

The Research on Online Teaching of Chinese College Students during the COVID-19 Pandemic

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Abstract. In the contemporary evolving world, online teaching has become an indispensable education pattern with the advancement of technology and society. As the newest members of society, college students have a high likelihood of experiencing various problems under this scenario. As a result, this paper mainly investigated and examined the online teaching activities during the COVID-19 pandemic. The study measured the impact of online teaching methods on academic performance of students and their attitude towards the course. The research was conducted through a survey on a sample of Chinese college students. After the collection and analyses of detailed data, certain issues were identified and provided with resolutions. The findings suggested that online teaching has both advantages and disadvantages, and different individuals possessed different evaluations of online teaching. Additionally, factors affecting the quality of online teaching were analyzed and relative resolutions were provided. The study concludes that online teaching can be an effective and practical method for Chinese college students with further development.

Keywords: Online teaching, Chinese college students, COVID-19, education.

1. Introduction

Lorenzo-Lledo et al. (2022) referred that all domains of society have experienced a considerable transformation as a result of the COVID-19 scenario [1]. The impacts of the worldwide epidemic have been especially pertinent to the subject of education. The necessity to address the difficulties of physical interactions between teachers and students resulted in the conversion of face-to-face learning situations into online instruction. Yang and Qiu (2021) stated that online instruction is a new approach to education that combines network infrastructure, multimedia, and other new technical tools to portray the position of the computer in the curriculum [2]. In order to investigate relevant issues of online teaching and take corresponding measures, 4 research questions were raised to proceed with the paper:

- Q1. What are the advantages and disadvantages of online teaching?
- Q2. What is the students' attitude towards online teaching?
- Q3. What are the factors influencing the quality of online learning?
- Q4. Is there any possible improvement for online teaching?

2. Method

2.1. Research Objects

There were 231 participants in this study. The participants were made up of 136 men, representing 58.87% of the total, and 95 women, which accounted for 41.13% of the total. These participants were all Chinese university students, and the sample included 50 freshmen, making up 21.65% of the total; 64 sophomores, making up 27.71% of the total; 61 juniors, representing 26.41% of the total; and 56 senior students, making up 24.24% of the sample population. Among them, 96 majored in science and engineering (41.56%), 59 in humanities and social science (25.54%), 44 in economics and management (19.05%), 20 in arts (8.66%), and 12 in other modules (5.19%). The majority of these students hailed from the eastern regions of China, especially the coastal areas, as indicated in Figure 1 below. These results provide a comprehensive understanding of participants included in the study and enable the researcher to carry out further analysis based on the collected data.

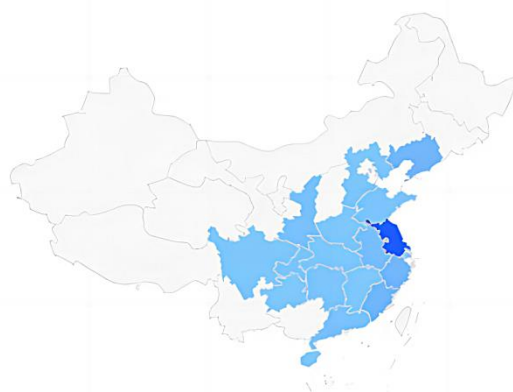


Fig 1. The Demographic Distribution of Participants

2.2. Questionnaire

An online questionnaire was designed with the purpose of assessing the virtual education both quantitatively and qualitatively for Chinese college students. The questionnaire could be divided into two parts. The quantitative part collected the basic personal information of the sample, including the participants' gender, grade, major, and districts. The qualitative part investigated the teaching situation and participants' attitude toward virtual education.

2.3. Research Procedure

Each participant was asked to finish the survey questions. Confidentiality was ensured, and respondents' names were all concealed. The digital questionnaires took approximately 5 minutes to complete without any compensation. The researcher then measured the statistics, evaluated tests, and finally investigated the correlation between results and hypotheses.

3. Result

Figure 2 indicated the number of users of common online course platforms in China. Among them, NetEase Open Course has the largest number of users (128). However, there is little difference in the usage frequency of these online course platforms.

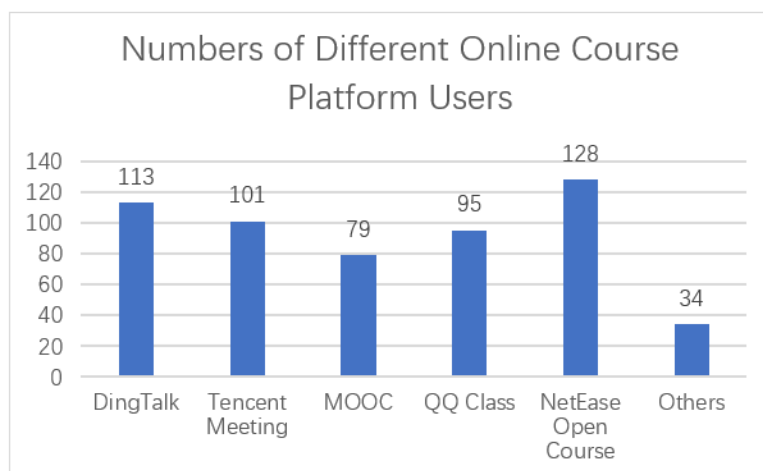


Fig 2. Numbers of Different Online Course Platform Users

Table 1 illustrated the summary variables: the degree of satisfaction with online teaching course arrangement, and the degree of satisfaction with online teaching assessment of students from different majors. On a scale of 1 to 10, higher scores indicate higher satisfaction. Thus, Science and Engineering students are least satisfied with online teaching.

Table 1. Relationships between Majors and Satisfaction of Online Teaching

Major	Degree of Satisfaction with Online Teaching Course Arrangement (0-10)	Degree of Satisfaction with Online Teaching Assessment (0-10)
Science and Engineering	4.552	4.531
Humanities and Social Science	5.831	6.169
Economics and Management	6.727	7.568
Arts	6.900	7.600
Others	7.583	8.333

Table 2 showed the summary variables: the effective degree and the liking degree of students with different genders. On a scale of 1 to 3, lower scores indicate higher effectiveness and liking degrees. Accordingly, male students prefer online teaching more than females, and think it is more effective.

Table 2. Relationships between Genders and Attitude towards Online Teaching

Gender	Effectiveness Degree (1-3)	Liking Degree (1-3)
Male	1.926	1.213
Female	2.589	1.916

Table 3 depicted the external elements influencing online teaching including network fluctuations and surrounding environment. Among them, Choice 1 represents Always; Choice 2 stands for Sometimes; Choice 3 means Seldom; and Choice 4 is Never.

By the question “Have you ever been affected by network fluctuations during online teaching?”

Frequency analysis results show that: The frequency of Choice 2 is 98, accounting for 42.424%; The frequency of Choice 1 is 83, accounting for 35.931%; The frequency of Choice 3 is 37, accounting for 16.017%; The frequency of Choice 4 is 13, accounting for 5.628%. Choice 2 (42.424%) is the highest and Choice 4 (5.628%) is the lowest. Consequently, most of the participants have faced the problem of network fluctuations.

By the question “Have you ever been affected by surroundings during online teaching?” Frequency analysis results show that: The frequency of Choice 2 is 97, accounting for 41.991%; The frequency of Choice 3 is 73, accounting for 31.602%; The frequency of Choice 1 is 43, accounting for 18.615%; The frequency of Choice 4 is 18, accounting for 7.792%. Choice 2 (41.991%) is the highest and Choice 4 (7.792%) is the lowest. Consequently, most of the participants have faced the problem of noise in surroundings.

Table 3. External Factors Influencing Online Teaching

Questions	Choice	Frequency	Percentage (%)
Have you ever been influenced by network fluctuations?	2	98	42.424
	1	83	35.931
	3	37	16.017
	4	13	5.628
Have you ever been influenced by surroundings?	2	97	41.991
	3	73	31.602
	1	43	18.615
	4	18	7.792
Total		231	100.000

Table 4 explained the internal factors influencing online teaching including teachers' proficiency and students' interactions. Among them, Choice 1 represents Very Proficient; Choice 2 stands for Proficient; Choice 3 means Ordinary; and Choice 4 is Not Proficient in Item 1. In Item 2, Choice 1 represents Very Willing; Choice 2 stands for Willing; Choice 3 means Ordinary; and Choice 4 is Not Willing.

By the item "The teaching staffs' skills of online education." Frequency analysis results show that:

The frequency of Choice 1 is 89, accounting for 38.528%; The frequency of Choice 2 is 66, accounting for 28.571%; The frequency of Choice 3 is 65, accounting for 28.139%; The frequency of Choice 4 is 11, accounting for 4.762%. Choice 1 (38.528%) is the highest and Choice 4 (4.762%) is the lowest. Consequently, most teaching staffs are capable of using online teaching tools.

By the item "The students' willingness of interactions in online education." Frequency analysis results show that: The frequency of Choice 3 is 100, accounting for 43.29%; The frequency of Choice 2 is 69, accounting for 29.87%; The frequency of Choice 1 is 47, accounting for 20.346%; The frequency of Choice 4 is 15, accounting for 6.494%. Choice 3 (43.29%) is the highest and Choice 4 (6.494%) is the lowest. Consequently, most students are not willing to take the initiative to interact in online teaching sessions.

Table 4. Internal Factors Influencing Online Teaching

Items	Choice	Frequency	Percentage (%)
The teaching staffs' skills of online education.	1	89	38.528
	2	66	28.571
	3	65	28.139
	4	11	4.762
The students' willingness of interactions in online education.	3	100	43.29
	2	69	29.87
	1	47	20.346
	4	15	6.494
Total		231	100.000

4. Discussion

In recent years, a significant shift towards virtual classes has been observed, particularly due to the COVID-19 pandemic which forced educational institutions to close their physical campuses and switch to remote learning via virtual classes, online resources and digital platforms. Consequently, the current research has revealed several concerns on virtual learning.

4.1. Advantages & Disadvantages of Online Teaching

Gong and Feng (2021) claimed that online learning has many advantages [3]. For instance, there is no geographic restriction on digital learning, and educational activities can be carried out using electronic devices. Course playback is also a feature of virtual learning. Students can independently study the lessons they missed by using the playback feature. Via the playback function, students could also review and solidify their information. Simultaneously, teachers can provide learning materials or students can actively seek for learning materials to enhance the learning process [3]. Moreover, Xu (2021) pointed out that diversity, interactivity, efficiency, and originality are capabilities of college educational materials in a network context [4]. This innovative teaching approach not only improves the standard for college instruction, but also breaks preconceived notions of what constitutes learning. It expands the perspectives of both students and teachers and enables them to see the world from various viewpoints [4].

However, Aisha and Ratra (2022) proposed that there were numerous obstacles to the development of distance education, including a scarcity of technological infrastructures, a lack of electronic devices, and low accessibility because of inadequate technological proficiency [5]. E-learning must

be accessed from home, office, or other solitary quiet location in to promote studying with concentration despite the presence of any instructor or facilitator. This ultimately leads to an atmosphere of isolation or constrained socialization and might cause students to become inactive, have low motivation, and have less self-control [5]. Aisha and Ratra (2022) also declared that technical difficulties might result in frustration [5]. For example, the legitimacy of certificates or diplomas obtained online was questioned because they lacked institutional approval and authority endorsement for their execution. Except from psychological concerns, the sample participants pointed out online learning can also cause physical discomfort such as eyestrain and constant tiredness [5].

4.2. Students' Attitude towards Online Teaching

According to Chitra et al. (2022), most students possess positive sentiments toward online learning with satisfaction of its applicability and validity [6]. According to the results of the survey, most Chinese college students have similar viewpoints of digital learning with the mean > 5 in satisfaction level and the mean < 2 in effectiveness and liking degrees.

Whereas these feedback vary depending on individuals' characteristics. From Song et al.'s (2005) perspective, students majoring in Science have a lower evaluation of existing online course management than students majoring in Arts. In terms of gender dimension, male students are more proficient than female students in utilizing online curriculum resources [7]. El Refae et al. (2021) also found that students from Communication and Media appeared to be more satisfied with digital learning in university than students from Engineering and Pharmacy [8]. The results in Table 1 were consistent with former studies that students majoring in Science and Engineering have a lower evaluation and satisfaction (mean=4.552 in class arrangement, and 4.531 in assessment methods) with virtual classes than students majoring in Arts (mean=6.900 in class arrangement, and mean=7.600 in assessment methods). In addition, Table 1 also proved that male students have higher evaluation of virtual education compared with females. Furthermore, other elements such as states, ages, cognition degrees, etc. could also generate differences to the attitude towards E learning as stated in Song et al. (2005) and El Refae et al.'s (2021) research [7,8].

4.3. Factors Influencing the Quality of Online Teaching

The quality of virtual classes is determined by various factors which are instrumental in ensuring effective learning. Clary et al. (2022) conducted the ideas that individual and environmental elements formed students' academic achievements [9]. The current research also discovered similar issues.

4.3.1 External Factors

Many Chinese colleges started utilizing systems like MOOC, DingTalk, NetEase Open Course, Tencent Meeting, QQ Class, etc. (Figure 2) to address the difficulties brought on by the suspension including in classes. Seddighi et al. (2022) pointed out that which platform to utilize is determined by teachers and students, and it relies on the techniques required for instructing the subject [10]. The importance of using platforms might vary based on variables including the requirement for instructors and students to make eye contact, audio, video, and document sharing, lifting hands, peer discussions, etc. To choose the most suitable platforms, it is crucial to understand the features and functions of each one [10]. Robalino Sánchez et al. (2022) claimed that the virtual learning environment is essential for university students [11]. However, approximately 92% of the participants have been influenced by surroundings as demonstrated in Table 3. Moreover, nearly 94% of the sample students have been affected by network fluctuations, and 42.424% of them always confront with such situations. According to Wijayati et al. (2022), the network connection issue has become one of the most fundamental problems preventing the implementations of online teaching [12].

4.3.2 Internal factors

Weber and De Oliveira (2022) considered the epidemic crisis as a crucial occasion to make modifications in educational procedures, because educators had to learn utilize technological resources to organize classes, produce instructional videos, operate teleconference technologies, and

also use communication instruments [13]. Table 4 indicated that although participants think that most teaching staffs are familiar with virtual educational tools, about 33% of them consider their teachers as not proficient in using the technological tools. Simultaneously, Clary et al. (2022) argued that individuals have distinctive features, experiences, and cognitive capacity that they can draw from while making decisions [9]. By fusing self-perceptions with the requirements that behaviors demand, students evaluate their capacity to engage in potential behaviors. The conventional face-to-face education model has been changed substantially by online learning. Students would consequently be compelled to assess their own internal psychological, affective emotions, and physical characteristics as a result of switching to a different learning method [9]. Li et al. (2022) also discovered that the most essential element influencing students' academic performance is the willingness of students participating in education under the virtual learning environment [14]. The results in Table 4 reflected that almost half of the students are passively receiving the teaching process rather than actively engaging in the classes.

4.4. Possible Improvements

Considering the impact of online teaching, it is important to focus on what it requires in the future. The Covid-19 pandemic has put a spotlight on online teaching, with a majority of educational institutions worldwide resorting to virtual classes to maintain social distancing protocols. To ensure that online teaching meets the evolving needs of the learners of the future, the following aspects can be considered.

4.4.1 Hybrid Mode

Avent and Richardson (2021) found that the education system and the students can profit from implementing blended and HyFlex instructional strategies. This choice will provide the adaptability to boost enrolment and accommodate changing educational patterns [15]. It is crucial to emphasize the virtual environment as a determinant in student involvement and take into account the implementation of this choice in the post-pandemic school environment.

4.4.2 Teaching Adjustment

AL-Tkhayneh et al. (2022) recommended several improvements that reducing the amount of time spent on distance learning to protect students' psychological state; lightening the load of distance learning on students by reducing the amount of work they are required to complete; adapting traditional face-to-face teaching techniques and resources to support digital learning; and offering more flexibility to students confronting with technical difficulties or poor internet connectivity [16].

4.4.3 Assessment and Evaluation

Hazra and Priyo (2022) observed that efficient proctoring is not achievable in an online situation [17]. To provide an equitable assessment atmosphere, invigilating has become a critical problem. The launch of virtual classrooms has highlighted the underlying issues with existing method of instruction more obvious and worsened them. The universities must adopt a more cutting-edge and successful strategy centered on issues like student participation and interactive learning in order to handle these obstacles. Student groups can be formed and allocated different tasks that will encourage participation, interdependence, and an equitable distribution of work duties, which will increase knowledge acquisition [17].

5. Conclusion

In conclusion, this paper has conducted several investigations concerning on online teaching during the COVID-19 pandemic. After carrying out corresponding researches of e-learning on Chinese college students, the results were analyzed and compared with previous studies. The current research then produced certain findings. The benefits and shortage of applying online teaching were detected, and the attitude and satisfaction level of the participants were founded. Afterwards, internal

factors and external factors affecting the quality of virtual classes were discussed, and potential solutions to enhance the environment of digital education were proposed.

As online teaching is emerging as a vital aspect of the education sector, the current research can be applied in the future of online teaching required by educators, institutions, and education technology providers to effectively integrate technology, promote communication, collaboration and student engagement, train educators and re-design assessment and evaluation methods. However, this research is limited to the topic of Chinese university students. Further research and investigations should be undertaken to conduct other similar studies with different variables to expand the prospects of other distant learning research.

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