Research on Online Teaching Effect Evaluation and Improvement Path Based on Likert Scale——Take Anhui University of Finance and Economics as an Example

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ABSTRACT. Under the background of the normalization of the new crown epidemic, online teaching has become an important supplement to the traditional offline teaching model, and it is the development trend of my country's future teaching model. With the rapid development of Internet technology, how colleges and universities seize the opportunity of teaching mode reform, promote online teaching in depth, and improve online teaching effects are becoming challenges for college teaching practice and talent training. Based on the status quo of online teaching in Anhui University of Finance and Economics, based on the analysis results of the Likert scale of 129 questionnaires, from the perspective of students, this paper determines the factors affecting online teaching and quantitatively evaluates teaching effects. The study found that factors such as students, teachers, and the external learning environment have a significant impact on the effect of online learning. Finally, from the perspectives of students, teachers, etc., suggestions for improving the effectiveness of online teaching are put forward to explore the optimization path of online education under the background of "Internet+".

KEYWORDS: Online teaching; Teaching effect; Likert Scale; Upgrade path

1. Introduction

As a way of learning based on the Internet, online education has experienced more than ten years of development in our country, and it is an important

supplement and extension of classroom knowledge learning for school students. In October 2019, 11 ministries including the Ministry of Education jointly issued guidelines, proposing that by 2020, the level of infrastructure construction for online education should be greatly improved, and modern information technologies such as the Internet, big data, and artificial intelligence will be more widely used in the field of education. The education model is more perfect, resources and services are more abundant.

Affected by the new crown pneumonia, the traditional offline teaching model will accelerate the spread of the virus due to the flow of personnel. Therefore, major colleges and universities actively respond to the call of "stop classes without suspension" and carry out online teaching activities in the form of live broadcast, recording and broadcasting. In order to understand the implementation of online teaching in colleges and universities, this article takes Anhui University of Finance and Economics as an example. It conducts research through offline interviews and questionnaire collection to find the main factors that affect the effect of online teaching, and realize the quantitative evaluation of online teaching effect, which is targeted Put forward suggestions for improving the effect of online teaching, and provide reference for other universities to continue to promote and optimize online teaching.

2. Research Status

2.1 Research Status of Influencing Factors of Online Teaching

The factors that affect the effect of online teaching can be divided into external factors and internal factors. Among them, external factors are mainly reflected in the technical level. Online education is based on the characteristics of the Internet and is bound to be affected by the network environment. Li Xingrong [1] and others believe that good network hardware and software levels provide good preconditions for network learning. Dong Wei [2] and others believe that platform design is related to the direct display of learning resources and is also one of the important influencing factors. Zhang Xiaoai, Wang Hong and others believe that whether the operation of the software or website is concise and effective, and whether the navigation design is reasonable [3], etc. will affect the user's sense of use. In addition, the richness, content, and cost of teaching resources on the platform [2] are also one of the important factors that affect the effect of online teaching.

The internal factors are mainly reflected in the user. First of all, different from traditional education, online teaching uses the online education platform as the medium, and teachers and students are separated in space and even time. Therefore, popularizing the concept of online education is a prerequisite for ensuring the effect of online teaching [4]. Secondly, the effect of online teaching is closely related to the quality and ability of teachers and students. Therefore, Tang Shuangying believes that the platform can help students conduct self-supervision and management by setting learning knowledge points and practicing knowledge points

[5]. Finally, considering the important impact of family education on students, Wang Jixin [4] and others put forward the concept of "home-school co-education", encouraging parents and schools to collaborate with online education platforms to participate in students' learning.

2.2 Research Status of Online Education Learning Effect Evaluation

Evaluating the effect of online teaching and learning can determine whether it is effective and worthy of development. At present, many scholars have used questionnaire survey methods, data collection methods, document analysis methods, etc. to evaluate online learning, and most scholars have established an evaluation system based on the user's perspective.

On the basis of previous scholars' research, many scholars have proposed more novel evaluation methods. For example, Li Jin [6] analyzed and compared from the perspectives of "social presence" and "connectedness", and proposed a new way of evaluating online education effects System; Zhou Yilin [7] used literature analysis and data mining to select four indicators of learning input, learning persistence and media preference, and established an online personalized learning effect evaluation model based on user portraits; Shen Xinyi et al. [8] adopted Delphi method, expert ranking method, expert workshop and other research methods are used to construct a learning performance evaluation index system based on MOOCAP to evaluate the learning effect from the aspects of students' learning style and academic performance.

2.3 Research Status of the Existing Problems of Online Education Effect

By sorting out the research results of online teaching and learning effect evaluation, it can be found that the current online teaching problems mainly include the following points:

Learning persistence is low. Due to too many interference factors in the learning process and the poor self-control ability of most students, this leads to insufficient attention of students in the online teaching process, which greatly reduces the teaching effect;

The problem of communication and interaction is highlighted. The separation of space and time has caused many inconveniences in the process of interaction between teachers and students. Students are unwilling to think deeply, and it is difficult for teachers to monitor students in real time. As a result, many discussions are confined to the surface and cannot be communicated in depth;

Teachers lack experience. Affected by the epidemic, many teachers started online teaching after only a short training. According to the survey conducted by some scholars, some teachers have not fully adapted to online teaching, thus failing to achieve the desired teaching effect [9].

On the basis of the above research, this paper not only considers the main

influencing factors generally considered, but also combines the feedback information of interviews with the students of Anhui University of Finance and Economics. The influencing factors are divided into individual students, teachers, and online learning platforms. The validity and credibility of the questionnaire design.

3. Research Design

3.1 Research Object

In order to gain an in-depth understanding of the online teaching status of Anhui University of Finance and Economics during the new crown epidemic and the normalization of the epidemic, this survey took all the undergraduates of Anhui University of Finance and Economics as the research object, and distributed online questionnaires 131 through WeChat, QQ and other social platforms commonly used by students. 129 valid questionnaires were collected, and the effective rate of the questionnaire was 98.47%.

3.2 Research Method

This study adopts the questionnaire survey method, based on the research purpose, combined with the discussion of the existing literature on the evaluation indicators of online teaching effects, designed questionnaires, collected student evaluations, and evaluated the online teaching effects of Anhui University of Finance and Economics.

The content of the questionnaire is divided into two parts. The first part is the statistics of the basic status of the interviewees. The question types are multiple-choice questions and sorting questions, surveying personal information such as gender and major of the interviewee. In the second part, the five-point Likert scale was designed to collect the respondents' scores on each influencing factor from the perspectives of students, teachers, and other factors. Other factors took into account the students' surrounding learning environment and the ease of use of online learning platforms, Network conditions, the influence of learning partners. The preparation of the questionnaire strictly follows the steps of designing the questionnaire structure, drafting questionnaire questions, implementing pre-tests, and project analysis. After the questionnaire was collected, invalid questionnaires were removed, valid questionnaires were coded, filed and sorted, and SPSS24 was used for statistical analysis. [11]

3.3 Instructional Design

Anhui University of Finance and Economics is actively exploring new online teaching models around the "new economic management" development strategy:

during the epidemic period, online teaching work will be carried out through platforms such as Chaoxing Xuetong, Dingding, and Tencent Conference; under the background of the normalization of the epidemic, online and offline integration Promote teaching work. In the process of online teaching, teachers guide students through the mode of "sign-in before class + knowledge point review + new class introduction + online discussion". Before class, teachers arrange online learning tasks according to the syllabus and organize students to study independently before class. After the students complete the preview, the teacher will teach through live broadcast, recording and broadcasting, and the students will complete discussions, homework and tests online after class. At the end of the semester, teachers use the platform's student learning records for performance statistics and course evaluation.

Statistics show that since Anhui University of Finance and Economics launched online teaching in March 2020, 2702 courses should be offered, and 2,610 courses were actually offered online, with a course opening rate of 96.6%. Among them, 1964 compulsory courses were opened, with an opening rate of 96.8%; elective courses were opened 646, with an opening rate of 95.8%. There are 851 planned teaching teachers and 817 actual online teaching teachers, with a teacher teaching rate of 96.0%. Online teaching is in stable order and progress is in good condition.

4. Description and Statistics

The statistical results of the questionnaire show that 38 males (29.46%) and 91 females (70.54%) participated in this survey, basically in line with the proportion of males and females in our school; the proportions of each grade are larger. One 25 people (accounting for 19.38%), 42 sophomores (accounting for 32.56%), juniors 40 (accounting for 31.01%), seniors 22 (accounting for 17.05%); most of the interviewees are economic management Professional students (70.54%), followed by science and engineering students (20.16%), and other majors (literature, art, law, etc.) the least (9.30%).

4.1 Online Learning Equipment Usage

Different from offline learning, which has higher requirements for the types, quality, and performance of teaching facilities, online learning more relies on terminal devices such as computers, tablets, and smart phones provided by students. The survey results show that: 57.03% of students have 2 devices for online learning, followed by 3 or more (33.60%), and the smallest proportion of students with only 1 device (9.38%). Explain that having online learning equipment is not an influencing factor that affects most students' online learning. Most students can complete online learning tasks with multiple devices.

4.2 Online Learning Habits of Students

This survey investigates students' online learning behaviors from two

perspectives: the average length of each online learning time and the frequency of online learning. The results show that: 46.51% of students study online for 1-2 hours at a time, 27.13% of students study online for 2-4 hours at a time; 55.04% of students study online every day, accounting for the highest proportion, 9.30% of students Use once for five days or more, which accounts for the smallest proportion. Most students study online for more time and frequency, and they can basically complete the course.
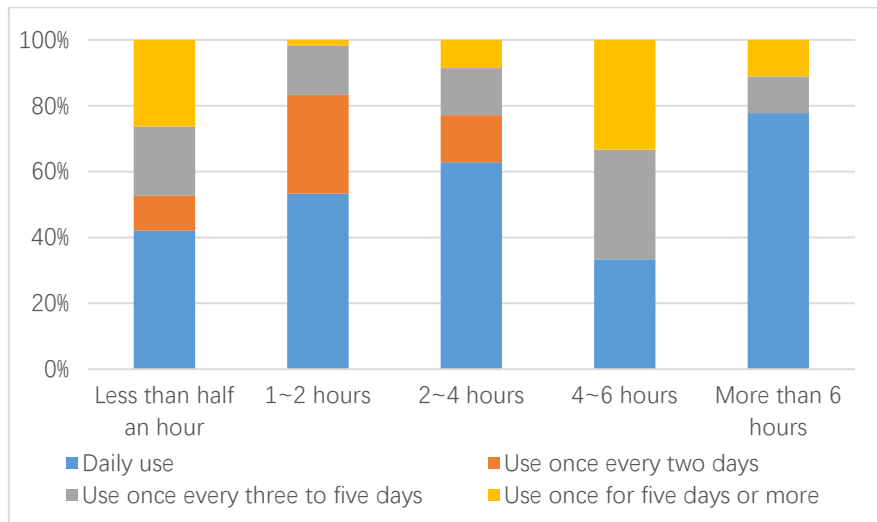

Figure.1 Statistics of online learning habits of interviewed students

4.3 Overall Evaluation of Students

The average comprehensive score of online teaching influencing factors is sorted and calculated according to the answers of all the applicants. The higher the score, the higher the ranking of the option, that is, the higher the importance. The calculation method is:

$$\text{Average composite score of options} = \frac{\sum \text{Frequency} * \text{Weight}}{\text{Number of people to fill in this question}}$$

Calculated: the average comprehensive scores of students' personal learning attitude, school teachers' influence, and platform factors are 2.52, 2.07, and 1.39, respectively, indicating that for students, their own learning attitudes dominate the effect of online learning, followed by The influence of school teachers, platform factors. In addition, about 72.87% of the interviewed students believe that the learning effect of offline learning is better than that of online learning. The reason may be that the promotion of online teaching in Anhui University of Finance and Economics is still in the initial stage and the development experience is insufficient,

which illustrates the specific impact of exploring each category Factors are necessary.

5. Analysis of Influencing Factors of Online Learning

Likert scale is a psychological response scale, which is currently the most widely used scale in investigations and studies. This survey designed a 5-level Likert scale, all indicators are set to positive, each question options include strong disagreement (1 point), disagree (2 points), neither agree nor disagree (3 points), Agree (4 points), resolutely agree (5 points), calculate the scores of each indicator based on the statistical results of the questionnaire, and then compare the degree of influence. This paper takes students and teachers as the main influencing factors, and the platform, surrounding environment, learning partners, and network conditions as other influencing factors to design a scale.

5.1 Questionnaire Test

Table 1 Results of reliability analysis

Kronbach Alpha	Number of items
0.842694	13

To test whether there is a high degree of consistency between the variables, the Cronbach coefficient is the most commonly used at present. The Cronbachα coefficient of the 129 sets of data in this survey is about 0.843, which is greater than 0.6. The consistency among the variables of the scale is good, and the reliability is acceptable.

Table 2 KMO and Bartlett test

KMO sampling appropriateness quantity.		0.786
Bartlett sphericity test	Chi-square approximation	708.61
	DOF	78
	Significance	0

This article uses factor analysis corresponding to structural validity analysis, KMO test to check the partial correlation between variables, and Bartlett spherical test to check the version correlation between variables. The KMO test value of the survey results is 0.786, which is close to 0.8; the significance of Bartlett's sphere test is 0, and the sample data collected by the questionnaire is highly effective.

5.2 Statistical Analysis

The online learning effect evaluation involves the evaluation of students, teachers, and other factors. The average value, standard deviation and ranking

results of each index are shown in Table 3.

Table 3 Online learning evaluation indicators and scores

Evaluation item	Index	Mean	Standard Deviation	Rank
Student	I can listen to the class carefully and complete the learning task when studying online,	3.18	0.98	1
	I can actively participate in the interaction inside and outside of class when studying online	3.14	0.89	2
	I can actively participate in the interaction inside and outside of class when studying online	2.99	1.027	3
	I will not affect my study due to network, software and hardware problems when studying online,	2.85	1.126	4
University Teachers	Be able to prepare and lecture carefully when teaching online	3.46	0.866	1
	Answer questions and interact with students during online teaching	3.45	0.892	2
	The learning materials provided during online teaching can meet the needs of students	3.4	0.906	3
	Able to complete teaching tasks on-site , and no violations such as late arrival ,early departure, and unreasonable suspension of classes, etc.	3.38	1.032	4
Other Factors	The surrounding learning environment will affect the learning effect of students during online learning	3.58	0.916	1
	Students can communicate with their learning peers during online learning	3.29	0.831	2
	Students' network conditions during online learning	3.23	0.825	3
	Online teaching platform operating system prescribed by the school	3.14	0.798	4

(1)Student Personal Factors.

There are a total of four questions in this part. The average of each item ranges from 2.85 to 3.18 on the five-point scale, and fluctuates around the median value of 3, indicating that the influence of students' personal factors on the effect of online learning is moderate. Among them, "students are able to listen to the class carefully and complete the learning tasks assigned by the teacher during online learning" is the highest (3.18), and "I will not be affected by network, software and hardware issues during online learning" is the lowest (2.85), indicating For students themselves, the subjective initiative of learning is the most important factor affecting the effect of online learning, and the degree of influence of external factors is less than that of their own independent learning ability.

(2)Teachers Factors.

There are a total of four questions in this part. The average of each item is

between 3.38 and 3.46 on the five-point scale, which is slightly higher than the median value of 3, indicating that the influence of teacher factors on the effect of online learning is medium to high. Among them, the average number of "teachers who can prepare and give lectures carefully during online learning" (3.46) is the highest, and the average of "teachers can complete teaching tasks in time during online learning, and no violations such as lateness, early leave, and unreasonable suspension of classes" The number (3.38) is the lowest, indicating that teachers can effectively improve students' online learning effects by carefully preparing and attending classes.

(3)Other Factors.

There are four questions in this part. The average of each item is between 3.14 and 3.58 on the five-point scale, which is slightly higher than the median value of 3. The external learning environment, learning partners, network conditions, and online learning platforms during online learning The degree of influence is decreasing but all belong to the upper middle degree. Among them, "the surrounding learning environment will affect my learning effect during online learning" is the highest (3.58), and "the operating system of the online teaching platform prescribed by the school is the lowest to use" (3.14), indicating that students are generally concerned about suitable learning The environment has higher requirements.

In summary, the average values of the influence of students' personal factors, teacher factors, and other factors are 3.04, 3.42, and 3.31, respectively, indicating that the influence of teachers and the external environment on students' online learning effects among the specific factors selected in this survey is higher than that of students personal reason. The average value of the external learning environment, whether the teacher carefully prepares and lectures, and whether the teacher can answer questions for students in a timely manner exceeds 3.4. Therefore, Anhui University of Finance and Economics should strengthen the maintenance of student learning environment and formulate online teaching standards for teachers. In short, through the Likert scale analysis method, combined with specific influencing factors, it is of great significance to propose an improvement path.

6. Improvement Path and Suggestions

The Internet age has promoted the transformation of teaching methods, and at the same time, new learning models have emerged, laying a foundation for students to change their learning concepts. How to use the original teaching system of Anhui University of Finance and Economics to grasp the "offline" during the epidemic The "online" transformation opportunity, with new online teaching methods as an effective supplement, is a question worth exploring.

6.1 Students need to Raise Awareness of Self-Learning.

Based on the data from this survey, most students are able to listen carefully, complete learning tasks, and use online learning equipment flexibly when learning

online. However, students' personal factors are still the main reason for the effect of online learning. Therefore, students still need to improve their self-study awareness, consciously complete the online learning tasks assigned by the teacher, and actively participate in the discussion of the course issues to ensure the mastery of knowledge. In addition, class teachers should strengthen supervision to ensure that all students can complete their learning tasks on time.

6.2 Teachers need to Strengthen Online Course Learning Guidance

Compared with offline teaching, some students may find it difficult to adapt to the online teaching mode in a short period of time due to the limitation of video duration, untimely communication between teachers and students, and fragmented learning time. Therefore, while imparting knowledge, teachers should also pay attention to the feedback of students' learning. On the one hand, they should help students overcome the difficulties of the students' feedback through live broadcast and distribution of learning materials; on the other hand, they should pay attention to teaching students the correct online learning methods. , To guide students to make full use of the advantages of online learning flexibility and autonomy to actively participate in online learning.

6.3 Schools need to Create a Good Online Teaching and Learning Environment

Due to the openness of Internet resources, students are extremely susceptible to interference from online games, entertainment and other information when using the Internet for online learning; due to the lack of real-time supervision by teachers and tutors during online learning, whether students are in a relatively safe, quiet, and comfortable environment. The learning environment is also difficult to guarantee. Therefore, schools should encourage students to create a comfortable, beneficial and efficient learning atmosphere, upgrade equipment and optimize the network to provide students with good online learning in response to network congestion during online learning. surroundings.

6.4 Enhance Interactive Communication Between Home and School, Teachers and Students

Affected by the separation of time and space between teachers and students in online teaching, problems such as poor teacher-student interaction have become prominent. Students, teachers, schools and other parties need to enhance communication and collaboration to realize the online teaching status of student independence, family support, and school follow-up to ensure the smooth progress of online teaching.

Acknowledgment

References

[1] Li Xingrong, Guo Hongsheng, Zhang Liangang. An Empirical Analysis of the Influencing Factors of the Effect of College Students' Online Autonomous Learning[J]. Modern Education Management, 2009(10): 57-60.

[2] Dong Wei, Zhang Mei, Gao Chenlu, Pan Haisheng. Research on Influencing Factors of Learning Effect of Online Education Platform Based on User Experience[J]. China Distance Education, 2020(11): 68-75.

[3] Zhang Xiaoai, Wang Hong. Network learning and the factors affecting the effect of learning [J]. Journal of Shandong Academy of Youth Management, 2006(01): 100-102.

[4] Wang Jixin, Cui Yongpeng, Yan Youtian. Analysis of the effect and potential influencing factors of large-scale online education practice during the war "epidemic"——Taking Xiaogan City, Hubei Province as an example[J]. Research on Audio-visual Education, 2020, 41(06) :5-12.

[5] Tang Shuangying, Zhou Xiaolan, Xiang Shoushu, Song Ping, Wang Yuting, Yan Shaobiao, Dong Xiao, Liu Hua. Evaluation of the effect of COOC online teaching platform and analysis of its influencing factors[J]. China Continuing Medical Education, 2020, 12(05): 40-43.

[6] Li Jin. A new system for evaluating the effect of online online education: based on the relationship between "social presence" and "connectedness" [J]. Journal of Changchun Institute of Education, 2019, 35(09): 17-20+ 44.

[7] Zhou Yilin. Research on the evaluation model of personalized online learning effect based on user portrait [D]. Central China Normal University, 2020.

[8] Shen Xinyi, Wu Jianwei, Zhang Yanxia, Li Ying, Ma Yuchun. Research on MOOCAP learners' online learning behavior and learning effect evaluation model[J]. China Distance Education, 2019(07): 38-46+93.

[9] Wu Xiaocui, Wu Xia, Long Zichi. Research on the effect of live teaching and improvement: Taking three universities as examples [J]. Journal of Guangzhou Radio and Television University, 2020, 20(05): 24-29+108 .

[10] Li Ying. Analysis of Knowledge Management and University Administrative Operation——Take Case University as an Example [J]. Journal of Fujian Jiangxia University, 2014, 4(06):107-115.