Journal of Education and Educational Research
ISSN: 2957-9465 | Vol. 5, No. 1, 2023

Research on the relationship between college students' learning autonomy, psychological needs, and self-control

Lei Dong [1], Hongmei Sun [2, *], Yuefei Zheng [1], Yongqi Li [1], Haojie Zhu [1] and Xu Wang [1]

[1] School of Mechanical Engineering, Tianjin University of Technology and Education, Tianjin 300222, China.

[2] School of Management, Tianjin University of Traditional Chinese Medicine, Tianjin 301617, China.

[*] **Corresponding author**: Hongmei Sun

Abstract: The aim of this study is to investigate the current status of students' autonomy in learning and examine its relationship with psychological needs and self-control. The participants in this study were college students, and a questionnaire survey was used to collect data, which were analyzed using SPSS. The results revealed that: (1) students' autonomy in learning was at a moderate level; (2) there was a significant positive correlation between psychological needs and autonomous learning, and there was also a significant positive correlation between psychological needs and self-control; (3) both psychological needs and self-control could significantly predict students' autonomy in learning; (4) self-control played a partial mediating role between psychological needs and autonomous learning, indicating that psychological needs influenced autonomous learning through self-control. These findings suggest that enhancing students' satisfaction of psychological needs and improving their self-control abilities can promote the development of autonomy in learning.

Keywords: Learning autonomy; Psychological needs; Self-control.

1. Introduction

The rapid development of information technology in this context has transformed the learning landscape, highlighting the significance of lifelong learning and the cultivation of autonomous learning skills and concepts. The self-learning ability of contemporary college students has emerged as a prominent force in the new era, rendering it increasingly significant. In comparison, college students engage in more intricate and advanced learning activities. Unlike the specific guidance offered in middle school, college teachers provide more abstract guidance. Consequently, in such circumstances, the ability to engage in autonomous learning becomes a pivotal determinant influencing students' academic achievement [1].

In recent decades, the autonomy of student learning has become a prominent research focus in psychology, both domestically and internationally, particularly in educational psychology. Xie Min found a significant positive correlation between university students' learning motivation and their level of autonomy [2]. Yang Bin et al. examined the influence of emotion regulation strategies on learning autonomy [3]. Liu Fang and Liu Shir's study revealed that university students generally possess strong capabilities for autonomous learning, with a positive linear relationship between autonomous learning and self-efficacy [4]. Additionally, Wang Lina's research indicated that self-efficacy promotes autonomous learning, while intrinsic interest, social responsibility, and individual development motivations have significant promoting effects on autonomous learning [5].

College students have a more complex and diverse learning experience compared to high school students, as they have more free time available. In such circumstances, the psychological needs for autonomous learning and self-control of learning behavior gain increased significance. The self-determination theory states that individuals have basic psychological needs, which encompass autonomy, competence, and relatedness, and these needs determine their behavior pertaining to autonomous learning. Additionally, effective control of their learning behavior not only contributes to the development of good autonomous learning habits but also promotes the satisfaction of basic psychological needs and improves learning efficiency, thereby leading to positive learning outcomes. Therefore, this study centers on college students as research participants, with the goal of comprehending the present state of students' autonomous learning, investigating the correlation among students' autonomous learning, psychological needs, and self-control of learning behavior, and exploring the impact of psychological needs and self-control on autonomous learning. Ultimately, this study aims to offer valuable insights for enhancing college students' ability in autonomous learning.

2. Research methods

2.1. Participants

The study focuses on college students as the subjects of research. 381 questionnaires were distributed, resulting in a 100% response rate. 299 valid questionnaires were obtained, yielding an effectiveness rate of 78.48%. Refer to Table 1 for specific data.

2.2. Research instruments

We utilized the self-directed learning survey questionnaire for students developed by Wang Xianliang in 2006. The questionnaire comprises 33 items divided into three subscales. It employs a five-point scoring method, and its internal consistency coefficient is 0.90.

We utilized the Basic Psychological Needs Scale developed by Liu Jun sheng and colleagues in 2013. The scale comprises 19 items and utilizes a 7-point scoring method, demonstrating an internal consistency reliability coefficient

of 0.84.

We utilized the self-control questionnaire revised by Tan Shuhua, Guo Yong Yu, and colleagues in 2008. Comprising a total of 19 items, the questionnaire utilizes a 5-point scoring method displaying an internal consistency coefficient of 0.86 for the overall scale.

2.3. Implementation process and data processing

The study employed random sampling to select 381 college students, and distributed survey questionnaires using the Questionnaire Star. Platform with participants completing the questionnaire. Independently, It typically takes 5 to 8 minutes to complete all the questions. Participant identities are kept anonymous throughout the study.

The measurement data was inputted into the computer and processed using SPSS 17.0 statistical software. Various analyses were performed, such as independent samples t-test, analysis of variance, and other methods.

Table 1. Primary Characteristics of Participants (n=299)

Variable	Variable Categories	Number of people(persons)	Percentage of occupation (%)
Gender	Male	92	30.77
	Female	207	69.23
Grade	Freshman year	60	20.07
	Sophomore year	47	15.72
	Junior year	68	22.47
	Senior year	124	41.47
Major category	Science and engineering	84	28.09
	Liberal arts	45	15.07
	Art and physical education	5	1.67
	Medical field	125	41.81
	Other	40	13.38
Place of residence	Rural area	179	59.87
	Town or urban area	120	40.13
Have you ever served as a class officer	Yes	143	47.83
	No	156	52.17

3. Research findings

3.1. The current situation of college students' learning autonomy

Self-directed learning indicating a stronger level of self-directedness in learning, it suggests a moderate level of self-directed learning among the participants. Scores greater than 3 indicate it suggests a lower level of self-directed learning. The average scores of individual questions on the self-directed. Learning scale around 3 indicating a moderate level of self-directed learning among college students. Specifically, the learning setting subscale obtains a higher average score. The subscale of motivation obtains the lowest average score. Refer to Table 2.

Table 2. Overall Situation of Independent Learning among College Students (N=299)

	Learning motivation	Learning environment	Self-regulation	Total of independent learning
Mean value	27.63	33.39	30.53	91.55
Standard deviation	6.48	8.60	7.97	22.34
Average score for each	2.76	2.78	2.77	2.77

3.2. Comparisons of differences Sin learning autonomy across demographic variables

3.2.1. Differences in learning autonomy among college students of different genders

Using gender as the independent variable, an independent samples t-test was conducted to compare on the overall self-directed learning score and the scores of its individual components. The results indicated that there was no significant differences in both the self-directed learning scores and the scores of its components among male and female students. Refer to Table 3.

Table 3. Differences in Independent Learning between College Students of Different Genders (M±SD)

Item or category	Male students (n=124)	value and significance	Female students (n=228)
Overall score of independent learning	96.32±21.67	89.43±22.35	2.483
Learning motivation	29.17±6.54	26.94±6.79	2.652
Learning setting or learning environment	35.00±8.45	32.68±8.59	2.170
Self-regulation	32.14±7.71	29.81±8.00	2.355

Note: *: $p<0.05$, **: $p<0.01$, ***: $p<0.001$

3.2.2. Differences in learning autonomy among college students of different grade levels

We conducted a one-way analysis of variance, treating grade as the independent variable and using the scores of self-directed learning. As well as various subscales as the dependent variables. The results showed no significant differences in self-directed learning total scores, as well as scores on the subscales of learning motivation, learning setting, and self-regulation, among college students of different grades. See Table 4.

3.2.3. Differences in learning autonomy among college students who have served as student leaders

We conducted an independent samples t-test using whether participants had served as class cadre as the independent variable, and self-directed learning total score along with various subscale scores as the dependent variables. The results revealed no significant differences in self-directed learning total score, as well as scores on the subscales of learning motivation, learning setting, and self-regulation,

based on whether participants had served as class cadre. See Table 5.

Table 4. Differences in Independent Learning among College Students of Different Grades (M±SD)

Item or category	freshman year (n=67)	sophomore year (n=52)	junior year (n=76)	senior year (n=157)	F-value and significance
Total score of self-directed learning	91.64±19.69	89.00±22.69	93.96±22.76	91.16±23.31	0.473
Learning motivation	27.52±6.44	26.77±6.45	28.30±6.82	27.65±7.08	0.474
Learning environment or learning setting	33.38±7.28	32.70±9.50	34.58±8.46	33.02±8.95	0.605
Self-regulation	30.74±6.95	29.53±8.01	31.07±8.31	30.05±8.30	0.362

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

Table 5. Differences in self-study among college students who have served as class cadre (M±SD)

Item	Served as a class monitor (n=162)	Never served as a class monitor (n=190)	t-value and significance
Total score of self-directed learning	88.97±22.49	93.90±22,01	-2.565
Learning motivation	26.59±6.87	28.58±6.58	-1.988
Learning setting	32.36±8.43	34.33±8.67	-1.047
Self-regulation	30.02±8.21	30.99±7.75	-1.916

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

3.2.4. Differences in learning autonomy among college students in different disciplines

Table 6. Differences in self-directed learning among university students in different disciplines (M±SD)

Project	Science (n=109)	Liberal arts or humanities (n=52)	F-value and significance
Total score of self-directed learning.	89.98±23.45	87.78±20.35	1.515
Learning motivation	26.93±7.10	27.02±5.85	1.068
Learning environment or learning setting	33.23±9.50	31.49±8.16	1.375
Self-regulation	29.82±7.87	29.27±7.39	1.966

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

No significant differences were found among university students. From different disciplines in terms of their total score in self-directed learning, as well as the sub-scales of learning motivation, learning environment, and self-regulation. See Table 6 and Table 7.

Table 7. Differences in self-directed learning among university students in different disciplines (M±SD)

Project	Art and sports-related disciplines (n=9)	Medical disciplines (n=134)	Others (n=48)	F-value and significance
Total score of self-directed learning	103.60±22.56	91.56±22.49	97.53±20.92	1.515
Learning motivation	30.20±6.98	27.70±6.93	29.25±6.56	1.068
Learning environment or learning setting	38.20±7.33	33.43±8.35	35.15±7.77	1.375
Self-regulation	35.20±8.35	30.43±8.22	33.13±7.60	1.966

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

3.2.5. Differences in learning autonomy among college students from different hometowns

An independent samples t-test was conducted, using the place of residence as the independent variable, and the total score of self-directed learning, as well as the sub-scales, as the dependent variables. No significant differences were found among university students. From different places of residence with regard to their self-directed learning total score, learning environment, learning motivation, and self-regulation. See Table 8.

Table 8. Differences in self-directed learning among university students from different hometowns (M±SD)

Project	Rural(n=138)	Urban(n=165)	T-value and significance
Overall score of self-directed learning	93.48±20.90	88.66±24.13	1.837
Learning motivation	28.46±6.35	26.38±7.23	2.625
Learning environment	34.03±8.01	32.43±9.37	1.581
Self-regulation	30.98±7.57	29.84±8.52	1.215

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

3.3. Correlation analysis of college students' learning autonomy, psychological needs, and self-control

A Pearson correlation analysis was performed college students' autonomy in learning, psychological needs, and the overall score of autonomous learning. The score of the

learning motivation scaled. The score of the learning settings scaled. The score of the self-control scaled the impulse control dimension. The healthy habits dimension, the resistance to temptation dimensions. The moderation of entertainment dimension. The learning motivation scaled the overall score of self-control its various dimensions. The overall score of autonomous learning the score of the learning motivation scaled. The score of the learning settings scaled, the score of the self-regulation scaled. The overall score of psychological needs, the autonomy dimension, and highly significant positive correlations were observed between the overall score of psychological needs, the autonomy dimension, and the affiliation dimension. However, there was no significant correlation observed. See Table 9.

Table 9. Correlation Analysis of College Students' Self-directed Learning, Self-control, and Psychological Needs

Project	1	2	3	4	5	6
The total score of self-directed learning	1.00					
Learning motivation	0.931**	1.00				
Learning settings	0.970**	0.851**	1.00			
Self-regulation	0.964**	0.839**	0.915**	1.00		
The total score of self-control	0.309**	0.253**	0.312**	0.315**	1.00	
The total score of psychological needs	0.200**	0.190**	0.183**	0.202**	0.214**	1.00

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

3.4. Regression analysis of college students' learning autonomy, psychological needs, and self-control

Table 10. Regression Analysis of College Students' Self-directed Learning with Psychological Needs and Self-control

The dependent variable	Entering equation variable	R^2	ΔR^2	B	β	T-value and significance
Total score of autonomous learning	Total score of psychological needs	0.04	0.04	0.593	0.200	3.520***
	Total score of self-control	0.115	0.075	0.679	0.279	4.991***

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

A regression analysis was conducted using the total score of autonomous. Learning as the dependent variable, and the total scores of psychological needs, and self-control as the independent variables to explore their effects on learning autonomy. The regression analysis showed that the total score of psychological needs accounted for 4% of the variance. In autonomous learning, indicating a significant positive predictive effect. The variable of self-control explained 7.5% of the variance. In the overall score of autonomous learning, demonstrating a highly significant positive predictive effect. Together, these two variables accounted for 11.5% of the variance. Refer to Table 10.

3.5. The impact of psychological needs on learning autonomy: Testing the mediating effect of self-control

From the above analysis, it is evident that there exists a positive correlation between learning autonomy, and psychological needs as well as self-control. Additionally, a significant positive correlation is observed between psychological needs and self-control. Hence, it is plausible to investigate whether self-control acts as a mediator. Between autonomous learning and psychological needs. The mediating effect can be assessed by utilizing the autonomous learning. Total score as the dependent variable, psychological needs as the predictor variable, and self-control as the mediating variable. To determine the mediation relationship, the mediation effect analysis method summarized by Wen Zhong Lin et al can be employed. This method represents the mediation relationship through three regression equations: (1) Y = CX + e1, (2) M = AX + e2, (3) Y = C′X + BM + E3, where Y represents the dependent variable denoting the autonomous learning total score, X signifies the predictor variable denoting psychological needs, and M represents the mediating variable denoting self-control. The testing process and results of the mediation effect are presented in Table 11.

Table 11. Analysis process and results of the mediating effect

Equation	Response variable	Predictor variable	SE	t-value and significance
Y=0.2X	Total score of self-directed learning	Total score of psychological needs	0.168	3.520***
M=0.214X	Total score of self-control	Total score of psychological needs	0.096	3.775***
Y=0.14X+0.279M	Total score of self-directed learning	Total score of psychological needs	0.166	2.506*
Total score of self-control			0.136	4.991**

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

Regression analysis in the first step revealed a significant effect of the predictor variable X. Psychological needs on the dependent variable Y. Total score of autonomous learning, with a coefficient c=0.200, t=3.520, p<0.05.

Regression analysis in the second step showed a significant effect of the predictor variable X. Psychological needs on the mediator variable M. Self-control, with a coefficient a=0.214,

t=3.775, p<0.05.

Regression analysis in the third step revealed simultaneous predictive effects of psychological needs, and self-control on autonomous learning. Using the total scores of psychological needs, and self-control as predictor variables, and the total score of autonomous learning as the dependent variable, significant results were obtained, c′=0.14, b=0.279, t=4.991, p<0.05.

In summary, psychological needs significantly predict both autonomous learning and self-control. Moreover, self-control plays a partial mediating role between psychological needs, and learning autonomy. The proportion of the mediation effect to the total effect is calculated as (0.214×0.279)/0.2=29.85%.

4. Discussion

4.1. Analysis of the overall situation of college students' autonomy in learning

Through descriptive statistical analysis, grades among college students in the domain of self-directed learning higher compared to the overall average level. Specifically, average scores on the learning motivation scale. The scale measuring the learning environment, and the scale assessing self-regulation align closely with the overall score. In the realm of self-directed learning, the scores on the learning environment scale slightly exceeds the scores on the learning motivation scale and the scale assessing self-regulation. However, the scores on the learning motivation scale slightly falls below the scores on the scale measuring the learning environment and the scale assessing self-regulation.

The findings suggest that college students' current level of self-directed learning is moderate. They actively improve their self-directed learning through motivation, learning settings, and self-regulation, displaying a comprehensive understanding of their learning circumstances. Particularly noteworthy is their performance in self-regulation and learning settings. Nevertheless, Liu Ge et al . Concluded that college students' self-directed learning is generally moderate. Chai Jun Ying's research has revealed the following: First, the overall level of self-directed learning is relatively low. Second, there is a significant gender disparity in self-directed learning, with females significantly surpassing males. Third, there is a notable positive correlation between students' academic performance and self-directed learning.

The analysis reveals a significant positive correlation. In comparison to secondary school, college students. In this context, the ability and habit of independent learning are vital for college students. However, college students exhibit shortcomings in terms of learning motivation, as evidenced by their comparatively low scores on the learning motivation scale. Despite possessing a moderate level of learning autonomy, they lack motivation and proactiveness in independent learning. Therefore, it is necessary to reflect on the current higher education system. Schools and teachers should offer additional guidance to college students on learning motivation, setting goals, and self-regulated learning to cultivate their learning autonomy, enhance teaching quality and academic performance, and foster talent.

4.2. Analysis of the demographic variables in college students' autonomy in learning

4.2.1. Gender differences in college students' autonomy in learning

Based on the independent samples t-test, there were no significant differences in scores between students of both genders on measures of overall autonomous learning, motivation scale, environment scale, and self-regulation, p>0.05. These findings align with the research results of Guo Hao et al , suggesting no significant difference. In the ability of male and female students to manage and arrange their learning methods effectively. This may be due to the fact that students of both genders receive the same level of higher education, and are capable of achieving similar levels of autonomy in managing, and arranging their learning, and daily lives. However, Wang Tian's study results suggest there are significant gender differences in learning autonomy, with males demonstrating significantly greater autonomy than females.

4.2.2. Grade differences in college students' autonomy in learning

Based on the results of one-way analysis of variance, no significant differences were found in both the overall self-directed learning score and its various subscales across all four university grades. This aligns with the research findings of Wang Tian. The absence of significant differences may be attributed to factors within the context of higher education, irrespective of the grade. Students can adjust and allocate their study time promptly, proactively develop study plans, and fulfill their learning tasks according to the plan, thereby cultivating good study habits. Therefore, this fully reflects the success of higher education, that is, there is no significant difference in the levels of self-directed learning across different grades.

4.2.3. The difference in whether college students have served as class cadres reflects their autonomy in learning

Based on the independent samples t-test, no significant difference was found in the scores of self-directed learning between students who have served as class cadres and those who haven't. This indicates that serving as a student cadre does not affect their learning motivation, learning environment, and self-regulation abilities. They possess a clear understanding of learning cognition and their individual learning status. These findings contradict those of Guo Hao and others. The level of learning autonomy does not depend on whether one has served as a class cadre, and the role of being a student cadre does not impact the student's learning autonomy.

4.2.4. The difference in college students' autonomy in learning varies across different disciplines

The results of one-way analysis of variance indicated no significant differences in the total scores of autonomous learning and scores on various scales among university students from different disciplines. This finding aligns with those of Zhao Dan's study. This suggests that students exhibit consistency in learning motivation, learning settings, and self-regulation across disciplines. All students require increased autonomy in learning and the development of study habits. The pursuit of strong study habits and consistent learning is consistent across disciplines at the university level. The variation in majors does not affect students' autonomy in learning. In general, students across all disciplines generally

exhibit high levels of autonomy in learning.

4.2.5. The difference in college students' autonomy in learning depends on the location of their family

The results of the independent samples t-test demonstrate that there is no statistically significant difference in overall scores, and subscale scores of self-directed learning between students from various locations. Regardless of whether they reside in rural or urban areas, students exhibit a moderate level of self-directedness. In learning and achieve higher scores on both the overall self-directed learning scale, and its subscales. The disparities in students' hometowns do not impact their learning outcomes. Within the same educational setting, students are capable of consciously regulating their learning behaviors, effectively managing their study time, and striving for enhanced learning efficiency. All students display commendable learning habits.

4.3. Analysis of the relationship between college students' autonomy in learning and psychological needs and self-control

4.3.1. Analysis of the correlation between the psychological needs, self-control, and academic autonomy of college students

Research findings indicate a significant positive correlation between college students' learning autonomy and self-control. This conclusion is derived from an analysis using Pearson correlation. There is a significant positive correlation observed between the motivation scale for learning and self-control, including its different dimensions. Thus, higher levels of self-control ability in students are associated with increased learning autonomy. Self-control significantly influences students' learning autonomy and plays a beneficial role. Students who have high levels of learning motivation exhibit stronger self-control abilities. Thus, cultivating and improving students' self-control abilities represents a starting point in nurturing and guiding their learning autonomy.

Learning autonomy and psychological needs exhibit a clear positive correlation, indicating that higher satisfaction of psychological needs corresponds to stronger learning initiative. Students who experience high satisfaction of psychological needs demonstrate remarkable enthusiasm and passion for learning. Effective student education requires attention not only to their physiological needs, but also to meeting their psychological needs, thus enhancing their learning autonomy.

4.3.2. Regression analysis of the psychological needs, self-control, and academic autonomy of college students

Regression analysis revealed a significant positive predictive effect of autonomous learning, psychological needs, and self-control on learning autonomy. The results indicate a similar impact and predictive effect of psychological needs and self-control on learning autonomy. Moreover, the correlation analysis reveals a significant positive correlation among psychological needs, self-control, and learning autonomy, implying that both factors exert some influence on learning autonomy among college students.

Self-control significantly predicts college students' level of learning autonomy, suggesting that students with stronger self-control possess higher levels of autonomy in their learning. Ineffective control of learning behaviors hinders the development of learning autonomy and habits, resulting in increased learning pressure and challenges. Students who possess stronger self-control are able to effectively regulate their learning behaviors and cultivate positive habits. Hence, there exists a close relationship between self-control and learning autonomy, emphasizing the positive impact and predictive role of self-control on autonomy in learning. A significant positive correlation exists between psychological needs and learning autonomy, suggesting that students who have high levels of satisfaction in their psychological needs possess stronger autonomy in learning. Satisfaction of psychological needs is a prerequisite for higher levels of learning autonomy. Once students' basic psychological needs are satisfied, they develop a strong desire and enthusiasm for knowledge, thereby enhancing their learning autonomy. This finding aligns with the research conducted by Zhao Xing Lian, Therefore, in the context of school education and teaching, it is essential to address both students' external material needs and internal psychological needs. By satisfying students' basic psychological needs, their motivation and engagement in learning are enhanced, thereby facilitating the development of self-directed learning, and improving their learning abilities.

4.3.3. Mediation effect analysis of self-control between psychological needs and autonomous learning

The study revealed that self-control partially mediates the relationship between psychological needs and autonomous learning. Fulfilling basic psychological needs positively predicts learning autonomy, while enhancing self-control further strengthens this relationship. Consequently, self-control acts as a partial mediator between psychological needs and learning autonomy.

The study findings indicate that psychological needs and self-control ability significantly predict college students' learning autonomy. Enhancing college students' satisfaction of basic psychological needs and self-control ability can further enhance their learning autonomy. The study offers recommendations for educators and parents to enhance students' learning autonomy. While cultivating students' learning autonomy, it is recommended to concentrate on developing their basic psychological needs and self-control ability. Prioritizing the development of students' self-control ability, and fulfilling their basic psychological needs can enhance their learning autonomy, thus improving their academic performance and teachers' instructional effectiveness. Yang Jing conducted an analysis of the factors that influence college students' autonomous learning, and put forward suggestions to enhance their learning autonomy. College students should consciously develop the habit of autonomous learning, while schools and families should create conducive conditions and provide essential support for fostering students' autonomous learning ability.

This study aims to explore the influence and predictive role of psychological needs and self-control on learning autonomy, and verify the hypotheses. The findings of this study suggest that psychological needs and self-control play a crucial role in college students' learning autonomy. Therefore, enhancing college students' learning autonomy should focus on addressing psychological needs and promoting self-control, while providing accurate and targeted guidance and support. Examining the relationship between college students' learning autonomy, psychological needs, and self-control holds both theoretical and practical significance, as it offers practical suggestions to enhance college students' learning autonomy. In the long-established educational model characterized by fixed thinking, it is crucial for contemporary college students

to avoid passive learning and cultivate self-directed learning abilities, which are now a societal imperative. In light of rapid scientific and technological advancements, along with the expanding need for career transitions and knowledge updates, relying solely on school-acquired knowledge is insufficient; thus, it is imperative for everyone to embrace continuous lifelong learning.

5. Conclusion

1)College students' level of learning autonomy is moderate.

2)The gender, grade, major category, and place of origin do not significantly impact the learning autonomy of college students.

3)Psychological needs and self-control significantly predict students' learning autonomy. Self-control partially mediates the relationship between psychological needs and independent learning, specifically enhancing learning autonomy. Increasing students' satisfaction with psychological needs and self-control abilities enhances their learning autonomy.

References

[1] Xie J. Yan L. Preliminary Development of a Scale for Assessing University Students' Study Autonomy. Chinese Journal of Mental Health, 2004(2), 94-96.

[2] Xie M. A Study on the Correlation between College Students' Motivation to Learn and Self-directed Learning [Dissertation]. Nanchang University.

[3] Yang B. Rong J. A Study on the Influence of Emotion Regulation Strategies on Learning Autonomy. Science and Technology Information, 2013(34), 18.

[4] Liu F. Liu S. A Study on the Relationship between College Students' Self-directed Learning and General Self-efficacy. Journal of Chifeng University (Natural Sciences Edition), 2009, 25(3), 166-167.

[5] Wang L. Empirical Study on the Relationship between Self-efficacy, Learning Motivation, and College Students' Autonomous English Learning. Journal of Guangxi Normal University (Philosophy and Social Sciences Edition), 2014, 50(3), 195-200.

[6] Wang, T. A study on the current situation and influencing factors of independent learning of college students [D]. Northeast Normal University, 2014.

[7] Zhao, D. Characteristics of college students' learning autonomy and its relationship with academic emotions [J]. Chinese Journal of Health Psychology, 2013, 21(10), 1564-1566.

[8] Wang Xianliang. Research on the Evaluation of Autonomous Learning of College Students[D]. Southeast University, 2006.

[9] Liu Jun sheng, Lin Liling, Liu Yuan, Wei Chao Bo, Zhou Ying, Chen Xin yin. Preliminary examination of the reliability and validity of the Chinese version of Basic Psychological Needs Scale [J]. Chinese Journal of Mental Health, 2013, 27(10), 791-795.

[10] Tan Shuhua, Guo Yong Yu. Revision of Self-Control Scale for College Students [J]. Chinese Journal of Clinical Psychology, 2008(5), 468-470.

[11] Wen, Z., & Ye, B. Moderation Effects Analysis: Methods and Model Development. Advances in Psychological Science, 22(5), 731-745.

[12] Liu Ge, Zhang Quan Mei, Yin Hongbin. Research on the Current Situation of College Students' Autonomous Learning. Journal of Xinjiang Education Institute, 2019, 35(2), 29-34.

[13] Chai Jun Ying. A Study on the Self-Directed Development of Students [D]. East China Normal University, 2016.

[14] Guo Hao, Yan Guan Zhao. Investigation and Analysis of the Current Situation of Independent Learning among Contemporary University Students and Its Influencing Factors: A Case Study of Z University [J]. Journal of Taiyuan Urban Vocational College, 2019(11), 101-104.

[15] Zhao Xing Lian. The Relationship between Basic Psychological Needs of Junior High School Students, Achievement Goal Orientation, and Self-Regulated Learning [D]. Hunan Normal University, 2019.

[16] Yang Jing. Analysis of Influencing Factors on Independent Learning of College Students [J]. Think Tank Era, 2019(29), 144-145.

[17] Qiang Jiaying. Learn Self-Control, Strengthen Independent Learning [J]. Curriculum Education Research, 2013(31), 201-202.