Study on College Students' Learning Efficiency under Online and Offline Teaching Mode

Zeng Jieying[1], Duan Jiawei[2], Zhong Maoyuan[2]

[1]Associate Professor, [2]Student,
[1,2]Beijing Wuzi University, Beijing, China

ABSTRACT

Background: With the development of China's epidemic teaching, Chinese college students have experienced a transformation from online subject learning in the home epidemic prevention period to offline teaching under closed campus management in the new semester. Based on anxiety, this paper explores the differences in learning efficiency of college students in the two teaching modes to find the possible optimization in the current epidemic teaching, so as to help students reduce anxiety and improve learning efficiency of college students.

Methods: Literature analysis, questionnaire survey and statistical analysis were adopted in this study. The research tools were self-rating Anxiety Scale (SAS) developed by Zung, and college students' learning self-efficacy questionnaire developed by Liang yusong and Zhou zongkui.

Students of grade 17, 18 and 19 were selected as samples, and a total of 394 valid questionnaires were collected. Data were analyzed using SPSS23.0 software.

Conclusions: Generally speaking, the anxiety level of college students is higher than that of normal Chinese people. Men reported significantly higher levels of anxiety than women. There is a negative correlation between anxiety and learning effectiveness; The learning efficiency of normal students was higher than that of anxious students.

KEYWORDS: COVID-19; Teaching mode; Anxiety; Learning efficiency

Research background

Learning efficiency refers to students' subjective judgment of whether they are competent for learning tasks and objective representation of their learning effects. It is an important indicator affecting students' learning motivation and academic achievement, and the core element of forming students' academic burden [1] .As the normalized teaching Chinese outbreak unfolds, the Chinese university students from home quarantine period of online learning teaching mode by campus under the closed-end management of the new term offline teaching model of teaching, students learning environment and learning style changes, cause the change of the anxiety. Anxiety and other bad emotions will have different degrees of influence on the learning ability and behavior of college students, so that the learning efficiency of college students will change, and ultimately affect the academic achievement and personal development of college students.

Research process
Research samples

In this paper, a random sampling method was adopted to distribute questionnaires in various colleges and universities, and 394 valid questionnaires were finally collected. The distribution targets are students who received online classes (2019-2020 spring semester) and offline classes (2020-2021 fall semester) during the epidemic period (grade 20 students were not included in the survey because they only received online classes and did not receive offline classes, so they could not compare and answer questions).

Basic personal information includes the student's gender and grade. In the sample, females accounted for 59.4%, males for 40.6%, grade 17 for 27.9%, grade 18 for 41.4%, and grade 19 for 30.7%.

Measuring tools
Self-rating Anxiety Scale
There were 20 items in the SAS scale, and likert scale 4 was used to score 1-4 points from "no or little time" to "most or all time", among which 5 items in question 5, 9, 13, 17 and 19 were graded in reverse. Add the total points to get the rough score, multiply the rough score by 1.25 and take the rounded part to get the standard score. According to the Chinese norm standard, the SAS cut-off value is 50 points, in which mild anxiety is 50-59, moderate anxiety is 60-69, and severe anxiety is higher than 69[2].

College students' learning self-efficacy questionnaire
According to the relevant dimensions of academic self-efficacy compiled by Pintrich and De Groot, Liang Yusong and Zhou Zongkui divided it into two dimensions of academic ability self-efficacy and academic behavior self-efficacy, with a total of 22 items. Likert 5-scale scoring method was adopted, and1-5 points were respectively scored from "strongly disagree" to "strongly agree". A higher score indicates a stronger sense of academic efficacy, while a higher score indicates a higher sense of self-efficacy[3].

Data processing and result analysis
Comparison between the anxiety level of college students and the norm of Chinese normal people
Table 1 Comparison between the anxiety level of college students and the Chinese normal norm

Variables	college students (n=394)	Chinese normal norm (n=1158)	T value	P value
College Students' anxiety Self-rating Scale under online teaching mode	35.84±8.25	29.78±10.07	14.574	.000
College Students' anxiety Self-rating Scale under offline teaching mode	35.6±9.799	29.78±10.07	11.783	.000

Test of anxiety differences among students of different genders
Table 2 Test of anxiety differences among students of different genders

Gender		N	Mean	Standard deviation	T value	Sig.
Online anxious	Male	160	46.609	10.991	2.842	.005
	Female	234	43.558	9.652		
Offline anxious	Male	160	47.398	13.483	3.962	.000
	Female	234	42.511	10.920		

Differential comparison of learning effectiveness
According to the scoring standard of self-rating Anxiety scale, the population was divided into normal (standard score < 50), mild anxiety (standard score ≥50 and < 60), moderate and severe anxiety (standard score ≥60) to study whether there are differences in the learning efficiency of the population with different anxiety levels under the two teaching modes.

Table 3 Description of the differences in learning effectiveness of online teaching mode among students with different anxiety levels

Mean difference			Standard error	Sig.	95% confidence interval lower limit	upper limit
1.Mild anxiety	2	-5.801*	1.244	.000	-8.25	-3.36
	3	1.558	1.911	.415	-2.20	5.32
2.Normal	1	5.801*	1.244	.000	3.36	8.25
	3	7.359*	1.697	.000	4.02	10.69
3.Moderate and severe anxiety	1	-1.558	1.911	.415	-5.32	2.20
	2	-7.359*	1.697	.000	-10.69	-4.02

Table 4 Description of the differences in learning effectiveness of offline teaching mode among students with different anxiety levels

平均值差值			标准错误	显著性	95% 置信区间	
					下限	上限
1. 轻度焦虑	2	-6.162*	1.481	.000	-9.07	-3.25
	3	2.386	2.058	.247	-1.66	6.43
2. 正常	1	6.162*	1.481	.000	3.25	9.07
	3	8.548*	1.732	.000	5.14	11.95
3. 中重度焦虑	1	-2.386	2.058	.247	-6.43	1.66
	2	-8.548*	1.732	.000	-11.95	-5.14

Correlation analysis

This study analyzed the correlation between anxiety, learning efficiency, Pearson correlation coefficient are shown in table below: online learning mode, anxiety and learning performance is negatively related to (r = -. 212), a study in offline mode, the negative correlation between anxiety and learning effectiveness (r = -. 284) on the whole, the present negative correlation between anxiety and learning efficiency.

Table 5 Learning efficacy and anxiety and their correlation in different dimensions

	1	2	3	4
1.Learning efficiency of online teaching mode	1			.
2.Online teaching model anxiety	-.212 **	1		
3.Learning efficiency of offline teaching model	.605 **	-.294 **	1	
4.Offline teaching model anxiety	-.318 **	.768 **	-.284 **	1

**. At 0.01 level (two-tailed), the correlation was significant.

Regression analysis of anxiety and learning effectiveness

In online teaching mode, the correlation coefficient between anxiety and learning effectiveness is 0.212, that is, there is a linear correlation between the two, and its determination coefficient (R^2) is 0.042. It can be inferred that anxiety has predictive power on learning effectiveness, and the explanatory quantity is 4.2%. It can be seen from the variance analysis of the regression model that F=18.422, P =0.000 < 0.005, indicating that the overall explanatory variation of the regression model has reached the significance level, and a linear regression model can be established. Therefore, the non-standardized regression equation can be obtained from the coefficient table. Online teaching mode, learning efficiency =84.761-0.243* anxiety.

In offline teaching mode, the correlation coefficient between anxiety and learning effectiveness is 0.284, and there is a linear correlation between the two, and the determination coefficient (R^2) is 0.08. It can be inferred that anxiety has a predictive power on learning effectiveness, and its explanation quantity is 8%. According to the variance analysis of the regression model, F=34.307, P =0.000 < 0.005, indicating that the overall explanatory variation of the regression model has reached the level of significance, a linear regression model can be established, and a non-standardized regression equation can be obtained from the coefficient table,

that is, learning efficiency in offline teaching mode =82.282-0.244* anxiety.

Discuss

Discussion on the overall situation of sample anxiety scores

The results show that the anxiety level of college students is higher than that of normal People in China, which is consistent with previous studies. In recent years, with the increasing pressure from various aspects, the psychological problems of College students in China have become increasingly serious. The sudden outbreak of the NOVEL coronavirus has continued to this day, which has also intensified the anxiety of college students to a certain extent.

Discussion on gender differences of anxiety

This study found that the anxiety of College students in China is affected by gender, which is different from the conclusion of Zhou Yong 'an [4] that anxiety is not affected by gender. In the study of Shen Xiaoying and Li Xiaowen, the anxiety level of female college students is higher than that of male students [5-6], while in this study, the anxiety level of male students is higher than that of female students, which is consistent with the results of Tao Jianhong [7]. Many factors, such as male and female biology, type of school and major, and social expectations, have been speculated to account for the disparity in research results.

The overall situation of learning effectiveness

The higher the score of learning efficiency is, the higher the level of learning efficiency is. On the whole, college students have a high level of learning efficiency and are in a positive state. College students are in the best period of learning, with strong thirst for knowledge and confidence, correct learning attitude, good expectations for the future, and positive and upward are the main melody of contemporary college students. Therefore, the scores of learning efficiency of college students in the two teaching modes are higher.

The influence of college students' anxiety on learning efficiency

In online and teaching mode, anxiety is negatively correlated with learning effectiveness (r=-.212**), and in offline teaching mode, anxiety is negatively correlated with learning effectiveness (R =-.284**). In conclusion, college students' anxiety is negatively correlated with learning effectiveness. This is just as studies have shown that students with higher anxiety levels expressed more negative emotions and perceived lower academic self-efficacy. It is found that there is a negative correlation between self-efficacy and anxiety, and the learning efficacy of normal students is higher than that of anxious students. According to the above analysis, anxiety is closely related to learning efficiency, and individual anxiety will directly or indirectly affect learning efficiency.

Advice

In the learning process of students, home education and school education are two very critical positions. Online teaching mode and offline teaching mode are also based on learning at home and at school. Individual students, families, teachers, schools and other relevant departments should achieve home-school linkage, and all parties should work together to help students grow.

From the Angle of relieving college students' anxiety: students should strengthen psychological construction independently; Parents should pay attention to students' mental health; Teachers should focus on optimizing the teaching model; Schools should pay attention to psychological counseling work.

From the perspective of improving the learning efficiency of college students: students should seek learning motivation independently; Parents should encourage students to study actively; Teachers should guide students to study independently; Schools should earnestly solve students' problems.

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