

The Study on the Influence of Peer Relationships on College Students' Academic Performance in HEZE University, ShanDong Province, China

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Abstract

Peer relationship is an important part of college students' study and life. The communication and interaction between college students and their peers can not only promote their own development, but also hinder their development. Therefore, this study aims to investigate the effects of peer relationships of college students on academic achievement to understand the current situation of peer relationships and academic performance, and analyze whether students peer relationship can affect students' academic performance, students' peer relationship quality on the academic performance of college students can play a predictive role, or to what extent we can predict the academic performance. This paper first defines the related concepts of peer relationship and academic performance through the summary of related literature, and puts forward the related theoretical basis, and what aspects of the current research are mainly focused on. Then combined with the results of empirical research, this paper analyzes the actual situation of peer relationship, academic engagement and academic performance of college students studying in HEZE university. And we do the descriptive analysis, measurement model analysis and structural equation model analysis to these situations. Finally, it summarizes the peer relationship academic engagement and academic performance of college students, and puts forward some suggestions.

Keywords: Peer Relationship, Learning Engagement, Academic Performance, College Student

Introduction

Cultivating talents is one of the three major functions of colleges and universities, and it is also the most important function of colleges and universities. As an institution that delivers

talents to the society, higher education plays an important role in the development of the country and the society. At present, higher education has developed quantitatively, but while higher education is expanding year by year in terms of quantity, the quality of its talent cultivation is worrisome, and there is still a gap between it and the requirements of the country and society.

Peers have an important value for college students, and college students' learning attitudes and academic achievements are influenced by their peers. Peer relationship has been attracting much attention in the West, and scholars have conducted research based on the influence of peer relationship on college performance. Scholar Xerri proposed that positive student-student relationship is conducive to the improvement of students' academic performance based on empirical investigation. Cheng, Dai, & Liu, (2023), have pointed out that study input also has a certain impact on academic performance, the more college students invest in their studies, the more intentional academic have results they can get. However, how peer relationships affect their academic performance, how peer relationships affect academic performance through academic engagement, and to what extent they affect academic performance need further investigation and research.

College students' academic performance is very important in the competitive society, but at present, from the actual situation, college students' sense of academic performance is not very high, and the reason is worth exploring, there are many factors affecting their sense of achievement, interpersonal relationships, and the degree of commitment to learning are all vital to the achievement of academic performance, through the review of the literature, found that the existing research tends to explore the impact of academic achievement of a single or multiple factors, and did not explore in depth the two important factors affecting the path and mechanism of the lack of this level of research is not clear. The literature review reveals that existing studies often explore single or multiple factors affecting academic performance, but do not deeply explore the path and mechanism of the two important factors on academic achievement, and lack of research at this level, and the mechanism of its role is not clear. Therefore, this study explores the behavioral aspects of college students' peer relationship, which can enrich the related research, and it also investigates the relationship between college students' peer relationship, learning engagement and academic performance, focusing on the path of their influence, which supplements the research in the related fields of academic performance and has certain theoretical significance.

The university period is a critical stage for college students, but in the face of a diversified and demanding society, there are many college students who have a low sense of academic performance, who have thought seriously about their current majors, and whose peer relationship have a certain impact on their academic performance. Therefore, understanding the current situation of college students' academic performance. At the same time, from the perspective of college students' peer relationship to explore the role mechanism of the important factors affecting academic performance, to provide empirical evidence for relevant policy research, to provide new ideas, to provide certain strategic support for the cultivation of high-quality talents, which will be conducive to improving the degree of commitment to learning, achieving higher achievements, and promoting their better growth and

development, and at the same time, and to provide effective ideas for university administrators.

Therefore, based on this foundation, this study investigates the current situation of peer relationship, academic engagement, and academic performance of college students, and explores the relationship between peer relationship, academic engagement, and college students' academic performance, as well as the degree of influence of peer relationship on college students' academic performance.

Literature Review

College Students' Peer Relationship

According to Smith, & Brown, (2020), the peer relationship of college students in this study mainly refers to the interpersonal relationships that individuals establish and develop with their classmates and friends who are frequently contacted and interacted with in their daily life and study during their college years. Influenced by factors such as age, experience, and environment, the peer relationship of college students is characterized by more equality, freedom, and openness compared with teacher-student and parent-child relationships.

College Students' Academic Engagement

This study refers to Fredricks' (2004), definition of academic engagement, which is defined as college students' active participation in various learning activities, full engagement and use of certain cognitive strategies when facing complex academic tasks, and positive affective experiences.

Academic Performance of College Students

According to Williams, & Johnson, (2021), Academic performance is the main form of college students' learning achievements, which can reflect the degree and level of students' development in the process of learning in the moral, intellectual and physical aspects; it can comprehensively measure the breadth, depth and proficiency of students' mastery of knowledge and skills, as well as the ability to use knowledge in practice. The broad academic performance includes two forms of comments and ratings, but in the actual study is usually used in the form of ratings to implement the judgment, that is, usually referred to as the percentage form. Using this form of examination, students' individual performance can be compared with the teaching objectives in order to determine the extent to which students have mastered knowledge and how far they are from the teaching objectives. As a result, academic performance can be judged by the number, percentage, or grade of students who have accomplished a predetermined number of instructional objectives.

Peer Relationship and Academic Performance

It has also been shown that social support from all sources plays a key role in academic performance. However, the role of peer relationships gradually increases with age. Harris, & Lee, (2023) have found that middle school students with higher quality peer relationships are more likely to achieve academic success, and that middle school students' academic performance is influenced by their peer relationships. There are many reasons for poor academic performance, among which being rejected or neglected by peers will affect the emotional changes of middle school students, which will lead to the decline of their academic performance. For middle school students, peer support has a significant effect on their academic performance. Zhang, & Wang, (2022) found that in China, children's academic

performance predicts peer status and acceptance, and that poor academic performance may lead to a range of problems such as peer rejection, loneliness, and anxiety. However, this correlation was not significant for Western children. Moreover, Western parents are more concerned with the healthy development of their children's personalities and pay less attention to their children's academic performance than Chinese parents do, which results in lower levels of academic stress among Western children. Those students who are academically disadvantaged are vulnerable to peer neglect and rejection, with a high correlation between academic performance and peer relationships for students in the sixth grade of elementary school. Other studies have also found that the higher the grade level, the greater the effect between academic performance and peer relationship.

Academic engagement and academic Performance

Based on the results of previous research, George Koo proposed the concept of "learning engagement" and put forward a model of learning engagement and academic success. The model recognizes that engagement in learning consists of two components: the amount of time and effort that students devote to purposeful educational activities, and the amount of effort that schools put into engaging students in learning activities. The model recognizes that engagement in learning is particularly important, suggesting that higher levels of engagement in learning lead to higher levels of student academic achievement and can influence what college students can achieve after graduation.

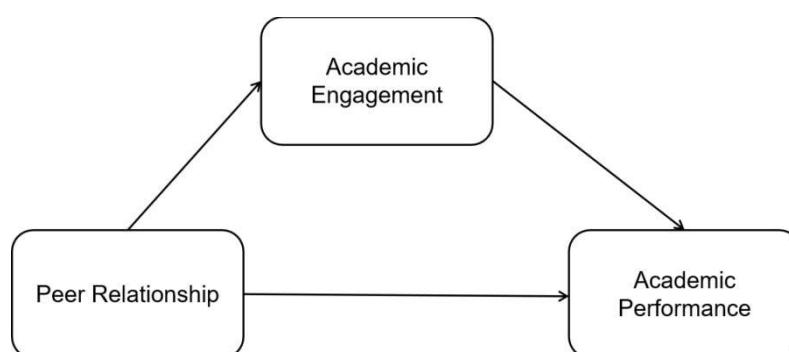
Peer Relationship and Academic Engagement

Peers can provide social reinforcement for college students' academic progress. First, peers are usually individuals who are similar in age or stage of psychological development to college students, and they share similar educational backgrounds and values. When college students face challenges, peers can empathize with them and provide emotional comfort, which can help enhance college students' engagement in their studies. Second, peers are also the main channel for college students to get practical help. Since most of college students' studies and daily lives take place in the school environment, they often spend more time with their peers than with their families and teachers. The emotional support and practical help provided by peers help college students participate more actively in learning activities, thus enhancing their academic engagement.

The ability of peer groups to model college students' academic pursuits is closely linked to the phenomenon of assimilation among peers. The phenomenon of assimilation describes the process of social comparison in which an individual's self-evaluation moves closer to the comparison object. Individuals tend to increase their self-evaluations when they are compared to those who perform well. For example, students who are not academically motivated enough, when compared to their hardworking peers, will have an incentive effect that motivates them to follow their peers' example of pursuing excellence and sustaining their efforts. This exemplary role played by individuals with positive attitudes and efforts in learning is the very embodiment of the assimilation effect. Those students with a high degree of commitment to learning can inspire those around them with a lower degree of commitment to learning to enhance their own enthusiasm for learning. Under the impetus of this demonstration, students who originally have a low level of commitment to learning will strive to improve their own commitment to learning.

Concetrual Framework

This study investigates the current situation of peer relationships, academic engagement and academic performance of college students through a questionnaire survey on peer relationships and academic engagement of college students, examines the relationship between peer relationships, college students' academic engagement and academic performance, and discusses in depth the influence of peer relationships on college students' academic performance, in an attempt to exert the positive influence of peer relationships, circumvent the negative influence of peer relationships, and increase the college students' academic engagement and thereby promote college students' academic performance, and to promote the academic performance of college students.



In this way, it enriches the research on peer relationships, academic engagement and academic performance of college students from the theoretical point of view. Moreover, it helps to guide college students to have reasonable peer interactions and guide them to have reasonable and correct interactions with their peers. At the same time, it also helps to revolutionize the working method of improving college students' academic performance. It helps schools and teachers to formulate appropriate management systems according to the actual situation of college students, to strengthen management from the aspect of peer relationship, and to enhance college students' learning input, so as to improve college students' academic performance.

Research Hypotheses

- H1: Peer Relationship can significantly predict Academic Engagement ;
- H2: Academic Engagement can significantly predict Academic Performance;
- H3: Peer Relationship can significantly predict Academic Performance;
- H4: Academic Engagement has a significant mediating effect between Peer Relationship and Academic Performance.

Research Methodology

This study adopts quantitative analysis to analyze the status quo of college students' peer relationships, the status quo of college students' learning input and its impact on academic performance. Firstly, we looked for the questionnaire of college students about peer relationship, college students' study input and college students' academic performance to survey college students, which mainly investigated the basic background information of college students, college students' study input level, college students' peer relationship and college students' academic performance. The collected data were coded, entered and analyzed using SPSS 24.0 statistical software and SmartPLS 4.0, and the analysis methods

included the following: frequency analysis, mean analysis, reliability and validity analysis, and structural equation analysis.

Sample Size

The involved population in the present study includes students of all majors of all grades in HZC. They may be from different grades, they may be from different majors, they may be student leaders and they may not be student leaders. This is to ensure that the data are from different students and are randomly sampled, so as to ensure the authenticity of the data, and that the research questions as well as the conclusions drawn can be more realistically generalized among college students. A random sample of 300 undergraduate students from HZU was selected to do this study.

Instrument

IPPA-P

The short version of IPPA-45 was developed to assess parent-peer attachment more efficiently, Ross B. Wilkinson and Daphne Yun Lin Goh (2014) developed a short version of the IPPA containing 45 items divided into three subscales, each of which assesses attachment to mother, father, and peers. The short version of IPPA's peer section was also adopted in this study to see peer relationships from the establishment of attachment to peers. 5 Likert scale is used in this questionnaire that are ranged from 1 which is strongly agree to 5 which is strongly disagree.

UWES-S

The UWES-S is a scale used to assess students' engagement in learning, which contains three sub-dimensions: vigor, dedication, and absorption, and the UWES-S was originally developed by Schaufeli et al. (2002b). The Chinese version of the Utrecht Work Engagement Scale for Students (UWES-S) was adopted in this study, and it was used by Lina Meng and YiJin (2016) who assessed the reliability and validity of the Chinese version of the UWES-S in a sample of Chinese nursing students.

GPA

Grade Point Average is a system used by most colleges and universities to assess a student's academic performance. GPA is a value obtained by converting the grades a student earns in different courses into GPAs and weighting them according to the percentage of credits each course accounts for. Simply put, GPA is the weighted grade point average. For example, if a freshman student has a GPA of 3.60 for the first half of the semester and 3.40 for the second half of the semester, let's take the average of those, $(3.60+3.40)/2 = 3.50$.

Pilot Test

In this study, a pilot test was done before the formal research, in order to measure the reliability and validity of each scale, and the results showed that the reliability and validity of each scale was good, which provided a good foundation for the next step of analysis. The results of the reliability and validity of the scales are as follows Table 1:

Table 1

Reliability and Validity of Pilot Test

Construct	Cronbach's alpha	CR	AVE
Absorption	0.831	0.845	0.527
Alien	0.913	0.939	0.793
Dedication	0.825	0.878	0.593
Vigor	0.901	0.93	0.688
academic engagement	0.887	0.851	0.669
comm	0.894	0.889	0.621
peer relationship	0.916	0.823	0.648
trust	0.923	0.920	0.694

Results and Finding

In this study, a total of 328 samples were recovered, excluding invalid samples such as short response time, regular answers, etc., and 290 valid samples were retained, with an effective recovery rate of 88.41%, and the questionnaire data were next descriptively analyzed using SPSS24.0 software. According to the Table 2, we can see that there are 134 male students, accounting for 46.21%, and 156 female students, accounting for 53.79% of the survey respondents. In terms of grade distribution, the largest number of students were freshmen, accounting for 27.59% or 80 students, followed by juniors with 79 students or 27.24%, sophomores with 73 students or 25.17%, and seniors with 58 students or 20%. In terms of the distribution of majors, a total of 148 students, or 51.03%, participated in the survey in arts, and a total of 142 students, or 48.97%, participated in the survey in sciences. 33.45% of the students were student members, totaling 97 students, 66.55% of the students were not student members, totaling 193 students.

Table 2

Descriptive Analysis

Variable choice		N	Percentage
gender	Male	134	46.21%
	Female	156	53.79%
grade	Freshman	80	27.59%
	Sophomore	73	25.17%
	Junior	79	27.24%
	Senior	58	20.00%
major	Literature	148	51.03%
	Science	142	48.97%
member	Yes	97	33.45%
	No	193	66.55%

In this study, the reliability and validity of the questionnaire were analyzed using SMARTPLS 4.0. According to Fornell and Larcker (1981), there are three criteria for assessing the convergent validity: i) the factor loadings of all the variables should be greater than 0.5, ii) the combined reliability (CR) should be greater than 0.6, and iii) the average amount of variance extracted (Ave) should be greater than 0.5.

Based on the Table 3, we can see that this is a study that explores the relationship between variables and involves multiple Constructs and Items. These first-order constructs include

Absorption with 6 items, Outer loadings with values between 0.745-0.832, Cronbach's alpha of 0.843, Composite Reliability (CR) of 0.912, Average Variance Extracted (AVE) was 0.634. Alien, with a total of 4 items, had values of Outer loadings ranging from 0.71-0.889, Cronbach's alpha of 0.823, CR of 0.898, and AVE of 0.656. Dedication, with a total of 5 items, had values of Outer loadings ranged from 0.762-0.832, with a Cronbach's alpha of 0.853, a CR of 0.899, and an AVE of 0.631. Vigor, with a total of 6 items, had Outer loadings ranging from 0.732-0.835, a Cronbach's alpha of 0.880, a CR of 0.919, and an AVE of 0.627. comm, with a total of 6 items, had values of Outer loadings ranging from 0.790-0.866, with a Cronbach's alpha of 0.878, a CR of 0.925, and an AVE of 0.677. trust, with a total of 5 items, had values of Outer loadings ranging from between 0.742 and 0.898, Cronbach's alpha was 0.894, CR was 0.912, and AVE was 0.634.

In the second-order constructs, peer relationship consists of three constructs, Alien, Comm and Trust, and Academic Engagement consists of three constructs, Absorption, Dedication and Vigor. The Outer loadings for peer relationship were between 0.755-0.846, Cronbach's alpha was 0.916, CR was 0.845, and AVE was 0.687. Outer loadings for Academic Engagement were between 0.734-0.910, Cronbach's alpha was 0.912, CR was 0.852, and AVE of 0.689. Overall, the convergent validity of both the first and second order of this study reached above criterion values.

Table 3

Reliability and Validity Test

Constructs	Items	Outer loadings	Cronbach's alpha	CR	AVE
FIRST ORDER					
Absorption	Absorption1	0.768	0.843	0.912	0.634
	Absorption2	0.832			
	Absorption3	0.785			
	Absorption4	0.825			
	Absorption5	0.745			
	Absorption6	0.774			
Alien	Alien1	0.806	0.823	0.898	0.656
	Alien2	0.838			
	Alien3	0.889			
	Alien4	0.71			
Dedication	Dedication1	0.765	0.853	0.899	0.631
	Dedication2	0.832			
	Dedication3	0.792			
	Dedication4	0.790			
	Dedication5	0.762			
Vigor	Vigor1	0.816	0.880	0.919	0.627
	Vigor2	0.835			
	Vigor3	0.765			
	Vigor4	0.776			
	Vigor5	0.732			
	Vigor6	0.808			
comm	comm1	0.823	0.878	0.925	0.677
	comm2	0.815			
	comm3	0.826			
	comm4	0.821			

	comm5	0.866			
	comm6	0.790			
trust	trust1	0.864	0.894	0.912	0.634
	trust2	0.898			
	trust3	0.742			
	trust4	0.765			
	trust5	0.862			
SECOND ORDER					
peer relationship	Alien	0.755	0.916	0.845	0.687
	comm	0.83			
	trust	0.846			
acdamic engagement	Absorption	0.734	0.909	0.852	0.689
	Dedication	0.842			
	Vigor	0.910			

Table 4
Discriminant Validity-AVE

FIRST ORDER						
	Absorption	Alien	Dedication	Vigor	comm	trust
Absorption	0.764					
Alien	0.254	0.812				
Dedication	0.351	0.343	0.789			
Vigor	0.461	0.334	0.711	0.795		
comm	0.273	0.425	0.289	0.312	0.821	
trust	0.259	0.576	0.325	0.334	0.467	0.815
SECOND ORDER						
	acdamic engagement	peer relationship				
acdamic engagement	0.823					
peer relationship	0.456	0.809				

According to the criteria given by Fornell and Larcker, if the arithmetic square root of AVE is greater than the absolute value of the correlation coefficient between the latent variables, which indicates that the internal correlation is greater than the external correlation, indicating that the latent variables are different from each other, then the discriminant validity is high. As can be seen from the Table 4, the square root of AVE of the first order variables in this study ranges from 0.764 ~ 0.815, and its minimum value is 0.764, the square root of AVE of the second order variables are 0.823, 0.809, and the correlation coefficient is 0.456 respectively, and the minimum value of the square root of AVE is greater than the maximum value of the correlation coefficient of its corresponding variables, which indicates that the discriminant validity of the present study is up to the standard.

Table 5
Assessing of the Path Co-efficient

Relationship	Path Coefficient (β)	Std. Error	BCI LL	BCI UL	t-value	P value	Decision	R ²	f ²	Effect Size	VIF
peer relationship -> academic engagement	0.283	0.048	0.185	0.374	5.812	0.000	Supported	0.095		Small	1.246
academic engagement -> GPA	0.218	0.058	0.102	0.324	3.757	0.000	Supported	0.040		Small	1.494
peer relationship -> GPA	0.201	0.053	0.089	0.314	3.456	0.000	Supported	0.004		Smmall	1.364

In this study, the hypotheses in the model were tested and analyzed through the Bootstrapping algorithm in SmartPLS 4.0, and the values of the path coefficients ranged from -1 to +1. A coefficient level closer to 1 indicates a better relationship, while a coefficient value closer to 0 indicates a lower correlation (Hair et al., 2017). We used p-values in conjunction with hypothesis testing methods to determine the statistical significance of hypotheses. Hypotheses were considered significant if the p-value for each hypothesis was less than 0.05. Then, this study incorporated the direct effects in the model, to examine hypothesis H1 to H3. The results are illustrated in Table 5, Multiple paths in the model are statistically significant. Specifically, the first hypothesis, we asserted that peer relationship are positively associated with academic engagement. The result of the study supports the hypotheses suggesting a significant positive relationship between peer relationship ($\beta=0.283$, t-value=5.812, $p<0.001$) and Academic Engagement. Hence H1 was supported.

Meanwhile, In the second and third hypothesis, it is asserted that academic engagement and peer relationship are positively associated with academic performance, the result of the study suggests that academic engagement ($\beta=0.218$, t-value=3.757, $p<0.001$) and peer relationship ($\beta=0.201$, t-value=3.456, $p<0.001$) are also positively related to academic performance. Consequently, H2 and H3 were supported.

Table 6
Assessing of the Mediating Analysis

Relationship	Path Coefficient (β)	Std. Error	BCI LL	BCI UL	t-value	P value	Decision
peer relationship -> academic engagement -> GPA	0.064	0.030	0.100	0.018	3.518	0.000	Supported

In the mediation effect test, the most widely used method and highly respected by scholars is the Bootstrap method. This method is not restricted by factors such as sample size and normal distribution in the analysis process, can provide accurate confidence intervals, and has shown good results in practical application. Therefore, this study chooses to use Bootstrap method to test the mediation effect. In this paper, the Bootstrapping algorithm of SmartPLS 4.0 is used to test the mediation effect of the model, and Bootstrapping is set to 5000 times, when the 95% confidence interval of the indirect effect does not contain 0, the mediation effect is significant; when it contains 0, the mediation effect is not significant.

In the fourth hypotheses, it is asserted that academic engagement have a significant mediating effect between peer relationship and academic performance. The result reported in Table 6, it suggests that academic engagement ($\beta=0.064, t\text{-value}=3.518, p=0.000$) have a significant mediating effect between peer relationship and academic performance. And, the direct analysis between peer relationship and academic performance showed that the effect of peer relationship on academic performance was positive and significant. The indirect effect of peer on academic performance through academic engagement was significant, indicating that academic engagement partially mediate the relationship between peer relationship and academic performance. Hence, H4 was supported.

Discussion

Discussion 1: Peer Relationship of College Students Positively Influence Academic Performance

According to Zhang, & Wang, (2022), peer relationships among college students are one of the most important factors affecting their academic performance. Peer relationships positively predict college students' academic performance by providing social support, promoting motivation, enhancing academic engagement, and creating a positive learning environment. Specifically, peer interactions promote knowledge sharing, exchange of learning strategies, and collision of academic perspectives, thereby enhancing individuals' cognitive abilities and critical thinking skills. In addition, mutual encouragement and support among peers can help alleviate academic stress and enhance learning confidence, thereby improving academic performance.

Empirical studies of Wang, & Wu, (2022), have shown that there is a significant positive correlation between the quality of peer relationships and college students' academic performance. High-quality peer relationships can provide college students with the necessary emotional and instrumental support to help them better cope with academic challenges and improve their learning efficiency. At the same time, competition and cooperation among peers can also stimulate individual learning motivation and improve academic performance. In summary, the establishment and maintenance of college students' peer relationships are important predictors of their academic performance. Therefore, colleges and universities and educators should pay attention to the cultivation of peer relationships and promote peer interaction and cooperation by organizing activities such as team learning and academic exchanges in order to improve the overall academic performance of college students.

Discussion 2: Peer Relationships of College Students Positively Influence Academic Engagement

Peer relationships significantly predicted and facilitated college students' engagement in learning through the mechanisms of providing social support, facilitating social comparison, and enhancing a sense of belonging. Specifically, peer relationships can provide college students with emotional support, reduce stress and anxiety during the learning process, and thus enhance students' emotional engagement in learning. Meanwhile, peer interaction and cooperative learning can promote knowledge sharing and exchange of learning strategies, and enhance students' cognitive engagement. In addition, the social comparison process in peer relationships can stimulate students' sense of competition and self-improvement motivation, thus enhancing their behavioral engagement.

The results of the empirical study of Simpson, & Green (2020), indicate that there is a significant positive correlation between the quality of peer relationships and college students' level of academic engagement. High-quality peer relationships can effectively enhance students' motivation and engagement in learning by providing positive social comparison standards, enhancing teamwork skills, and facilitating academic discussions. Therefore, the establishment and maintenance of peer relationships are significant predictors of motivating and sustaining college students' engagement in learning.

In summary, the quality and depth of college students' peer relationships have significant positive predictive effects on learning engagement in academic settings. Educational policy makers and university administrators should pay attention to the role of peer relationships in promoting learning engagement and create a supportive and motivating learning environment for college students by designing and implementing effective peer interaction and teamwork programs.

Discussion 3: College students' engagement in learning has a positive impact on academic performance

The research of Patel, & Richards (2019), has shown that college students' engagement in learning is a key predictor of their academic performance. Learning engagement significantly predicts academic achievement in several ways.

In summary, college students' engagement in learning significantly predicts their academic achievement in several dimensions. Therefore, educators and college administrators should emphasize the importance of fostering students' engagement in learning by providing high-quality instruction, creating a positive learning climate, and encouraging interactions among students in order to promote students' academic development and success.

Discussion 4: Academic engagement partially mediates peer relationships and academic performance among college students

The results of this study support the partial mediating role of learning engagement between peer relationships and academic performance among college students. Peer relationships indirectly improved academic performance by enhancing academic engagement. This finding emphasizes the importance of peer relationships in promoting academic performance and points to academic engagement as a potential mechanism for enhancing academic performance.

Implication

Implication 1: Emphasize peer influence and lead by example

In the previous study, it was shown that college students' peer relationships can have a positive impact on college students' academic performance. Therefore, for the improvement of college students' academic performance, peers can play a great role.

College students in the transition from adolescence to adulthood regard peer relationships as one of their important interpersonal relationships, and the acceptance and encouragement of peers is one of the most important sources of socialization and achievement for college students, but the quality of peer relationships or the nature of peer behaviors can also have a great impact on individuals. If they are exposed to positive peers, it will be better to promote academic adaptation and improve academic performance; on the contrary, if they are

exposed to peers with more undesirable behaviors, it will, to a certain extent, affect academic adaptation and academic performance. The old Chinese saying, "The one who is close to the ink is black, and the one who is close to the Zhu is red," plainly describes the sociological laws behind the influence mechanism of different social factors, including peers, on individuals. The sociological law behind the influence mechanism of different social factors, including peers, on individuals. Meanwhile, college students with better academic performance and stronger personal ability have the opportunity to have better peer relationships. According to Zeng, Zhong, & Wu, (2022), the research has shown that individual excellence is an important factor in enhancing interpersonal attraction, while academic performance is an important indicator of personal competence in secondary school students, which further affects their peer relationships.

The emergence of peers with positive learning attitudes, strong self-control in learning and excellent academic performance in small peer groups will have a certain positive impact on other members of the peer group in terms of psychology and behavior. For example, in the dormitory, group study such a small peer group, you can give full play to the role of good learning behavior role models to lead, encourage ordinary students to actively learn from the role models, in the dormitory and the group to create a learning role models, respect for the role models, study hard, and make progress together in the mental outlook and ethos. Classes can also set up a "one to one" activity group, so that students with good academic performance can help and guide students with an improper attitude towards learning to form a positive outlook on learning.

Implication 2: Provide courses on interpersonal communication and create a good atmosphere for peer interaction

According to the research of Baker, & Clark, (2021), it can be understood that good peer relationships can promote the level of college students' learning engagement. Therefore, it is especially important to guide students to form good peer relationships and create a good atmosphere for peer interaction. And in the descriptive analysis of peer relationships, it was found that peer acceptance scored the lowest among peer relationships. It has been shown that individuals with stronger interaction skills tend to be more popular in the group and have a higher degree of acceptance by peers; and vice versa, individuals with a low status in the group tend to lack interaction skills, and therefore the worse the interaction skills. The reason why peer-to-peer relationships are affected is related to the lack of interaction skills among college students. In this regard, schools should provide courses on interpersonal communication to enable college students to better understand themselves and others, to acquire certain knowledge of social communication and to improve their social communication skills. Bock advocates that interpersonal relationship courses should be offered to students of all disciplines. Secondly, a variety of activities can be carried out to provide more opportunities for college students to socialize. Not only limited to classroom interactions and interactions, but also extracurricular activities, such as social practices, can be organized to provide students with opportunities to communicate and enhance their friendships with each other, and to create a good atmosphere of peer interaction in the class.

Implication 3: Focusing on students from different backgrounds to make education more relevant

The results of Patel, & Richards, (2019) study show that there is a significant difference in the level of college students' commitment to learning, with sophomores and juniors having a significantly higher level of commitment to learning than freshmen. In this regard, schools can take different measures for students of different grades in terms of learning investment. For freshmen, schools can reasonably arrange courses and organize extracurricular learning activities to enrich the learning life of freshmen and enhance their learning motivation.

In the area of enhancing peer relationships, teaching must also be tailored to the needs of the students. Different courses are offered to students of different grades. Anderson, & Thompson, (2019) has proposed to offer adaptive interpersonal communication courses for freshmen to increase freshmen's understanding of interpersonal relationships and interpersonal communication, to help them form the awareness of improving their interpersonal communication ability, and to lay the foundation for their subsequent interpersonal communication to proceed smoothly. An upgrading interpersonal communication course is offered for sophomores to provide them with skills and methods to solve interpersonal conflicts. The developmental interpersonal communication course for juniors provides them with basic etiquette knowledge, campus etiquette, social etiquette and other etiquette knowledge.

The study show that there is a significant difference in the level of study engagement among college students with different status. The learning engagement level of students who serve as student leaders is significantly higher than that of students who do not serve as student leaders. In this regard, teachers should pay more attention to ordinary students in the teaching process, increase the frequency of communication with ordinary students, care about their learning life, and make efforts to improve the learning engagement level of ordinary students.

According to Miller, & Hernandez, (2021), teachers should also focus on the peer relationships of ordinary students who are not student leaders, consciously guide ordinary students to integrate into the collective, and improve the communication between ordinary students and collective members. In addition, since student leaders can improve the quality of peer relationships and promote the level of college students' commitment to learning, teachers can implement the student leader rotation system in the classroom, so that each student has the opportunity to have frequent contact with teachers and classmates, which can enhance their feelings and exercise their abilities, so as to achieve the effect of improving the harmony of the group and the overall level of learning.

Implication 4: Realize the importance of peer relationships and take the initiative to build good peer relationships

Peer relationship is one of the important interpersonal relationships of college students, and good peer relationship has a facilitating effect on college students' study, and also has an important value for promoting the healthy development of college students' psychology and the development of socialization, therefore, it is especially important to maintain a good relationship with peers. First of all, college students should realize the importance of peer relationships, pay attention to peer relationships from the conception, and have the

consciousness of maintaining good peer relationships in learning and interaction with peers, and keep the willingness to learn peer interaction skills. Secondly, in the process of interaction with peers, we should pay attention to the skills of interaction, such as to live in harmony with others, learn to listen to others' ideas, take care of the feelings of others, and do not quarrel over small things; in addition, controlling their own emotions is also an important way to maintain good peer relations, maintain positive and optimistic emotions in the process of interaction, and transmit positive energy to peers, communicate in a timely manner when there are contradictions and try to maintain a harmonious relationship with peers. When conflicts arise, communicate in a timely manner and try to maintain a harmonious relationship with peers. In conclusion, college students should realize the importance of peer relationships and take the initiative to build good peer relationships.

Conclusion

The objective of this study was to examine the effect of peer relationships on academic performance of university students with the mediating role of learning inputs. The conclusion drawn is that peer relationships have an effect on their academic performance and influence academic performance through the mediating role of learning input. Educators need to create a good interpersonal environment for students, and at the same time college students need to maintain their peer relationships and increase their learning inputs so that their academic performance will show an excellent trend.

References

- Baker, A., & Clark, M. (2021). Peer group effects on college student performance: Evidence from a natural experiment. *Economics of Education Review*, 82, 102094. <https://doi.org/10.1016/j.econedurev.2021.102094>
- Bagozzi, R. P., Fornell, C., & Larcker, D. F. (1981). Canonical correlation analysis as a special case of a structural relations model. *Multivariate Behavioral Research*, 16(4), 437-454. https://doi.org/10.1207/s15327906mbr1604_2
- Cheng, J., Dai, C., & Liu, M. (2023). Daily peer relationships and academic achievement among college students: A social network analysis based on behavioral big data. *Sustainability*, 15(22), 15762. <https://doi.org/10.3390/su152215762>
- Davis, L., & Patel, R. (2021). Investigating the role of peer relationships in the academic success of first-generation college students. *Journal of College Access*, 6(1), 21-34. <https://scholarworks.wmich.edu/jca/vol6/iss1/3>
- Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research*, 74(1), 59-109.
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2017). *Multivariate data analysis* (7th ed.). Pearson.
- Harris, P., & Lee, J. (2023). Social integration and academic performance: The role of peer relationships in higher education. *Journal of Higher Education*, 94(2), 212-226. <https://doi.org/10.1080/00221546.2022.2042654>
- Lee, H., & Kim, J. (2020). The role of peer relationships in student academic performance and persistence in higher education. *Educational Research Review*, 30, 100322. <https://doi.org/10.1016/j.edurev.2020.100322>
- Meng, L., & Jin, Y. (2016). The role of classroom climate in the relationship between achievement goals and academic outcomes in math classrooms. *Frontiers in Psychology*, 7, 1567. <https://doi.org/10.3389/fpsyg.2016.01567>

- Miller, R., & Hernandez, L. (2021). Peer influence on academic outcomes: The role of friendship quality and academic stress among college students. *Journal of Adolescent Research*, 36(3), 303-321. <https://doi.org/10.1177/0743558420985440>
- Nguyen, M., & Parker, S. (2020). Peer support and academic outcomes in STEM education: A study of college students. *International Journal of STEM Education*, 7(1), 15. <https://doi.org/10.1186/s40594-020-00226-3>
- Patel, K., & Richards, D. (2019). The impact of peer mentoring on academic performance and retention in higher education. *Studies in Higher Education*, 44(4), 765-779. <https://doi.org/10.1080/03075079.2019.1596085>
- Ramirez Hall, A., & Nishina, A. (2019). Prospective associations between peer support, academic competence, and anxiety in college students. *Social Psychology of Education*. <https://doi.org/10.1007/s11218-019-09521-9>
- Schaufeli, W. B., Martinez, I. M., Pinto, A. M., Salanova, M., & Bakker, A. B. (2002). Burnout and engagement in university students: A cross-national study. *Journal of Cross-Cultural Psychology*, 33(5), 464-481. <https://doi.org/10.1177/0022022102033005003>
- Simpson, K., & Green, A. (2020). The influence of peer academic support on university students' academic success and engagement. *Learning and Instruction*, 65, 101237. <https://doi.org/10.1016/j.learninstruc.2019.101237>
- Smith, L., & Brown, P. (2020). The influence of peer relationships on academic motivation and achievement in college students. *Journal of Educational Psychology*, 112(4), 765-777. <https://doi.org/10.1037/edu0000398>
- Wang, C., & Wu, J. (2022). Peer relationships, academic performance, and well-being in university students: A longitudinal study. *Journal of Educational Psychology*, 114(2), 230-243. <https://doi.org/10.1037/edu0000680>
- Williams, K., & Johnson, T. (2021). Peer support networks and academic success in higher education: A longitudinal study. *Higher Education Research & Development*, 40(3), 564-578. <https://doi.org/10.1080/07294360.2020.1839024>
- Wilkinson, R. B., & Goh, D. Y. L. (2014). Structural, age, and sex differences for the factor structure of the parental attachment questionnaire. *Measurement and Evaluation in Counseling and Development*, 47(2), 109-129. <https://doi.org/10.1177/0748175613513807>
- Zeng, G., Zhong, M., & Wu, W. (2022). The impact of peer effects on academic performance of college students]. *Frontiers in Psychology*, 13, 1055963. <https://doi.org/10.3389/fpsyg.2022.1055963>
- Zhang, Y., & Wang, X. (2022). The effects of peer relationships on college students' academic engagement and performance. *Frontiers in Psychology*, 13, 831694. <https://doi.org/10.3389/fpsyg.2022.831694>