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University Online Course Evaluation Based on Mixed Data after the Pandemic

Zhougeng Lin[1], Lifan Shu[2*], Yihao Huang[3]

[1]School of Management, Shenzhen Polytechnic University, Shenzhen, China
[2]School of Management, Shenzhen Polytechnic University, Shenzhen, China
[3]Qifeng School, Lishui Town, Nanhai District, Foshan, China
[*]Corresponding author: Lifan Shu, shu_lifang@126.com

Abstract: *After the COVID-19 pandemic, the Chinese universities have accelerated the progress of online education. Online course teaching is not only a way to ensure education during pandemic, but also a social trend. This paper designs a survey to investigate student experience of online teaching. The survey is on a small scale and employs a fine-tuned LLM to collect survey data. The results find three main influencing factors. Suggestions are proposed based on the analysis.*

Keywords: *Online course; course evaluation; LLM; pandemic*

1. Introduction

During the COVID-19 period, universities and schools in China stopped offline teaching and fully implemented online courses in order to effectively prevent the epidemic. It accelerates the informatisation process of curriculum in Chinese universities. After the end of the epidemic, the informatization of education has been further deepened. This paper discusses the development of online courses in Chinese universities after the pandemic.

Some universities created instant messager groups such as QQ groups and WeChat groups to interact with students, and implemented online assignments and online examinations.

Online courses include open courses, open course resources, MOOC, etc. Online live streaming class includes live video, “PPT+voice+whiteboard”. Online courses normally use teaching platforms like Super Star Learning, Rain Classroom, QQ, DingTalk and Khan Academy. Although the higher education department and information technology department have been working hard to ensure quality of distance education through a variety of ways, however, from the student feedback, the quality of remote education are subject to network speed, terminal equipment, etc.

This paper designs a questionnaire to investigates the current situation and problems of students taking online courses. Then the paper analyses the problems existing in online courses after the epidemic and proposes solutions to improve the quality of learning experience of online courses.

2. Influencing Factors and Survey Design

Higher education students are normally influenced by three elements of online courses: practicality, flexibility and richness[1,2,3]. For practicality, if course content has a clear knowledge framework, it will be helpful for students to construct cognitive logic and quickly transform knowledge into their own needs[4]. Different from face-to-face classes, a reasonable schedule of online courses should have strong flexibility, which can provide students with online discussion activities with high participation and interaction. Finally the richness of online course content relates to whether students can keep maintaining their interest in learning process and the length of attention. Therefore, abundant course resources and reasonable design of online courses are the guarantee of online teaching quality [5].

2.1. Richness of Course Resources

Various and excellent online learning resources can stimulate students' learning motivation and improve their interest at home or in a dormitory. At present, the dilemma of online courses is that the construction of online courses ignores the needs of students [6-9]. The courses simply present textbook

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knowledge without combining learning resources with after-class expansion. In most situations, these resources are not updated in a timely manner, and most of them are the old versions of a few years ago [10-13]. This is also one of the main reasons why most learners lose their original strong interest in online learning and cannot constantly focus on the screen of online lectures. Therefore, diversified learning resources, multiple types of professional knowledge activities, and the remote encouragement of students' learning are the most helpful measures for the practical application of online learning.

2.2. Reliability of Online Platforms

After the pandemic, the surge in user numbers of online education platforms has led to a shortage of resources. According to students' feedback from the on online classes, the response time and the video quality are the main complaints [9]. The more active students in their courses, the more similar learning statuses comparing to the offline classes. Therefore, the construction and maintenance of network learning platforms are the basis of lecture delivery and curriculum implementation. Platform construction should be improved by online education companies employing new technologies to meet the learning needs of students and teachers[13].

2.3. Mixed Human and LLM Survey

Considering the influencing factors, the investigation evaluates the online course quality in 3 aspects as shown in the Figure 1: course content, learning resources and learning platform. The course contents are divided into three parts: practicality. The questionnaire evaluates students' experience using the platform. In addition, the survey respondents are undergraduate students in Chinese universities.

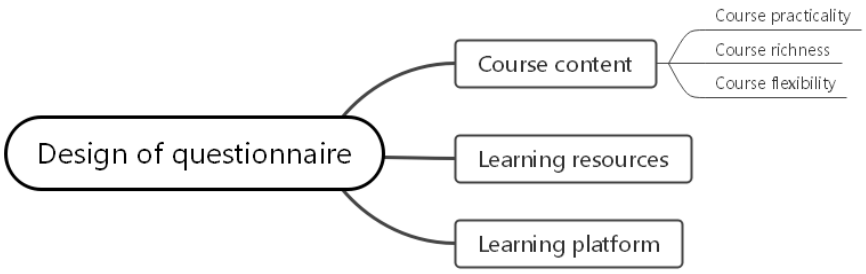

Figure 1: Logic structure of questionnaire

This questionnaire focuses on the reality and changes of higher education teaching, explores the possibility of further development of network teaching from the perspective of the factors that affect student online courses, then analyses data and draw conclusions. Based on the conclusions, this paper provides important suggestions and measures to improve the quality of online courses and online experience of the teachers and students.

This survey plans to distribute questionnaires on a small scale and use a fine-tuned large language model (LLM), which is developed based on the ChatGLM, to collect survey data. The LLM uses the ChatGLM and the fine tuning method employs the Low-Rank Adaptation. The following fine-tuning codes are tested the best combination of parameters of alpha and r through experiments[14-15].

ft_scaling = alpha / r

ft_weight += (lora_B @ lora_A) * ft_scaling

Experiments have shown that the best results are found when $\mathrm{alpha} = 117$ and $\mathrm{r} = 200$ [14-19].

3. Result analysis

This research limits the investigation factors, only considers the course content, learning resources and learning platform. 2141 copies of the questionnaire received and 1388 of them are valid. The fine-tuned ChatGLM program simulates the population surveyed to generate approximate a quarter of real survey data, which are 350 copies, to increase the sample size of the survey.

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3.1. Reliability analysis of the survey

Undergraduate students, as the survey respondents, have the most direct feelings and the deepest feedback about the online classes. This paper adopts various data for analysis, which has a certain degree of credibility [20]. Firstly, the data is collected from the students who actually attend online distance education, therefore the conclusions obtained are credible. Secondly, the paper analyses and summarises the problems of the online education processes, which has certain value for the developing online education. Through the analysis of data, this paper finds out the connection and relationship among course design, learning resources, platform design and learning status of students in online classes, and gives constructive suggestions based on the feedback of survey.

3.2. Course construction

The content of the course is not well matched with the job market. As shown in the Figure 2, more than half of students consider the course content is not very helpful to career development.

Option	Subtotal	Proportion
Good	610	43.26%
Average	680	48.23%
Negative	90	6.38%
Valid questionnaire	1380	

Figure 2: Practicality of online course

According to Figure 3, online course is less flexible comparing to offline. The students reflect that the amount of online learning tasks required to complete is much more than that in offline teaching. The online practice and online test to be completed in class often lead to procrastination in class time.

Option	Subtotal	Proportion
Good	631	44.68%
Average	643	45.39%
Negative	115	7.8%
Valid questionnaire	1388	

Figure 3: Flexibility of online course

In the Figure 4, the students surveyed felt that there is a lack of online teaching resources. Data show that nearly 9.22% of students in class find that their teachers insist traditional teaching methods for online courses, such as using offline documents, slides, lack of interaction with students comparing to offline.

Option	Subtotal	Proportion
Good	780	55.32%
Average	450	31.91%
Negative	132	9.22%
Valid questionnaire	1362	

Figure 4: Richness of online course

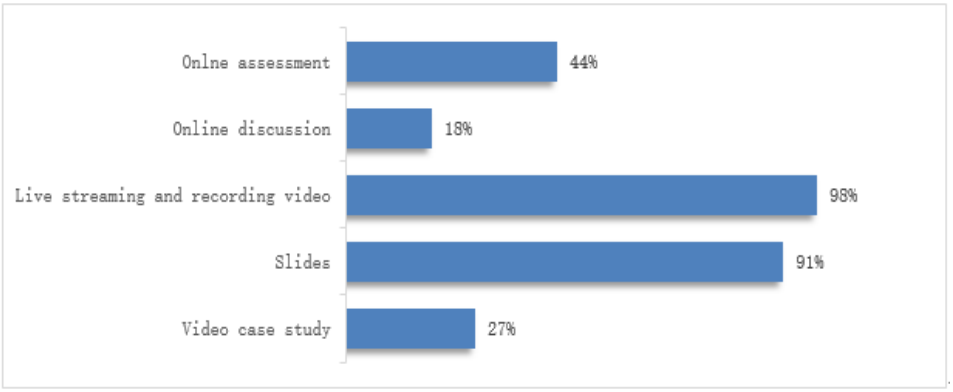

Figure 5: 5 main types of learning resources

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As seemed in the Figure 5, teachers normally use 5 types of learning resources for their online lectures. The most of them prefer live stream or recorded videos, slides and video cases, but the studying reviews and online discussion less have much lower proportion, despite around 25% of students think that the effectiveness of online discussion and studying reviews can't be ignored.

In the Figure 6, the survey found that different teachers in the same university may use different online teaching applications and software, which requires their students to install multiple applications or software. However, the data from different software cannot be interconnected which increases the difficulty of students to be on time for class and engage in class activities, and students tend to forget the deadlines for homework and tests due to not checking the deadlines in time from different applications. Secondly, the quality of each platform varies, the internet speed of teachers and students highly affect their experience, which greatly delays the teaching progress of teachers and affects the learning efficiency of students.

Option	Subtotal	Proportion
Unstable network	79	56.03%
Too many learning platforms	92	65.25%
Learning quality	79	56.03%
Course schedule	35	24.82%
Valid questionnaire	141	

Figure 6: Negative influence to the online course

It is found that course content, learning resources and online platform determine students' experience in class, which, in turn, affects students' learning status and the overall teaching quality. This is the first large-scale trial for Chinese universities to use online teaching which is a valuable experience. The survey data of this study can help to promote the development of high-quality online courses[9]. The arrangement of online teaching curriculum should consider the enhancement of student employability, improve the practicability of curriculum for social practice and the effectiveness of cultivating social talents.

The primary audience for online courses is students. Better online courses can bring students a sense of psychological pleasure, so that students can feel the expectation and satisfaction of attending classes without being restricted by time and space. If students can get the pleasure of learning in online teaching, they will take the initiative to complete the learning process without the supervision of teachers which may be difficult online. Therefore, this questionnaire focuses on the research from the perspective of practice, and it will also pay more attention to the subjective feelings of students in the distance learning process.

3.3. Course content

Textbooks for online class should be updated in time and remove outdated course content. For example, in the process of writing textbooks, students who have learned relevant contents can engage in the process. The advice and extended thoughts raised by students are valuable suggestions for textbook writing, because students have a further understanding of what they expect from distance education [10,11,12]. The course content can not only keep in the latest frontier of the relevant professions in the industry every year, but also can constantly adopt the feedback of graduates from the industry.

In addition to the basic knowledge and teaching skills, teachers should constantly improve the course content according to the latest industry development, such as use latest practical case study, inviting industry practitioners for remote sharing or cooperative teaching, to improve students' understanding and interest in their majors. Teachers can also guide students to understand the background and key steps of problems, then encourage students to solve problems by themselves, so as to improve students' participation and interest inside or outside the online lectures.

The actual progress of the course and limitations should be taken into account in the arrangement of time of course to meet students' learning needs. Refer to offline courses, the content preview should be completed by students before the online class, coursework should be completed after class, and the class discussion should be completed during class.

Based on the requirements of syllabus, teachers should use various multimedia teaching means to integrate resource so as to improve the quality of online course. For example, teachers can use APP like Super Star Learning, Voov Meeting and Rain Classroom to deliver supplementary resources. In

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addition, teachers can explain a knowledge from different aspects and provide relevant information and website links, such as links to MOOC, and do cross thinking analysis from different aspects to learn knowledge and solve problems.

3.4. Learning platforms

As shown in the Figure 7, the main concerns are number of online course platforms, unstable network and the quality of online platforms. Besides, it is advised to discuss with students to set up a login time before online course, for example if the class starts at 8:30, the login time can set as 8:25, the 5 minutes not only gives the students the time to solve network problems or test their smart phones and software.

Option	Subtotal	Proportion
Unstable network	79	56.03%
Too many online platforms	92	65.25%
Quality of online platforms	79	56.03%
Schedule and arrangement	35	24.82%
Valid questionnaire	141	

Figure 7: Main concerns of online course

In addition, learning in platforms is affected not only by teachers and students, but also by technical problems that may occur on the platforms themselves. Universities and colleges can cooperate with the main learning platform to set up an after-sales team. The after-sales team should respond to teachers and students timely to solve technical problems. At the same time, the course data should be backed up to prevent losing online class scores, homework scores, and test scores after platform system collapsed.

This section mainly focuses on the questionnaire result analysis, discusses problems and putts forward some suggestions for improvement according to the result analysis of the research. This section researches course content in three different aspects, such as the slow update of the textbook version, the limitations of the course content, etc. Considering less resources and more learning platform options, it is suggested teachers and students to have more communication and online teaching applications to have more technical support.

4. Conclusion

Chinese universities had extensive use of online courses during the pandemic, and after the pandemic ended, the development of online courses has continued. This paper conducts a questionnaire research based on online courses to understand the impact of course content construction, online resource richness, online platform reliability and functionality.

Based on the analysis of the survey, this paper finds that the course content construction needs to be in line with the latest development of the industry. Teachers should be encouraged to provide more learning resources online, and the number of platforms should be limited to ensure that students attend classes in an order manner. Teachers and students need more communication for online classroom comparing to offline classes.

This paper integrates with survey data and advises to solve the problems, which helps universities to improve the quality of online teaching and solves the problems for students during distance classes.

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