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Relationship between perceived social support and university students' academic engagement in Shanxi, China: the chain mediating effect of academic buoyancy and academic emotion, the moderating effect of proactive personality

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Abstract

This study takes perceived social support as independent variable, academic buoyancy and academic emotion as mediator variables, and proactive personality as moderator variable, academic engagement as dependent variable. Based on the quantitative data of 445 and qualitative data of 20 university students in Shanxi Province, China, the method of questionnaire survey to analyze the relationship of variables and verify the research hypothesis and theoretical conceptual framework.

The research results show that: (1) Perceived social support has positive predictive effect on academic engagement; (2) Perceived social support has positive predictive effect on academic buoyancy; (3) Academic buoyancy has positive predictive effect on academic engagement; (4) Perceived social support has positive predictive effect on academic emotion; (5) Academic emotion has positive predictive effect on academic engagement; (6) Academic buoyancy and academic emotion have chain mediating effect between perceived social support and academic engagement; (7) Proactive personality has moderating effect between perceived social support and academic engagement; (8) Proactive personality has no moderating effect between academic emotion and academic engagement. Finally, some recommendations are made.

Keywords: Perceived social support, Academic buoyancy, Academic emotion, Proactive personality, Academic engagement

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Introduction

With the expanding scale of higher education in China, the importance of improving the quality of higher education is becoming more and more prominent. Previous research findings that academic engagement is an important indication in the quality assessment of university education (Kuh, 2009), and it is essential for promoting high-quality growth of teaching in universities. The higher the academic engagement degree of university students, the more obvious the learning effect obtained, and the greater the outside world's recognition of educational quality.

So, university education more emphasis on students' learning capacity, learning level, and academic success.

Combined with the education and teaching practices of various colleges and universities, it is found that the quality of undergraduate education in colleges and universities still faces many problems and challenges, which are mainly reflected in the unsatisfactory investment of university students. The lack of university students 'academic engagement has become an important factor restricting higher education from "big" to "strong", and the study of the determining elements of university students' academic engagement has become an urgent subject in the realm of higher education.

Research's objective

1. To explore effect of perceived social support, academic buoyancy, academic emotion, proactive personality on academic engagement.

2. To explore chain mediating effect of academic buoyancy, academic emotion, between perceived social support and academic engagement.

3. To explore moderating effect of proactive personality, between perceived social support and academic engagement, as well as between academic emotion and academic engagement.

Hypothesis

H1: Perceived social support has positive predictive effect on academic engagement.

H2: Perceived social support has positive predictive effect on academic buoyancy.

H3: Academic buoyancy has positive predictive effect on academic engagement.

H4: Perceived social support has positive predictive effect on academic emotion.

H5: Academic emotion has positive predictive effect on academic engagement.

H6: Academic buoyancy and academic emotion have chain mediating effect between perceived social support and academic engagement.

H7: Proactive personality has moderating effect between perceived social support and academic engagement.

H8: Proactive personality has moderating effect between academic emotion and academic engagement.

Conceptual framework

According to literature review, the conceptual framework is constructed, as Figure 1:

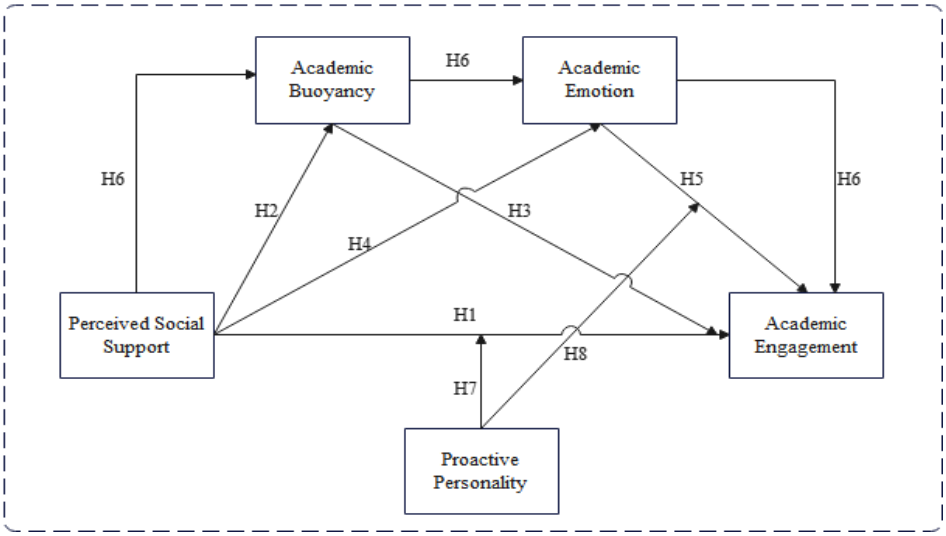

Figure 1 Conceptual Framework

Methodology

1.Population and sample

Quantitative: This research chooses students from the top 5 schools (Shanxi Medical University, Taiyuan University of Technology, Shanxi Agricultural University, Shanxi University and Shanxi University of Finance and Economics) with good quality of Shanxi university graduates as the research population. Combine the Yamane formula with the number of questionnaires, 445 students are selected for empirical analysis as samples.

Qualitative: Through random sampling method according to the different grades of university students. Five university students were randomly selected from each school to participate in the interview, total 20.

2. Questionnaire design and measurement

Quantitative: This study used a structured questionnaire survey method. The scales of perceived social support, academic buoyancy, academic emotion, proactive personality and academic engagement involved in the questionnaire all used the mature scale with good verified credit validity. Combined with the literature review, the measured items of 5 variables were determined. Perceived social support (PSS) scale into 12 dimensions, separated into family support, friend support, and other support. Academic buoyancy (AB) scale has 4 questions. Academic emotion (AM) scale divided into two categories: positive and negative intellectual emotions,12 questions. Proactive personality (PP) scale contained 11 items. Academic engagement (AE) scale consists of three dimensions: vitality, dedication, and focus, 17 questions together. All five scales use the Likert scoring method.

Qualitative: This study used three coding methods to analyze the interview data. The qualitative study used the semi-structured interviewing method. Interviews were conducted through face-to-face, mail, telephone, etc. On the basis of the extensive literature review, specific interview outlines were prepared based on the variables of quantitative analysis. Interview data have been obtained through interviews with 20 university students.

3. Reliability and validity analysis

Cronbach's alpha, often known as the dependability coefficient, is the most commonly utilized. The reliability results of 445 formal questionnaires, such as Table 1, and the values of Cronbach’s Alpha for understanding the explanatory dimensions of perceived social support, academic buoyancy, academic emotion, proactive personality and academic engagement were all above 0.7, which met the standards. As a result, the scales employed in this investigation are reliable and consistent.

Table 1 Reliability Analysis of Scales

Scale	Cronbach’s Alpha
PSS	0.978
AB	0.947
AM	0.948
PP	0.980
AE	0.987

Validity is the degree to which the measured findings can be measured. This study mainly tests the validity from four aspects: content validity, construct validity, aggregation validity and discriminant validity.

1) Content validity. The content of the questionnaire was adjusted and pilot test before the formal questionnaire was issued. Therefore, the scale content and validity of this survey questionnaire is good.

2) Construct validity. In this study, Kaiser-Meyer-Olkin (KMO) and Bartlett tests on each variable's data. The results showed that the KMO values of all variables were above 0.7, which met the standard requirements, and the Bartlett sphere test results were significant in Table 2. This means that each variable is independent of each other to some extent, and is therefore suitable for factor analysis.

Table 2 KMO and Bartlett Tests

Scale	Percent of the cumulative explained variance	KMO	Bartlett Sig.
PSS	80.66%	0.955	0.000
AB	86.39%	0.862	0.000
AM	79.35%	0.909	0.000
PP	83.27%	0.952	0.000
AE	83.21%	0.973	0.000

The confirmatory factor analysis (CFA) of all variable scales using AMOS 26 software showed that the factor load of all items on the corresponding construct exceeded 0.60.Compared with other factor models, the data had the best fit to the five-factor model including perceived social support, academic buoyancy, academic emotion, academic engagement and proactive personality, fitting indicators (CFI=0.82, TLI=0.81, RMR=0.07), as Table 3, suggesting that the constructs in this study have good construct validity. Figure 2 shows Output of CFA Model.

Table 3 Results of the Confirmatory Factor Analysis

	X^2/df	RMSEA	CFI	TLI	RMR
Five-Factor Model	5.87***	0.10	0.82	0.81	0.07
Four-Factor Model	7.98***	0.13	0.74	0.73	0.10
Three-Factor Model	9.01***	0.13	0.70	0.69	0.15
Two-Factor Model	9.49***	0.14	0.68	0.67	0.15
Single-Factor Model	11.81***	0.16	0.60	0.58	0.14

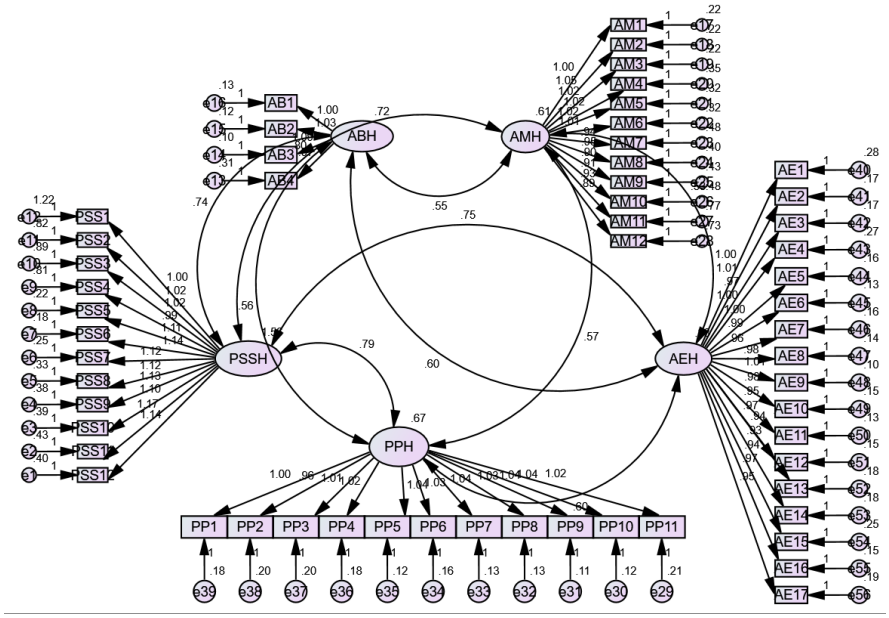

Figure 2 Output of CFA Model

Note: The variable name is followed by the letter H to avoid duplication of the model name and the variable name in analysis, and the variables are same with original model.

3) Aggregation validity. As Table 4 illustrates, the scale utilized for this investigation has good structural validity (factor load is greater than 0.5, CR value is greater than 0.7, and AVE value is greater than 0.5) based on the values of these three variables.

Table 4 Aggregation Validity Results

	AVE	CR
PSS	0.784	0.977
AB	0.824	0.949
AM	0.596	0.946
AE	0.816	0.980
PP	0.822	0.986

Note: * indicates p <0.05, * * p <0.01, and * * * p <0.001.

Source. According to AMOS Software.

4) Discriminant validity

As shown in Table 5, the average variant extraction (AVE) of all constructs was 0.500 higher, and the combined reliability (CR) coefficient was greater than 0.700, showing that these constructs had good aggregate validity. In the meantime, the square root of the AVE was greater than the correlation coefficient between the variables and other factors, indicating that these constructs had good discriminant validity.

Table 5 Discriminant Validity Results

	AE	AM	PP	AB	PSS
AE	0.903				
AM	0.749	0.772			
PP	0.799	0.886	0.907		
AB	0.768	0.836	0.804	0.908	
PSS	0.660	0.819	0.773	0.693	0.885

Source. According to AMOS Software.

Results

1. Result of Questionnaire

1.1 Common method variance

The link between variables resulting from the use of similar measurements, which does not accurately reflect the genuine relationship between the underlying constructs, is referred to common method variance, or CMV. This study collected data by student self-assessment, so there may be a strong problem of CMV. First, by performing an exploratory factor analysis, result display, there are 5 factors with a feature value more than 1, the variance contribution rate was 81.64%, and the maximum factor variance interpretation is 63.67% (above 40%).This indicates that there is some common method variance problem; Secondly, we also performed confirmatory factor analysis of a single factor using AMOS 26 software, results reflect (χ 2 / df=11.81* * *, RMSEA=0.16, CFI=0.60, TLI=0.58, RMR=0.14) is much worse than the original model, this indicates that there is no more serious problem of common method variance problem.

1.2 Correlation analysis

Correlation analysis determines whether or not there is a relationship between variables, as well as the direction and strength of the association. Pearson correlation coefficient, with values ranging from -1 to 1, is the most often used

correlation coefficient. The greater the absolute value, the stronger the association. In this case, a complete positive correlation is represented by 1, a complete negative correlation by -1, and no linear link is represented by 0. If the Pearson correlation coefficient is less than 0.2, the link between the variables is weak and does not warrant further investigation. If the Pearson's correlation coefficient is larger than 0.75, the scale's validity or the presence of validated multicollinearity should be addressed. As shown in Table 6.

Table 6 Correlation Analysis Results

	PSS	AB	AM	PP	AE
PSS	1				
AB	.692**	1			
AM	.765**	.774**	1		
PP	.770**	.790**	.829**	1	
AE	.657**	.757**	.715**	.784**	1

Note: *p <0.05, * * p <0.01, and * * * p <0.001.

The results showed a significant positive correlation between perceived social support, academic buoyancy, academic emotion, proactive personality, and academic engagement (P<0.01).

1.3 Hypothesis testing results

1) Main effect and mediation effect tests

Results show the following: the effect value between academic engagement and perceived social support is 0.66 (P<0.001), proving H1; the effect value between academic buoyancy and perceived social support is 0.69 (P<0.001), proving H2; the effect value between academic buoyancy and academic engagement is 0.77 (P<0.001), proving H3; the effect value between academic emotion and perceived social support is 0.82 (P<0.001), proving H4; and the effect value between academic emotion and academic engagement is 0.75 (P<0.001), proving H5.

Indirect effect results are presented in Figure 3. The results showed that the mediating effect of PSS-AB-AM-AE was established and verified by H6.

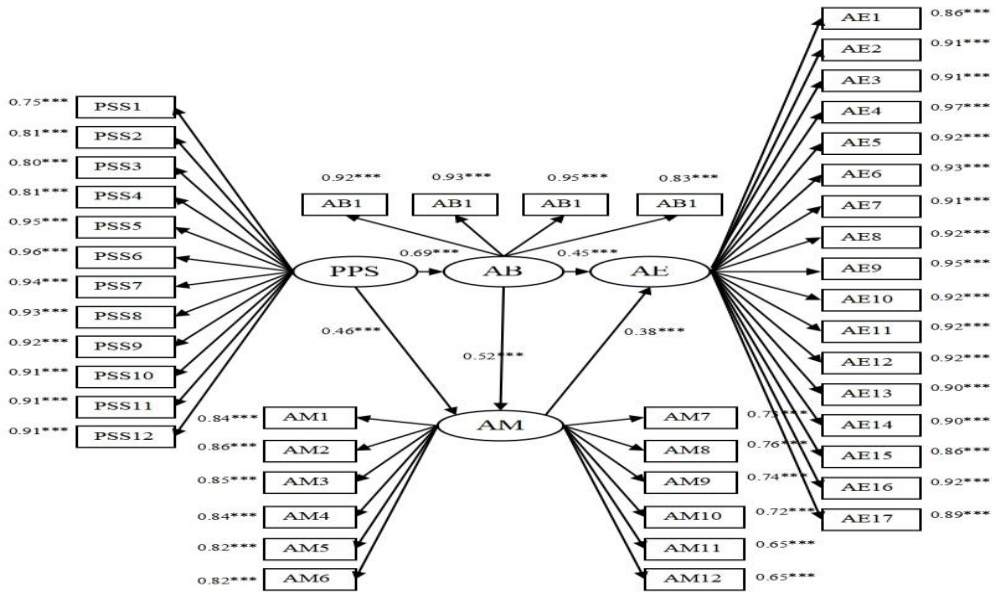

Figure 3 Chain Intermediary Path

As Figure 4, the effects of perceived social support and academic engagement were found to be 0.0977 (SE=0.0303, P<0.001), indicating that H1 has been verified; H2 has been verified in relation to perceived social support and academic buoyancy; H3 has been verified in relation to academic engagement and buoyancy; H4 has been verified in relation to perceived social support and academic emotion; and H5 has been verified in relation to academic engagement and academic emotion.

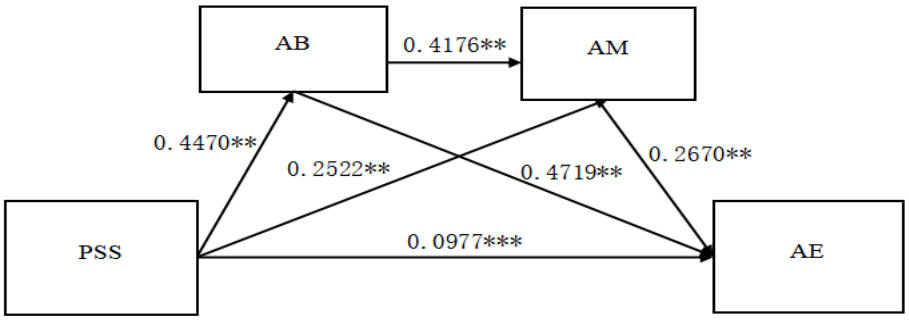

Figure 4 Mediating Path Coefficient

Indirect effect results are presented in Table 7. Result display, the total indirect effect between perceived social support and academic engagement was 0.5059, the mediating effect of PSS-AB-AE was established (the effect value was 0.3252, the confidence interval is [0.2225, 0.4256], Excluding 0); The mediating effect of PSS-AM-AE established (the effect value was 0.1038, the confidence interval is [0.0252, 0.2025], Excluding 0); The mediating effect of PSS-AB-AM-AE established (the effect

value was 0.0769, The confidence interval is [0.0194, 0.1501], Excluding 0.). Thus, the H6 was verified.

Table 7 Mediating Effects of The Different Pathways

	Effect	BootSE	BootLLCI	BootULCI
Total Indirect Effect	0.5059	0.0866	0.3444	0.6765
PSS⟶AB⟶AE	0.3252	0.0518	0.2225	0.4256
PSS⟶AM⟶AE	0.1038	0.0464	0.0252	0.2025
PSS⟶AB⟶AM⟶AE	0.0769	0.0331	0.0194	0.1501

Source. According to AMOS Software.

2) Moderating effect test

The association between perceived social support and academic engagement can be moderating effect by proactive personality, as the figure illustrates, however the relationship between academic emotion and academic engagement is not moderating effect by proactive personality. The effect value of the interaction term of proactive personality and perceived social support on academic engagement was 0.1143 (SE=0.0318, P <0.001), and the effect value of the effect of proactive personality and academic emotion on academic engagement was -0.0923 (SE=0.0521, P> 0.05). Thus, as Figure 5 shows, H7 was verified, but H8 was not.

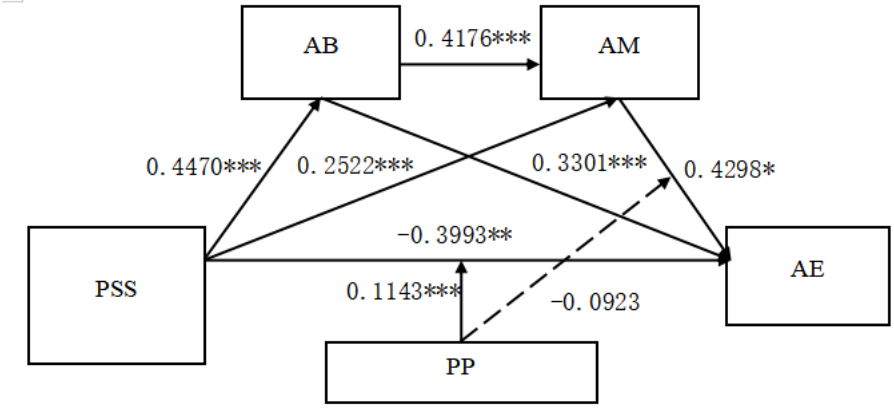

Figure 5 Moderating Effect Test Results

3) Hypothesis Test Results

The outcomes are displayed in Table 8.

Table 8 *Hypothesis Test Results*

Number	Research Hypothesis Test	Result
H1	Perceived social support has positive predictive effect on academic engagement.	PASS
H2	Perceived social support has positive predictive effect on academic buoyancy.	PASS
H3	Academic buoyancy has positive predictive effect on academic engagement.	PASS
H4	Perceived social support has positive predictive effect on academic emotion.	PASS
H5	Academic emotion has positive predictive effect on academic engagement.	PASS
H6	Academic buoyancy and academic emotion have chain mediating effect between perceived social support and academic engagement.	PASS
H7	Proactive personality has moderating effect between perceived social support and academic engagement.	PASS
H8	Proactive personality has moderating effect between academic emotion and academic engagement.	FAILED

Source. According to Amos Results.

2. Results of interview data

Through in-depth interviews with 20 university students, the respondents agreed with the results of the theoretical model of the study, enriching the credibility of the research findings.

Discussion and Conclusions

The findings indicate that there is a substantial association between perceived social support and academic engagement and their aspects, which is consistent with the H1 of this study. Perceived social support can significantly predict the academic engagement level of university students, that is, The greater the perceived social

support, the greater the level of intellectual engagement. This is consistent with the research results of Yang Ze et al. (2022) and Cheng Lina (2016).

The findings support the study's H2 and H3, demonstrate a significant correlation between academic buoyancy and perceived social support, academic engagement, and their dimensions. Additionally, academic buoyancy serves as a mediator in the relationship between social support and academic engagement among university students. While perceived social support can also have a significant effect on university students' academic engagement levels by raising their individual academic buoyancy levels, knowing social support can have a direct positive effect on academic engagement. This is consistent with research by Ursin et al. (2021), which found that academic buoyancy and social support function as a mediator between the effects of academic stress and academic engagement.

The study's conclusion demonstrates a significant correlation between academic emotion and perceived social support as well as academic engagement and its dimensions. This finding is consistent with study H4 and H5, suggesting that academic emotion plays a mediating role in understanding how social support predicts university students' academic engagement. First, there is evidence to suggest that perceived social support positively influences academic engagement; second, Students who report strong amounts of social support are more likely to be satisfied with their academic experiences, which in turn may influence their degree of academic engagement among university students. Negative academic emotions may affect the academic engagement level of university students.

The study's findings indicate that academic engagement and perceived social support are mediated by academic buoyancy and academic emotion.H6 was confirmed. By raising their academic buoyancy and encouraging them to feel more pleasant academic emotions during their academic pursuits, perceived social support can have an indirect impact on students' academic engagement. When participating in academic activities, university students with high academic buoyancy levels can feel more good academic emotions and less negative ones.

The findings indicate that proactive personality influences between perceived social support and academic engagement. H7 was confirmed. High levels of academic engagement are produced by proactive personalities, which is consistent with earlier findings. Cultivating proactive personality can better promote university students' investment in learning and improve their academic achievement and level.

According to results, proactive personality has no moderating effect between perceived social support and academic engagement. H8 was not confirmed. Positive academic emotion has a positive impact on university students' academic engagement,

and they are more willing to devote their energy to their study.Positive academic emotion will be affected by individual factors such as individual cognition, achievement goals and cognitive ability, but proactive personality has no moderating effect between academic emotion and academic engagement, which is consistent with the research of Xu Xiancai & Gong Shaoying (2009).

Recommendation

1. Improve the Level of Social Support

Social support is a comprehensive and multi-level social system that should increase university students' engagement from the three perspectives of family, friends, and society. As family, one is to create a good family atmosphere. Second, pay attention to students' mental health. Third, students' guidance should be strengthened; As friends, First, to strengthen the communication. Second, enhance the ability of friends tutoring. Third, to strengthen the emotional support of friends; As society, First, teachers should fully realize the importance of providing support for university students. Second, establish a platform and system for communication and sharing between teachers and students. Third, cultivate a positive university education environment to promote teachers' support.

2. Enhance the Academic Buoyancy Level

First, adjust university students' views and understanding of setbacks. Second, take the initiative to find out and make good use of the effective resources around you. Third, choose the appropriate learning method.

3. Cultivate Positive Academic Emotion

we should pay more attention to pupils and understand their adaptability, improve the students' learning guidance institutions, and give timely help and support. Second, it is need to understand the learning needs of students, stimulate students' thirst for knowledge, guide university students to set up correct and appropriate learning goals, create a good learning atmosphere, and appropriately enhance their learning investment. The third is to adjust the assessment method of learning results and guide students to treat the learning results correctly.

4. Shaping the proactive personality

As a result, developing a proactive attitude may play a crucial role in increasing university students' involvement in studying. First, exercise a keen insight. Second, to improve the enthusiasm of learning. Third, to cultivate a strong will.

Future research direction

Although this study established perceived social support, academic buoyancy, academic emotion, proactive personality, academic engagement research model, but in the face of reality university students' academic engagement still exist many problems need to be improved, due to the H8 hypothesis test failed, therefore, in the future research can continue to modify model, improve the model in order to scientific.

1. Further modification of Research model

Because of the study's short period, academic engagement of university students is not deep enough. In future research, long-term research plans can be established, especially in qualitative research to continuously enrich the research results of academic engagement.

2. Expand the scope of the research

Research data were obtained exclusively from university students in Taiyuan, Shanxi Province, Therefore, the representative of the findings is limited. In future research, extensive research should be carried out in different regions, different grades and different types of universities. On the one hand, comparative studies can be carried out; on the other hand, the applicability and feasibility of the model can be further improved.

3. Select more representative samples

This research scales are self-evaluation scales, therefore, there are some negative descriptions of the reverse problem, although the survey method, in the process of the confidentiality of the study results fully emphasized. In future studies, select more representative samples, the quality of samples can be more effectively controlled, such as setting the shortest answer time of questionnaire, setting trap questions, and increasing manual inspection.

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