=0.134), 95% C.I.= (0.084,0.89). The results show that the mediating effect of M2 is significant; The third path is indirect effect 3 (effect value=0.084) composed of $X \rightarrow M1 \rightarrow M2 \rightarrow Y$, 95% C.I.= (0.054,0.121). The research results show that M1 and M2 have significant chain mediating effects on X and Y (see Table 4 for the results). The specific path of teacher support on academic achievement is shown in the attached figure. Thus, it is assumed that H2, H3 and H4 are supported.

The specific regression path coefficients of the chain mediation model are shown in Figure 2.

Table 4. Statistical table of mediation effect

	Effect value	Boot SE	Boot CI LLCI	Boot CI ULCI	Proportion of intermediary effect
Total indirect effects	0.289	0.035	0.222	0.359	
Indirect effect 1	0.071	0.019	0.037	0.114	25%
Indirect effect 2	0.134	0.027	0.084	0.189	46%
Indirect effect 3	0.084	0.017	0.054	0.121	29%

Figure 2. output results of overall path analysis



5. Conclusions and Recommendations

After the data analysis and discussion in Chapter 4, the conclusions and recommendations of this paper are summarized as follows:

5.1. Conclusions

The research conclusions of this paper are as follows :

First, the correlation analysis of four variables. The research results show that the relationship between the above four variables is positive and significant, which shows that when higher vocational students feel more teacher support, students will be able to form stronger academic self-efficacy, and accordingly will pay more efforts in learning to ensure better academic performance.

Second, the internal relationship between teacher support and students' academic achievements. From the output results of path analysis, when other conditions remain unchanged, for every additional unit of teacher support, the academic achievements of students in higher vocational colleges will increase by 0.26 units, which indicates that the more teachers support, the more students will improve their academic achievements. As one of the most important social supports that affect students' school life in higher vocational colleges, when teachers provide help and support to students' learning, it will greatly shorten the distance between teachers and students, and also improve students' confidence and ability to solve problems, so that students can better solve the difficulties encountered in the learning process, Meet the students' basic psychological needs of harmonious teacher-student relationship and being competent for learning, so that they can enhance their interest in learning and achieve the goal of improving their academic achievements.

Third, the chain mediation model between academic self-efficacy and learning engagement. When the analysis model includes students' academic self-efficacy and learning engagement, teacher support cannot directly predict students' academic achievements, but it can affect students' academic achievements through teacher support → academic self-efficacy → learning engagement → academic achievements. That is to say, when teachers give more guidance and help to students, they can effectively improve students' academic self-efficacy, and then encourage students to spend more time on learning and improve their academic achievements.

5.2. Suggestions

The above research conclusion shows that the support of higher vocational teachers on students' learning is an effective way for students to form higher academic self-efficacy, improve their learning engagement, and thus improve their academic achievements. To this end, efforts can be made in the following aspects.

First, teachers should care for students in multiple ways to enhance their self-confidence. As the most direct and close group of students, teachers should pay attention to students' learning while completing teaching tasks. Teachers should often go deep into students, take the initiative to understand, integrate and guide students. Teachers' positive support and encouragement will enable students to study hard and be willing to make more efforts to achieve good academic performance.

Second, encourage teachers to apply various teaching strategies in teaching to improve students' sense of achievement. This reminds higher vocational teachers to make efforts to improve students' participation in the classroom teaching process. Teachers can adopt teaching strategies such as "students' self-study and self talk+mutual evaluation", "group and team cooperative learning" and "professional competition" in teaching, increase students' participation in the teaching process, enable students to integrate into the whole teaching process through their own participation, and experience the sense of gain and achievement of completing teaching objectives and tasks through their own efforts in the process, so as to effectively improve students' learning confidence and ability, Promote students' willingness to spend time on learning to achieve the goal of improving students' academic achievements.

Third, teachers should strive to improve their comprehensive abilities and enhance students' sense of gain. Teachers should always adhere to the principle of "self-cultivation and self-discipline, teaching by example through words and deeds", establish a good style of teacher ethics, govern teaching by virtue, have lofty ambitions and be willing to contribute, and influence students imperceptibly with good words and deeds. Try to be a teacher loved by students and satisfied by parents, and become a model of teaching by words and deeds; We will further strengthen theoretical learning and practical research, strive to be a pioneer, and be willing to be the cornerstone. We will continue to improve our education and guidance capabilities, organization and management capabilities, communication capabilities, and research capabilities, so as to better protect students' growth and enhance their sense of gain.

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