Factors Affecting the Quality of Online Teaching in Universities in the Context of Epidemic Situation and Countermeasures

Qian Liu, Tianqi Lu, Wenjie Wang, Haowen Guo, Xiaofei Kang

College of Science, North China University of Science and Technology, Tangshan 063210, China.

Abstract: In the context of the information age, online teaching has become an important field of education development in the future. In order to study the factors affecting online teaching during the COVID-19, we mainly used the form of online questionnaires to investigate Hebei universities. Based on the data of the questionnaire survey, SPSS software is used to analyze the reliability and validity, build an evaluation index system of online teaching satisfaction, evaluate online teaching satisfaction with factor analysis, and further analyze the influencing factors of satisfaction. In addition, based on the results of the above questionnaire, we adopt the literature research method to provide coping strategies for the current drawbacks of online teaching. The results show that online teaching satisfaction is generally satisfactory, but there are still some students who are not suitable for online teaching; The main factors of students and teachers' quality are important factors affecting online teaching, while the factors of teaching environment have less influence on online teaching satisfaction. On this basis, we put forward suggestions: establish students' correct understanding of online teaching, strengthen teachers' online teaching skills training, and strengthen technology research and development.

Keywords: COVID-19; Online Education; SPSS; Influencing Factors; Response Strategies

1. Introduction

The sudden emergence of novel coronavirus in 2020 has led to the transformation of school curriculum form from offline to online. Because the development of online teaching is uneven in different regions, and the depth of promotion is different in different schools, it will lead to the inequality of students' learning resources. Therefore, understanding the influencing factors of online teaching in universities during the epidemic has important reference value for the development of online teaching mode in the future.

2. Study samples and data collection

In this study, data were collected by means of questionnaire survey from May 2020 to February 2021. A total of 731 questionnaires were distributed and 680 valid questionnaires were recovered, with an effective rate of 93%. All the samples were from Hebei. The questionnaire is divided into two parts: (1) the basic information of the respondents, a total of 7 items; (2) The respondents measured the influencing factors of online teaching, including 9 factors. The Likert Scale was used to explain the extent of the respondents' measurement of the influencing factors. The questionnaire is designed for people of different schools, ages and majors, so the questionnaire is reasonable and can be used for empirical analysis.

Table 1 The sample demographics

Classification		Frequency	Percentage	Classification		Frequency	Percentage
Gender	Male	376	55.26		Township	137	51.14
	Female	304	44.74		village	138	48.86
Grade	Freshman	196	28.83		Neo Confucianism	100	14.64
	Sophomore	168	24.67		Engineering	163	24.01
	Junior	186	27.30	Professional category	Economic management	184	27.06
	Senior	130	19.18		Literature, History and Philosophy	114	16.79
Urban and rural	Prefecture level city	216	59.08		Agronomy	58	8.48

distribution	county-level city	189	40.92		Legal Arts	61	9.02

3. Empirical analysis

3.1 Descriptive statistical analysis

3.1.1 Sample description

In this study, SPSS software was used to analyze the data. The sample adequacy test coefficient KMO value was 0.907, which was greater than the test value of 0.5, and the Bartlett spherical test value Sig.

The factor analysis method was used to test the validity of variables. The minimum KMO of each variable was 0.846, and the significance was 0.000, which met the preconditions of factor analysis. The minimum cumulative variance interpretation rate was 79.94%, which met the requirements. All items of each variable are greater than 0.5 load on one factor, and each item is loaded on only one factor, meeting both convergent validity and differential validity. Among them, the quality of online teachers and motivation for learning achievement need to be deleted because they do not meet the common degree. All variables do not need to delete items in the reliability test, and all meet the internal consistency principle. Cronbach 'Alpha measurement values are greater than 0.700, and all variables pass the reliability test.

3.2 Descriptive statistical analysis of the variables

The descriptive statistics of specific measurement items of online teaching indicators are shown in Table 3. It can be seen from Table 5 that the average value of each specific lateral item of online teaching effectiveness ranges from 3.62 to 3.99, tending to 4. In general, the overall satisfaction of online teaching and the satisfaction of learning needs during the corresponding epidemic situation still need to be improved. According to the respondents' answers to the agreement degree of each measurement item of online effective teaching, further descriptive statistics were made on the proportion of their answers. Among them, 37.58% of the students were highly satisfied with online teaching, and 35.27% of the students thought that their learning needs were well met through online teaching.

Table 2 Statistical results of the answer proportion of the specific measures of each index of online teaching effectiveness

Measurand	Specific measure item	Measure item level /%					Average
		Disagree	Partially Disagree	Neutral	Agree	Strongly agree	
Effectiveness of online teaching	Overall satisfaction with online teaching during the epidemic period	1.21	2.31	30.00	28.90	37.58	3.99
	During the epidemic period, the degree of learning needs are met	1.32	2.64	30.88	29.89	35.27	3.95
	The effect of online learning and the difference in classroom learning	3.19	5.93	33.08	27.14	30.66	3.76
	Comparison between online learning and traditional classroom learning effect	4.48	7.58	36.26	23.74	27.58	3.62
	Sustainability of future online learning	3.85	3.74	34.07	26.70	31.65	3.79

4. Conclusion and coping strategies

4.1 Conclusion

Through questionnaires and data analysis, we can build a mathematical model of the factors that affect the effectiveness of online teaching. According to the principal   component matrix and the rotating component matrix, we can rename 9 specific measurement item factors in each dimension, So as to determine the four influencing factors that support the effectiveness of online teaching: teachers' online behavior perception, students' learning motivation and learning efficiency, and learning environment. Because the standard deviation of each variable is between 0.82646 and 0.91385, which is within the acceptable range, the respondents agree with the above influencing factors.

Among the above variables, the average value of online teaching effectiveness is the lowest, and the standard deviation is the largest.

In each variable, the average value of teachers' online behavior perception scores is the highest. In contrast, students' learning motivation, learning efficiency and data support of learning environment need to be strengthened and improved.

During the epidemic, students scored the highest overall satisfaction with online teaching, because through online teaching, students' learning needs were basically met. Compared with traditional classroom teaching, online teaching tends to be more traditional classroom learning for most students, partly because students need a process to recognize and accept online teaching, and they are more willing to accept face-to-face communication and interaction with teachers. They think online teaching is more convenient and fast. The different views of the students more accurately confirmed that understanding the influencing factors of online teaching in universities during the epidemic period has an important reference value for the development of online teaching mode in the future.

4.2 Coping Strategy

4.2.1 Establish students' correct understanding of online teaching

Because the average score of teachers' online behavior perception is the highest, in contrast, the data support of students' learning motivation, learning efficiency and learning environment needs to be strengthened and improved. Therefore, students' active participation in teaching activities is the key to improving online teaching.

4.2.2 Strengthens online teaching skills training for teachers

Training on design skills of auxiliary teaching materials. The role of courseware design skills in online teaching cannot be ignored. The attractiveness of courseware content is closely related to students' attention. Excellent auxiliary materials can stimulate students' interest in learning, and can more easily remind teachers and students about the progress of teaching. Thus it is easier to improve the quality of teaching and achieve the teaching objectives. Therefore, the design technology of teaching materials is very important.

4.2.3 Strengthens technology research and development

Strengthen network technology. Not every region has good network conditions. Even if it has good network conditions, when the number of people using the network is large, network jams will occur. It is necessary to strengthen the research and development of network technology.

References

[1] Li H, Zhou LR. Study on the Improvement Strategy of Online Teaching Quality in the post-epidemic era [J]. Journal of Liaoning Higher Vocational Education, 2022, 24(02):63-65.

[2] Zhang T, Li JL. Analysis of factors influencing the effect of online learning in colleges and universities under the background of COVID-19 [J]. Heilongjiang Education (Theory and Practice), 2021(12): 54-55.

[3] Wang B, Chen YW, Ji WL, Zhou J. Analysis of online teaching situation and factors affecting Learning Effect in universities during the epidemic period: A case study of Chuzhou University [J]. Journal of Chuzhou University, 201, 23(04): 114- 120+136.