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Original Paper

The Mediating Effect of Learning Attitude on Perceived Stress and Academic Self-efficacy of Chinese Nursing Students under the Hybrid Teaching Mode: A Cross-sectional Study

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Abstract

Background: The hybrid teaching mode is a kind of teaching mode developed and applied in teaching activities from the perspective of "Internet+". This mode deeply integrates online teaching and offline classroom teaching, breaks through the limitations of time and space, and achieves the teaching goal of taking students as the main body and teachers as the leading role. The hybrid teaching mode has become the most popular teaching mode in Chinese universities. However, it is not clear how this teaching mode affects students' learning attitude, pressure perception and academic self-efficacy.

Objective: The purpose of this study is to explore the relationship between perceived stress, learning attitude and academic self-efficacy of undergraduate nursing students under the hybrid teaching mode, and provides reference for hybrid teaching.

Design: A cross-sectional study.

Settings and participants: From June 2022 to July 2022, the study was conducted using a convenience sample of 166 undergraduate nursing students from three universities in Xi'an, China.

Methods: Perceived Stress Scale, Learning Attitude Scale and Academic Self-efficacy Scale were

administered to the nursing students by questionnaire star.

Results: Undergraduate nursing students scored 2.69 ± 0.59 on the Perceived Stress Scale, 3.51 ± 0.57 on the Learning Attitude Scale, and 3.41 ± 0.61 on the Academic self-efficacy Scale. The total academic self-efficacy score was significantly negatively correlated with the perception of loss of control dimension of perceived stress (P<0.01), and was significantly positively correlated with undergraduate nursing students learning attitude and all its dimensions except the professional perception dimension (P<0.01). Learning attitude was a partial mediator between stress perception and academic self-efficacy among undergraduate nursing students, with proportion of effects of 49.68%.

Conclusion: Under the hybrid teaching, the undergraduate nursing students perceived stress is at a lower level, and their learning attitude and academic self-efficacy are at a medium to upper level. Perceived stress and learning attitude have a negative and positive impact on academic self-efficacy, respectively. Learning attitude plays an intermediary role between the undergraduate nursing students' perceived stress and academic self-efficacy; The academic self-efficacy of nursing students can be improved by helping them establish a positive learning attitude and reduce their perceived stress.

Keywords

The Hybrid Teaching, Nursing Students, Learning Attitude, Perceived Stress, Academic Self-efficacy

1. Introduction

Learning attitude is a kind of positive or negative psychological tendency held by students in the learning process, including cognition, emotion and behavior (Lin Zhiping, Zheng Jiansheng, & Yan Sangsang, 2020). The learning attitude of nursing students is their psychological tendency towards learning mode, content and process under the professional learning situation, and the attitude to the content, mode and environment of nursing work to be engaged in Zhang Yunhan, Zhao Guanghong and Yu Jiaohua (2011). Perceived stress refers to the psychological subjective feeling and cognitive evaluation of stress when individuals encounter difficulties in life or face stress events (Tian Miao, Xiang Shengxiao, Yu Shangping, Tong Ping, Hu Yali, & Wang Yan, 2022). Academic self-efficacy from Bandura's self-efficacy theory, which refers to the individual's judgment of his ability to complete academic tasks (Brennan, 2022). The hybrid teaching mode is an important breakthrough in promoting educational reform and innovation in the new era. It is a brand new teaching mode and a product of the integration of internet technology and traditional classroom education (Yang Kefeng, Mao Huaxia, Tang Wenjing, Jia Jie, Cai Wei, & Shen Xiuhua, 2022; Ashraf et al., 2021). Under the hybrid teaching mode, the learning attitude, perceived stress and academic self-efficacy of undergraduate nursing students may be affected to some extent. At present, there is no research on their overall situation and their correlation. Therefore, this study investigates undergraduate nursing students to explore their learning attitude, pressure perception and academic self-efficacy under the hybrid teaching mode and their relationship. It can provide reference for improving academic efficiency of nursing students in the future.

2. Methods

2.1 Design and Samples

From June to July 2022, convenience sample method was used to select undergraduate nursing students from three universities in Xi' an who carried out online and offline mixed teaching as research objects. The study adopted four dimensions of the Learning Attitude Scale, two dimensions of the Perception Stress Scale, two dimensions of the Academic Self-efficacy Scale and seven items of the general information questionnaire. With reference to the Medical Statistics edited by Professor Sun Zhenqiu (2014), the sample size was 10 times of the independent variable. 150 cases need to be investigated in this study. Considering the factors such as lost interview rate, the sample size was increased by 10%, and the final sample size was 165 cases.

2.2 Measurements

The self-designed general information questionnaire includes gender, grade, nationality, religious belief, family residence, professional preference, preferred teaching methods and online learning experience, etc.

The learning attitude scale was adopted by Liu Shaopeng and Deng Lulu (2015). The revised “Nursing Students’ Learning Attitude Scale” was a survey tool. The scale had 16 items in total, including four dimensions of learning interest, learning experience, learning habits and professional cognitions. Using the Likert 5-grade scoring method, “very consistent”, “relatively inconsistent”, “consistent”, “relatively consistent” were scored 1-5 points respectively. The higher the score, the better the learning attitude. Cronbach’s Alpha coefficient of the scale was 0.806.

The perceived stress scale was compiled by Yang Tingzhong and Huang Hanteng (2003) according to the translation of the English version of the perceived stress scale. The scale, a total of 14 items, including two dimensions of tension and sense of loss of control, were scored with 1-5points from “never” to “always” using the Likert 5-grade scoring method. The higher the score, the higher the pressure perception of nursing students, and Cronbach'sα coefficient of the scale was 0.78.

The Academic self-efficacy scale adopted the academic self-efficacy scale compiled by Liang Yusong (2004). The scale was developed, with a total of 22 items, including two dimensions of academic ability self-efficacy and academic behavior self-efficacy. The scale rated on a 5-points Likert scale ranging from1 to 5. A higher score indicated a better level of academic self-efficacy, and the Cronbach’ s Alpha coefficient was 0.817 in this study.

2.3 Ethical Considerations and Data Collection

This ethics committee granted the study, and adopts the unified introduction language and conducts the survey in the form of questionnaire star. We made a poster about this research to introduce the research to students. The poster contains the purpose, significance, inclusion criteria, exclusion criteria of the research object, and contact information of the researcher. For the nursing students who signed the informed consent form and volunteered to participate in the study, two nursing researchers used the unified guidance language to guide the subjects to fill in the questionnaire. The questionnaire was filled

in by the nursing students, and the researchers checked whether there was any omission in the filling.

2.4 Data Analysis

Statistical analysis was performed using the IBM SPSS Statistics 19.0 software. The statistical methods mainly included descriptive statistics, one-way ANOVA, Pearson correlation analysis, and multiple linear regression. The mediation effect of learning attitude on perceived stress and academic self-efficacy of nursing students was tested by Bootstrap, a process plug-in, with a sampling number of 5000, α=0.05 was the test level, and Value P<0.05 indicated that the difference was statistically significant.

3. Results

3.1 Demographic Characteristics of Participants

A total of 166 valid questionnaires were collected (excluding 6 points of invalid questionnaires, effective response rate: 96.39%). Among the 160 nursing students, 26 were freshmen (16.25%), 66 sophomores (41.25%), 42 junior students (26.25%), and 26 seniors (16.25%), the average age was 20.90 years. 56.87% of the undergraduate nursing students said they preferred online and offline hybrid teaching mode, 54.38% of them were satisfied with the online teaching mode, and 76.25% of them believed that their knowledge of online learning exceeded 60%. 43.13%~70.00% of the students encountered problems with network equipment, poor interaction between teachers and students, and decreased self-control during online teaching. See Table 1 for details.

Table 1. General Information and Online Learning of Research Objects (n=160)

Veriable	Group	Number (n)	Percentage (%)
Gender	Man	26	16.25
	Woman	134	83.75
Grade	Freshman	26	16.25
	Sophomore	66	41.25
	Junior	42	26.25
	Senior	26	16.25
Favorite teaching methods	Online teaching	18	11.25
	Offline teaching	51	31.88
	Online and offline hybrid teaching	91	56.87
Satisfaction with online teaching methods	Satisfied	87	54.38
	Commonly	68	42.50
	Dissatisfied	5	3.12
Knowledge mastery of online learning	≥80%	43	26.88
	60%~80%	79	49.37

	＜60%	38	23.75
Online learning enthusiasm	Very high	38	23.75
	Commonly	100	62.50
	Not high	22	13.75
Problems encountered in online teaching:			
Network device problems	Yes	98	61.25
	None	62	38.75
Poor interaction	Yes	103	64.38
	None	57	35.62
Many assignments and courses	Yes	73	45.62
	None	87	54.38
Many teaching contents	Yes	69	43.13
	None	91	56.87
Decrease of learning self-control	Yes	112	70.00
	None	48	30.00

3.2 The Scores of Undergraduate Nursing Students Learning Attitude

The score of undergraduate nursing students' perceived stress scale was 2.69±0.59, learning attitude scale was 3.51±0.57, academic self-efficacy scale was 3.41±0.61. See Table 2 in details.

Table 2. Scores of Perceived Stress, Learning Attitude and Academic Self-efficacy of Undergraduate Nursing Students (n=160, $\bar{x}$ ± s)

Variable	Total score	Equipartition
Perceived stress	37.59±8.32	2.69±0.59
Tension	19.57±5.21	2.80±0.74
Loss of control	18.03±5.98	2.58±0.85
Learning attitude	56.08±9.15	3.51±0.57
learning interest	12.92±4.03	2.23±1.01
Learning experience	15.57±3.48	3.89±0.87
Learning habits	13.60±3.32	3.40±0.83
Professional cognition	13.99±3.86	3.50±0.96
Academic self-efficacy	75.08±13.43	3.41±0.61
learning ability self-efficacy	37.86±8.83	3.44±0.80
learning behavior self-efficacy	37.22±5.66	3.38±0.51

3.3 Correlation Matrix of Learning Attitude, Perceived Stress and Academic Self-efficacy among Undergraduate Nursing Students

Except for the professional cognition dimension, the total score of academic self-efficacy of undergraduate nursing students was significantly positively correlated with each dimension of learning attitude ($P<0.01$), and was significantly negatively correlated with the dimension of perceived stress of loss of control ($P<0.01$), as shown in table 3.

Table 3. Correlation Matrix of Learning Attitude, Perceived Stress and Academic Self-efficacy of Undergraduate Nursing Students under the Hybrid Teaching Mode

Variable	Academic self-efficacy	Learning ability self-efficacy	learning behavior self-efficacy	Perceived stress	Tension	Loss of control	Learning attitude	Learning interest	Learning experience	Learning habits	Professional cognition
Academic self-efficacy	1										
Learning ability self-efficacy	0.954**	1									
Learning behavior self-efficacy	0.884**	0.704**	1								
Perceived stress	-0.506**	-0.446**	-0.506**	1							
Tension	-0.112	0.015	-0.289**	0.699**	1						
Loss of control	-0.607**	-0.633**	-0.453**	0.782**	0.102	1					
Learning attitude	0.703**	0.638**	0.672**	-0.423**	-0.12	-0.484**	1				
Learning interest	0.567**	0.608**	0.396**	-0.275**	0.091	-0.461**	0.759**	1			
Learning experience	0.616**	0.578**	0.560**	-0.457**	-0.107	-0.542**	0.831**	0.562**	1		
Learning habits	0.691**	0.676**	0.585**	-0.271**	0.118	-0.479**	0.783**	0.690**	0.608**	1	
Professional cognition	-0.076	-0.225**	0.171*	-0.071	-0.384**	0.235**	0.156*	-0.344**	-0.04	-0.272**	1

Note. * * Significant correlation at 0.01 level (bilateral), * significant correlation at 0.05 level (bilateral).

3.4 Mediating Effect of Learning Attitude on Perceived Stress and Academic Self-efficacy of Undergraduate Nursing Students

On the basis of correlation analysis, the mediating effect analysis was carried out with perceived stress as independent variable, academic self-efficacy as dependent variable, and learning attitude as the mediating

variable. The results showed that the perceived stress had a negative predictive effect on learning attitude (β=-0.407, *P*<0.001), it can also negatively predict academic self-efficacy (β=-0.520, *P*<0.001); Learning attitude positively predicts academic self-efficacy (β=0.635, *P*<0.001), and when learning attitude was added to the model, perceived stress still negatively predicted academic self-efficacy (β=-0.262, *P*<0.001). See Table 4 for details.

Table 4. Regression Results of Mediating Effects of Learning Attitude on Perceived Stress and Academic Self-efficacy of Undergraduate Nursing Students

Dependent variable	Independent variable	Model analysis				Coefficient test			
		R	R^2	*F*	*P*	β	*SE*	*t*	*P*
Academic self-efficacy	Perceived stress	0.256	0.252	54.491	<0.001	-0.520	0.070	-7.382	<0.001
Learning attitude	Perceived stress	0.179	0.174	34.420	<0.001	-0.407	0.069	-5.867	<0.001
Academic self-efficacy	Perceived stress	0.547	0.541	94.762	<0.001	-0.262	0.061	-4.299	<0.001
	Learning attitude					0.635	0.063	10.033	<0.001

3.5 Analysis of the Effect Proportion of Undergraduate Nursing Students Learning Attitude as a Mediating Variable

The direct effect of academic self-efficacy is -0.262 (95%*CI:*-0.381～-0.142), and the intermediary effect is -0.258 (95%*CI*: -0.360～-0.124), accounting for 49.68% of the total effect, indicating that learning attitude has a partial intermediary effect between undergraduate nursing students perceived stress and academic self-efficacy, as shown in Table 5. The relationship between variables is shown in Figure 1.

Table 5. Verification Results of Mediating Effect of Learning Attitude on Perceived Stress and Academic Self-efficacy of Undergraduate Nursing Students

	Effect	SE	95%*CI*		Proportion of effects (%)
			LLCT	ULCI	
Total effect	-0.520	0.070	-0.658	-0.382	
Indirect effect	-0.258	0.060	-0.360	-0.124	49.68
Direct effect	-0.262	0.061	-0.381	-0.142	50.32

CI: Confidence Interval.

LLCI: Lower Limit Confidence Interval.

SE: Standard Error.

ULCL: Upper Limit Confidence Limit Interval.

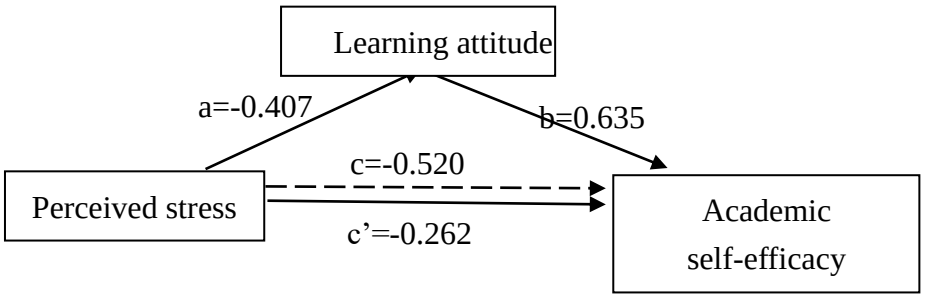

Figure 1. Relationship Model between Learning Attitude, Perceived Stress and Academic Self-efficacy of Undergraduate Nursing Students

4. Discussion

4.1 Learning of Undergraduate Nursing Students under the Hybrid Teaching Mode

This study shows that more than half of undergraduate nursing students prefer the online and offline hybrid teaching mode and are generally satisfied with the online learning mode. More than two-thirds of the nursing students think that their online learning knowledge is more than 60%, indicating that the hybrid teaching mode is more suitable for undergraduate nursing students. However, it is worth noting that 43.13%~70.00% of nursing students reported that online teaching has problems such as network equipment, poor interaction, and decreased self-control. To carry out the hybrid teaching mode, we should focus on solving these problems that are not conducive to nursing students' learning. We can use Tencent conferences, Ding Talk, and other real-time connection software to promote timely communication and interaction between teachers and students, and use flipped classes to increase nursing students' classroom participation and self-control in online learning, by recording teaching videos for nursing students with poor network to review after class.

4.2 Correlation between Perceived Stress and Learning Attitude of Undergraduate Nursing Students under the Hybrid Teaching Mode

This study shows that the perceived stress of undergraduate nursing students under the hybrid teaching mode is at a lower middle level, which is consistent with the research results of Mu Jingying, Cui Wenyu, Xu Jing and Yang Lu (2019). Tension is higher than the total score of perceived stress, and the loss of control is lower than the total score of perceived stress. This is inconsistent with the research results of Lu Bingqian, Lin Yin, Zhu Xuehua and Lin Yiping (2022). It may be that there is a certain difference between the hybrid teaching mode and offline teaching. Some nursing students have not yet adapted to the online teaching mode, and think that their understanding and mastering of knowledge through online learning is not good. They are worried that the final exam results are not ideal, and their psychological tension is increased. The reason why nursing students have a low sense of loss of control may be that the hybrid teaching mode requires nursing students to learn more independently. Nursing students have greater freedom in learning content and learning time, and can better control the learning process and rhythm according to their personal conditions (Zhang, Ma, Wang, Li, & Fa, 2022). The

learning attitude score of undergraduate nursing students is at the medium level, and the four dimensions scores from low to high are learning interest, learning habits, professional cognition and learning experience, which are basically consistent with Xia Yuting Chen Yifei and Zang Shuang (2020)'s research results. The low learning interest of nursing students may be mainly due to the fact that online learning can not form timely and effective interaction with teachers and students due to its single form of online listening. The professional cognition score ranks second, which is different from the lowest professional cognition score shown by Xu Zhifang, Huang Fangyan, Yin Haiying and Dai Yali (2013). The analysis reason may be related to the expansion of social influence and improvement of social recognition of nursing staff after the outbreak of COVID-19. During the epidemic, the importance of nursing work has been greatly shown, the public opinion guidance of society to nurses has become more positive, and nursing students have a deeper understanding and feeling of the nursing work they will be engaged in in the future, Recognize the value of nursing profession (Wu Jianglin, Cai Yiran, Huang Mingzhu, Kong Ping, & Ke Li, 2021). In this study, perceived stress of nursing students is significantly negatively correlated with their learning attitude (r=-0.423, P<0.01), indicating that the lower the perceived stress of nursing students, the more active their learning attitude, reducing the perceived pressure of nursing students in learning is beneficial to correct their learning attitude.

4.3 Correlation between Perceived Stress and Academic Self-efficacy of Undergraduate Nursing Students under the Hybrid Teaching Mode

This study shows that under the hybrid teaching mode, the academic self-efficacy of undergraduate nursing students is at a medium level, which is consistent with the research results of Liu Mingchang, Liu Lamei, Li Qiang, Kang Sijia and Zhang Liping (2022), indicating that the academic self-efficacy of undergraduate nursing students still needs to be improved. This study found that academic self-efficacy and its two dimensions of undergraduate nursing students is significantly negatively correlated with the loss of control in perceived stress (r=-0.633～-0.453, P<0.01), indicating that the lower loss of control, the higher the academic self-efficacy of nursing students, and the better the judgment of learning ability and the implementation of learning behavior. The reason may be that the more control nursing students have over their own learning process, the less pressure they feel, the more confident they are in their ability to complete professional learning. Therefore, under the hybrid teaching mode, we should pay attention to reducing the perception stress of undergraduate nursing students. Some studies have shown that emotional flexibility training can improve the perceived stress of nursing students to a certain extent (Ye Yansheng, Zhang Zhixia, Ye Lei, & Xie Yongqian, 2016), and mindfulness-based interventions can effectively relieve negative emotions (Yu Shuting, Xu Wei, Liu Xinghua, & Xiao Luchuan, 2019), thereby enhancing the academic self-efficacy of undergraduate nursing students and promoting them to learn nursing knowledge actively and confidently.

4.4 Correlation between Learning Attitude and Academic Self-efficacy of Undergraduate Nursing Students under the Hybrid Teaching Mode

This study shows that, in addition to professional cognition, the learning attitude and its dimensions of

undergraduate nursing students under the hybrid teaching mode are significantly positively correlated with academic self-efficacy and its two dimensions (r=0.396～0.703, P<0.01), indicating that the higher the learning interest, the better the learning experience and learning habits. The stronger the academic self-efficacy of nursing students, the more confident they are in learning professional knowledge. The research shows that nursing students with a stronger sense of self-efficacy tend to achieve better results (Bulfone et al., 2022). Therefore, in the hybrid teaching mode, teachers should focus on improving nursing students' learning interest, optimizing learning experience, adopting new teaching methods such as scenario case simulation, flipped classroom, problem-based learning, etc., to stimulate the enthusiasm of nursing students to learn professional knowledge and skills, and promote them to enjoy nursing learning.

4.5 Mediating Effect of Learning Attitude of Undergraduate Nursing Students on Pressure Perception and Academic Self-efficacy under the Hybrid Teaching Mode

This study shows that under the hybrid teaching mode, perceived stress can directly and negatively affect academic self-efficacy of undergraduate nursing students, while learning attitude can partially mediate the impact of pressure perception on academic self-efficacy of nursing students, and learning attitude plays a partial mediating role between perceived stress and academic self-efficacy. It is suggested that in the implementation of the hybrid teaching mode, teachers should dynamically understand the perceived stress of undergraduate nursing students, and adopt various ways to reduce the perceived stress of nursing students, especially to reduce the sense of tension, cultivate the pressure resistance ability of nursing students, reduce the perceived stress[14], and keep a comfortable and pleasant mood. At the same time, guiding nursing students to establish a positive learning attitude, especially helping them improve their learning interest, has a positive role in promoting nursing students' academic self-efficacy.

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