

Evaluation of the effectiveness of EFL online teaching during the COVID-19 pandemic

SAGE Open
October-December 2021: 1–17
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DOI: 10.1177/21582440211054491
journals.sagepub.com/home/sgo


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Abstract

Online teaching has been massively conducted during the novel coronavirus period all over the world. How to evaluate online teaching has been increasingly researched recently. This study looked at how English as a foreign language (EFL) teaching was delivered online by university teachers during the COVID-19 pandemic. We investigated university teachers and students' perception of effective EFL online teaching and learning based on several evaluation modes in using technology in education. Data were collected using questionnaires and interviews from teachers and students in a variety of provinces in Mainland China. The results showed that various methods were used to deliver online EFL courses and these approaches are found to correlate with each other. Teachers and students provided positive comments on online teaching and were satisfied with their online teaching and learning. Participants also noted effective ways in online EFL teaching. The findings indicated that when teachers have more training, more skills, and more confidence, they could deliver more effective online teaching and learning.

Keywords

effectiveness, online teaching, EFL, COVID-19, evaluation

Introduction

During the COVID-19 pandemic, a large number of schools and universities all over the world had to move face-to-face classroom teaching to online teaching. Many countries have launched policy and support to enhance online teaching from primary to university education. A variety of online platforms have provided appropriate functions and tools to help teachers to conduct online teaching, such as Zoom, Skype, BigBlueButton, Dingding, etc. Online education has become the only substitute for many universities in this special circumstance. As a result, there is a need to investigate the effectiveness of online courses in the COVID-19 context. In addition, studies regarding the relative effectiveness of online education compared to traditional classroom teaching are also important for stakeholders such as policymakers to evaluate online teaching (Bernard et al., 2004).

Although researchers have provided theoretical and practical instructions for teachers with the aim to help teachers perform well during the process of teaching online (e.g., Boettcher & Conrad, 2010; Cross & Polk, 2018), Young and Duncan (2014) argued that teachers who delivered online lessons received lower scores from their students compared with their counterparts who gave face-to-face lectures. According to Thomas and Graham (2019), insufficient training and support received by online

teachers may lead to lower ratings from students. Instructors who have not received professional training tend to teach online courses in the same way as they deliver lectures in classical classrooms, ignoring the differences between online teaching and face-to-face education (Kreber & Kanuka, 2013). Moreover, competencies required in an online teaching circumstance are different from those in face-to-face teaching (Creasman, 2012). Therefore, it is possible for a teacher who received a high score in face-to-face course to gain a lower score in an online environment (Thomas & Graham, 2019). Moreover, teaching online requires an instructor to have expertise not only in teaching content but also in technology (Miller & Sisk, 2019), which adds more responsibilities to the instructor.

Furthermore, more pressure on online teachers comes from students' preference for the traditional way of imparting knowledge. For example, Roy et al. (2020) revealed in their survey that the majority of students desired to receive

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normal classroom education again rather than continue online education, making the job of online instructors more challenging. Despite the fact that some studies investigated students' perception of online teaching during COVID-19 period (e.g., Hani & Saleh, 2020; Roy et al., 2020), research into teachers' perception appears to be lacking (Wu et al., 2020). According to Wu et al. (2020), teachers' satisfaction toward online teaching can influence their personal self-efficacy belief (which is regarded as an important index of online teaching quality), making it especially essential to explore university teachers' experience and their comments on teaching effects during COVID-19. Additionally, EFL teachers' perceptions of the effectiveness of online language teaching during COVID-19 is also under-researched. Therefore, this paper intends to explore teachers' as well as students' perspectives on the effectiveness of EFL online teaching in respect to the deliverance of online courses, and provide some insights and helpful implications for online teaching. Thus the research questions are:

1. How are online EFL courses delivered during the COVID-19 pandemic in China?
2. How is the effectiveness of online teaching from EFL teachers' perspective?
3. How is the effectiveness of online teaching from students' perspective?

Literature Review

Online language courses have become increasingly popular thanks to a number of advancements in computer-assisted language learning (CALL), which not only include more application of course management sites, but also other diverse online tools (Enkin & Mejías-Bikandi, 2017). Online teaching and learning have been found beneficial to learners' EFL learning (Ding, 2020; Hiscock, 2020; Lee et al., 2018; Oskoz & Gimeno-Sanz, 2020; Robertson & Piotrowski, 2019; Wei, 2018). Online EFL courses with synchronous communication in video conference context have found popularity in recent years (Michel & Cappellini, 2019; Rassaei, 2017) and can enhance learners' foreign language learning when they chat via the video tool (Pineda et al., 2021; Warner-Ault, 2020). However, these studies above were mostly based on learners' perceptions and discussed regular online EFL teaching environment, rather than in massive online EFL teaching in the COVID-19 circumstance. The effectiveness of online EFL teaching during COVID-19 based on teachers' perceptions are also crucial to explore.

Although some studies have investigated online language teaching and learning in COVID-19 recently, very few of them used comprehensive models to evaluate the effectiveness of massive online language teaching in this specific pandemic. Thus, this study will adopt several models which had been used to evaluate online teaching and learning to

look at the current online EFL teaching and learning during the COVID-19 outbreak.

Chickering and Gamson (1987) proposed seven principles (e.g., encouraging student-teacher interaction, encouraging students' cooperation, giving timely feedback, etc.) to evaluate teaching effectiveness in a traditional classroom. Among their seven principles, the first one (a good practice should encourage student-instructor contact), which is the most critical factor in learners' motivation and involvement, and the second one (a good practice should encourage students to cooperate with each other), which may enhance students' learning, belong to the field of interaction (Chickering & Gamson, 1987). Similarly, Wei (2018) suggested that the effectiveness of information EFL teaching mode is determined by two factors: the amount of attention paid to individual differences of students and the build of various interactive platforms. Therefore, we can infer that when evaluating the teaching effectiveness of traditional courses, the interaction of students and teachers is a vital factor.

Furthermore, some researchers argued that the interactions of students and instructors play a significant role in the success of online education (Cheng, 2011; Selim, 2007). For example, in the model to assess the application of computer-mediated communication in tertiary institutions, social presence, one of the three core elements of Community of Inquiry model, directly contributes to the successful educational experience (Garrison et al., 1999). Social presence is the ability of participants to present their personal characteristics to other participants in the community, showing themselves as "real people," which also is a process of interaction among participants in a learning community. If the participants consider the interaction with others pleasant as well as personally fulfilling, they will maintain as part of the group during the program (Garrison et al., 1999). Similarly, Korkealahto and Leier (2021) also found that students benefited from collaborative foreign language learning in an online social media environment.

Apart from interaction, many other factors affect the effectiveness of online courses, and many scholars have suggested various determinants of the effectiveness of e-learning (Al-Fraihat et al., 2020; Davis et al., 1989; Fathema et al., 2015). Technology Acceptance Model (TAM) is specially modified for modeling users' acceptance of computer technology (Davis et al., 1989). Perceived Ease of Use (PEOU), which is defined as the extent to which an individual assumes using a certain technology is effortless, and Perceived Usefulness (PU), which is defined as the extent to which an individual considers that using a particular technology will facilitate his/her job performance, are the most important indicators of users' acceptance of computer technology (Davis et al., 1989). If a user does not find difficult to use a technology tool, he/she thinks the technology is helpful, indicating that PU can be affected by PEOU (Davis et al., 1989). According to TAM, PEOU and PU (two fundamental constructs) have

causal relationships with other three constructs which are Attitude Toward Using (ATT), Behavioral Intention to Use (BI), and Actual System Use (AU) (Davis et al., 1989). PU and PEOU influence ATT, PU, and ATT determine BI, and BI affect AU (Davis et al., 1989). TAM claims that if a user finds a technology easy to use and useful, he/she will have an optimistic attitude to this technology. Moreover, the perception of usefulness and good attitude of a technology may develop a user's positive intention to use this technology, and if a user has the intention to utilize a technology, he/she will use it (Davis et al., 1989).

A great number of studies have been conducted to examine the validity of TAM and it has been extended into more versions: TAM2 (Venkatesh & Davis, 2000) and TAM3 (Venkatesh & Bala, 2008). According to Venkatesh and Davis (2000), TAM2 identified the common determinants (perceived ease of use, image, output quality, job relevance, result demonstrability, and subjective norm) of PU and two moderators (experience and voluntariness). It revealed that users' acceptance of new information technology (IT) was significantly impacted by social influence processes (subjective norm, image, and voluntariness), together with cognitive instrumental processes (job relevance, result demonstrability, output quality, and PEOU). Integrating the conclusions from TAM and TAM2, TAM3 posited that the influence of PEOU on PU would be moderated by experience and the determinants of PEOU, which may have no significant impact on PU (Venkatesh & Bala, 2008).

TAM has been considered as the commonly cited, highly influential and very predictive model of computer technology adoption (Fathema et al., 2015). TAM was used to investigate the technology acceptance determinations in various settings for a long time, but it was rarely employed in education (Teo et al., 2007). Later, there appeared a trend of using TAM in studying the e-learning process (Park, 2009). Fathema et al. (2015) applied TAM to check instructors' use of Learning Management (LMSs) and expanded the framework of TAM. Fathema et al. (2015) investigated the relationships of three proposed factors (system quality (SQ), perceived self-efficacy (PSE), and facilitating conditions (FC)) and the previous five TAM constructs through gathering data from 560 instructors in two American universities. Their research results not only further verified the claim of Davis et al. (1989), but also proved the evident impact of PSE, FC, and SQ on faculty's utilization of LMS in tertiary institutions. Further, Fathema et al.'s (2015) study revealed that PSE, which was an important determinant of PEOU and PU, was a vital factor in the application of technology. Consequently, instructors with high PSE or those confident about their LMS abilities, compared with those less confident, may use LMS more frequently.

Another framework that is employed in this paper is Technological Pedagogical Content Knowledge (TPACK), which is critical for teachers to deliver effective teaching (Koehler et al., 2013). In TPACK, content, pedagogy and

technology are three main parts of teachers' knowledge. Teachers' content knowledge is about the subject matter to be taught, pedagogical knowledge is about how to teach and learn. Technical knowledge is much more difficult to define because it not only requires a teacher to be equipped with traditional computer literacy and apply it to daily work, but also demands a teacher to recognize when IT can help or affect the achievement of an aim and continuously adjust to developments in IT (Koehler et al., 2013). Many studies examined TPACK's reliability and validity. For example, according to Harris et al. (2010), other researchers can use TPACK because its rubric and Cronbach's Alpha were tested and the results showed its reliability and validity (.857). Similarly, Kabakci Yurdakul et al. (2012) examined the scale of TPACK and the result for the Cronbach alpha coefficient was .95, showing significantly valid.

Recently, Hubbard (2019) suggested that there are a set of areas in which technology can positively influence the teaching and learning of languages. They are learning efficiency, learning effectiveness, access, convenience, motivation, teaching efficiency, and teaching effectiveness. Learning efficiency means students may learn language and skills quicker or more easily; learning effectiveness indicates that students learn what is required, keep language or skill in mind longer, and learn more; access is defined as obtaining materials or experience interactions which might be hard or impossible to get without CALL; convenience indicates students can learn almost the same effectiveness through a wider choice of times and places; motivation suggests students are willing to learning language and enjoy this process; teaching efficiency means less time is required for teachers to finish some tasks; Teaching effectiveness is defined as the actions of an instructor which have a deeper or more continuous positive influence on students' learning. These areas will be discussed in this paper.

According to previous research into the effectiveness of online EFL, there are three general limitations. The first one is that the majority of scholars considered online EFL teaching as for English learning in various aspects. Nevertheless, only a few studies mentioned the theoretical frameworks underpinning their research, making it necessary to explore deeply into the theories evaluating the effectiveness of online EFL teaching activities. Another limitation is that previous studies focusing on the effectiveness of online EFL teaching are restricted to a certain country or city. Since under the influence of COVID-19, many countries have to adopt online EFL teaching to substitute traditional face-to-face instruction, which means both students and teachers are forced to accept this mode of EFL teaching. Thus, this situation is different from previous situations, leaving the question: are prior conclusions about the effectiveness of EFL teaching still valid when it is world-widely used? In the end, although some authors have proposed various theories checking the effectiveness of online education, they are not specified in the area of EFL teaching. Therefore, it seems essential to find

empirical evidence regarding the validity of those theories mentioned above in the area of EFL teaching.

Methodology

Participants

The aim of this study is to investigate Chinese university teachers as well as students' perceptions of the effectiveness of online EFL teaching during the special period of COVID-19, when all the lessons had to be delivered online instead of traditional face-to-face methods. The research tools in this study were consisted of questionnaires and semi-structured interviews. The questionnaire targeted at teachers was circulated to teachers in different regions in China. One hundred eighty-one university teachers completed the questionnaires, and 63% were female teachers and 37% were male ones. These participants came from various provinces and municipalities, with teachers from Anhui province, Jiangsu province, and Shandong province constituting the top three of all the participants, 36%, 11.58%, and 8.42% respectively. The majority of these participants (60.53%) have master's degree level, followed by 18.95% of doctors and 4.74% bachelors. Meanwhile, 15.79% of them did not belong to any of these three categories.

In terms of their teaching experience, 54.21% of them have taught English for 10 to 20 years, which is followed by those who have taught for 20 to 30 years (23.16%), more than 30 years (9.47%), 5 to 10 years (7.89%), and less than 5 years (5.26%). During their teaching career, slightly more than half of them have experienced online teaching, while less than a half did not have such an experience. When they taught classical face-to-face lessons, nearly 90% of them have utilized the Internet to facilitate their teaching. Before they commencing online teaching, they have received different lengths of training with regards to e-learning. It is astonishing that nearly half of them (45.79%) did not receive any training, and although the remaining of them have been trained, only 6.32% of them have received more than a month's training. When they completed this questionnaire, 45.79% of these teachers have taught online for 2 to 3 months, 42.63% have taught online for more than 3 months, and 11.58% have taught for 1 to 2 months.

Meanwhile, 213 participants (57 males and 156 females) completed the questionnaire, aiming at investigating students' perceptions of online EFL teaching. Students who answered this questionnaire mainly came from Chongqing City (154 participants) and Jiangsu Province (55 participants). Only one participant is a senior, while no participant is a junior. Therefore, the participants mainly are freshmen (33), sophomore (124), and postgraduates (55). When they completed this questionnaire, 44.6% of them had attended online English courses for more than 3 months, 32.86% of them had 2 to 3 months' online courses, and the remaining had 1 to 2 months' online courses. The size of participants'

classes tended to be relatively large, with 60.21% classes having 30 to 100 students and 10.99% classes even having more than 100 students.

Instruments and Data Analysis

In the teacher's questionnaires, questions 1 to 9 gather personal information of participants, such as gender, qualification, length of teaching, and so on. Questions 10 to 26 (except 21, 24) are targeted at finding answers to how online courses are delivered by teachers. The remaining questions are based on framework modes in the literature review above. Questions 21, 24, and 27 to 32 are the four factors which may be correlated to teachers' perception of online courses, among which questions 21, 24, and 27 are about the interaction during online courses, questions 28 and 29 are about some theories taken from TAM, question 30 is about the theories taken from TPACK, and questions 31 and 32 are about the theories taken from Hubbard's eight principles. Questions 28 and 29 contains three sub-questions respectively. Question 30 is made up of five sub-questions. Question 31 comprises 8 sub-questions and 32 consists of 9 sub-questions.

The reliability and validity of different items in the teacher's questionnaire should be tested to guarantee the accuracy of further analysis. Exploratory factor analysis (EFA) was used to check the underlying correlations in a number of scale variables, grouping them into related clusters (Loewen & Plonsky, 2016). EFA also can examine the level of construct validity (Leech et al., 2014). During evaluating the questionnaires in this study, items whose communalities were lower than 0.4 were removed. After the primary removal of items, only one item was left in interaction factor, thus this factor was discarded. After further removing the items which belonged to a different factor according to the EFA data, a final EFA result was achieved. Therefore, in the remaining three factors, there were four items, five items, and eight items respectively in TAM (factor 1), TPACK (factor 2), and Hubbard's eight principles (factor 3). They explained 43.192% of the variance. The final EFA test was reliable since KMO was 0.882, higher than 0.7, p -value was less than .05, and all item loadings were higher than 0.30 (Leech et al., 2014).

In addition, the reliability of the remaining items was also examined, and the Cronbach's alpha of each factor (TAM, TPACK, and Hubbard's eight principles) was all between .5 and .8. Although, according to some scholars, the value above 0.7 is considered acceptable (Field, 2009), Qin (2009) suggested that 0.5 may also be accepted on condition that the number of items is not large. Considering that the number of useful questionnaires in this research was only 181, the items with Cronbach's alpha over .5 were all retained. Namely, all the remaining items are both valid and reliable.

In the student's questionnaires, questions 1 to 11 gather personal information of participants, such as gender, grade,

city, size of class, and so on. Questions 12 to 24 are about the interactions during online courses. Questions 25 (containing two sub-questions), Questions 26 (containing three sub-questions), and 27 (containing four sub-questions) are related to students' understanding of teachers' perception of online courses, among which questions 25 and 26 are about some theories taken from TAM, and question 27 is about some theories taken from TPACK. Question 28 (containing 8 sub-questions) and Question 29 (containing seven sub-questions) are about the theories taken from Hubbard's eight principles. The rest questions are mainly about students' general evaluation of online courses. SPSS was also used to analyze the questionnaire data to look at relevant correlations or differences among various factors.

The reliability and validity of different items in this instrument were also tested to guarantee the accuracy of further analysis. After calculating, three factors remained: 2 items in interaction (factor 1), 4 items in TPACK (factor 2), and 11 items in Hubbard's eight principles (factor 3). They explained 44.1793% of the variance. The final EFA test was reliable since KMO was 0.872, p -value was less than .05, and all item loadings were higher than 0.30 (Leech et al., 2014). Further, the Cronbach's alpha of each factor was above .9, which is high value.

In order to gather some more in-depth data from students, a semi-structured interview was also conducted. Thirteen students were invited to participate the interview and give more information related to their perception of the online courses. The questions are mainly about students' perception of the importance of technology in English teaching, their preferred ways of interactions and their understanding of the significance of online teaching, as well as their evaluation of the effectiveness of online teaching.

The questionnaire data were analyzed in SPSS22 to look at relevant correlations or differences among various factors. The interview data were recorded and transcribed into the computer. Interviewees were coded as S1, S2, S3, etc. The analysis of interview data was combined with questionnaire data in the same categories.

Results and Data Analysis

How are Online EFL Courses Delivered During the COVID-19 Pandemic in China?

EFL teachers used a variety of methods in delivering on teaching during the COVID-19 pandemic. In terms of the formats of lessons, the largest proportion of these teachers (47.37%) chose live online teaching, and nearly the same percentage of them (43.68%) taught students through combining live online teaching with recorded lessons. Only 4.74% of them have solely used recorded teaching materials, and 4.21% have tried other novel modes. As for the contents of the recorded lessons, participants embraced various methods, such as recording the videos or audios of

the lessons, making learning materials for learners' self-study (e.g., PPT), requiring students to self-study some coursed provided on some platforms (e.g., MOOC), and requesting students to study the materials presented on universities' own e-learning system and several other rarely-used approaches. The top three platforms these teachers used to deliver live lessons are QQ (38.12%), Zoom (25.41%), and Tencent Meeting (24.86%).

Meanwhile, the results from the questionnaire answered by college students show that most of their teachers delivered courses via combing live online teaching with recorded lessons (46.48%). 42.72% of their teachers merely taught live online lessons and 10.33% only provided recorded lessons. As to the platforms where students received live online instruction, the top three are Tencent Classroom (50.79%), Tencent Meeting (32.45%), and Zoom (26.18%).

When it comes to the interaction within live online classes, 81.77% of the instructors pointed out that they interacted with their students, while the rest did not. As to the methods provided by these platforms allowing interactions, 92.27% of these teachers mentioned that users can type messages to interact, and 74.03% said users can send voice messages. 55.25% stated that users can turn on cameras and 60.22% indicated that users can share their screens to interact with each other. Moreover, a similar proportion of teachers allocated 10% to 20% or 20% to 30% of class time to interaction, 28.73% and 27.26% respectively. While only 11.05% of teachers used 50% of class time for interaction. The majority of the teachers preferred voice messages during interactions, while more than half of the teachers thought that students preferred typing messages for interactions.

In contrast, nearly all the students (99%) indicated that their teachers interacted with them during live online teaching. As to the methods provided by these platforms for interactions, the data are similar as that mentioned above. In addition, 42.93% students thought 20% to 30% of class time should be allocated to interaction, while similar percentages (about 20% respectively) of students considered 10% to 20% and 30% to 40% class time should be used for interaction. As to the way to interact, the results are quite different from the other questionnaire, with 57.59% of the students preferring typing messages during interactions, while only 29.84% of them preferring voice messages. According to the interview, the general reasons behind their preference of typing messages may be that students believed that typing messages can allow them to organize their thoughts and they were afraid to make mistakes, when they spoke. As to those who preferred voice messages, their main reasons may be that it saved time than typing and it was a good chance to practise speaking English.

In addition, the relationships between whether students and teachers can see each other via a camera during online teaching and teachers' perception of the effectiveness of online teaching can be seen in Table 1. Since Cohen's f is 0.24 and the p -value (.02) is less than 0.05, we can assume

Table 1. The influence of seeing each other during online teaching on effective online EFL teaching.

	Whether you and students can see each other in live online teaching (mean \pm standard deviation)				Cohen's <i>f</i>	<i>p</i>
	Students and teachers can see each other (<i>n</i> =22)	Students rather than the teachers can be seen (<i>n</i> =7)	Teachers rather than students can be seen (<i>n</i> =22)	Students and teachers can not see each other (<i>n</i> =130)		
How do you think about the effectiveness of online teaching?	2.09 \pm 0.53	2.14 \pm 0.69	2.41 \pm 0.73	2.06 \pm 0.41	0.235	.023*

p* < .05. *p* < .01.**Table 2.** Influence of teacher's degree on teacher's perception of effective online teaching.

	Your degree: (mean \pm standard deviation)				Cohen's <i>f</i>	<i>p</i>
	Bachelor (<i>n</i> =9)	Master (<i>n</i> =107)	Doctor (<i>n</i> =35)	Other (<i>n</i> =30)		
How do you think about the effectiveness of online teaching?	2.67 \pm 1.00	2.10 \pm 0.49	2.09 \pm 0.45	2.00 \pm 0.00	0.28	.004**

p* < .05. *p* < .01.

that whether students and teachers can see each other has significant influences on their perception of the effectiveness of online teaching. When only the teachers can be seen by the students, the mean of effectiveness is the highest (2.41), while it is the lowest when students and teachers cannot see each other (2.06). Further, the group with students and teachers being able to see each other has the second smallest mean (2.09). It seems that being able to see each other can increase teachers' perception of the effectiveness of online teaching. Therefore, it can be assumed that when both or neither the students and teachers can see each other, teachers feel more comfortable.

The relationship between teachers' degree and teachers' perceptions of effective online teaching was also discussed. As is shown in Table 2, the *p*-value is .004, which means that there are significant differences among teachers with different degrees, and the effect size (Cohen's *f*) is 0.28 which is a medium effect (Aberson, 2010). This suggests that the higher the degrees of the teachers, the lower means they may have toward the effectiveness of online teaching are. This result indicates that teachers with higher degrees tend to think online teaching more effective due to their more knowledge and skills they acquired in their own study.

When the teachers were asked how they evaluated their online course effectively, they listed four most important methods to achieve this evaluation in Figure 1. Checking students' homework was listed top one.

Regarding problems instructors encountered during online classes are presented in Figure 2, where the most prominent problems are related to monitoring students

after-class performance, a higher time and energy-demand from the teachers, Internet connection, and students' participation. These problems should be taken into account in order to reinforce online teaching efficiently. In terms of the problems students encountered during online classes, unstable Internet connection and breakdown of platforms are the two main issues. According to the data in interview, these two reasons also led to students' dislike of online teaching, so enough attention should be paid to guarantee a more efficient online teaching.

How is the Effectiveness of Online Teaching From EFL Teachers' Perspective?

Teachers' Technology Acceptance Model (TAM) Analysis. Twenty-nine percent of the teachers stated that interaction between students and teachers is very effective and 55% perceived it effective. According to Table 3, the means of "Do you think the interaction between teachers and students is effective" and "When I ask students to respond to me, I always get a response from them" are 1.873 and 1.994 respectively, which means teachers generally agreed to these two statements. Meanwhile, the mean of the other item about the effectiveness of class discussion among students is above 2 (2.392), suggesting that most instructors think that class discussion is effective.

Teachers were asked to evaluate online teaching in the TAM context. According to Table 4, the mean of every item is below 2, which indicates that generally, all the teachers agreed to the statement in each item. Among these four items,

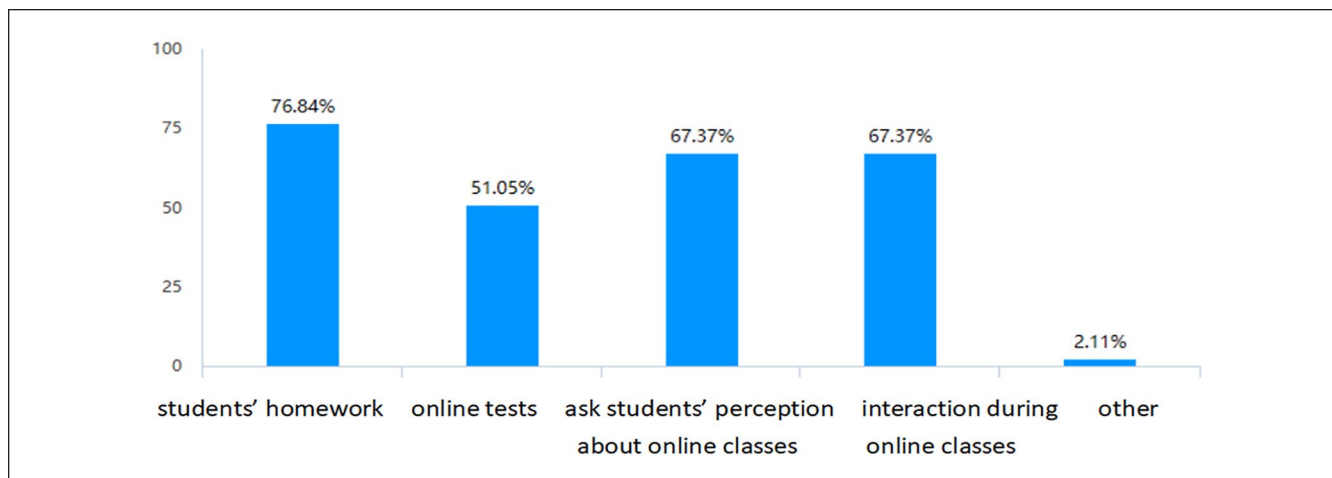


Figure 1. Methods to evaluate online courses from the teachers' perceptions.

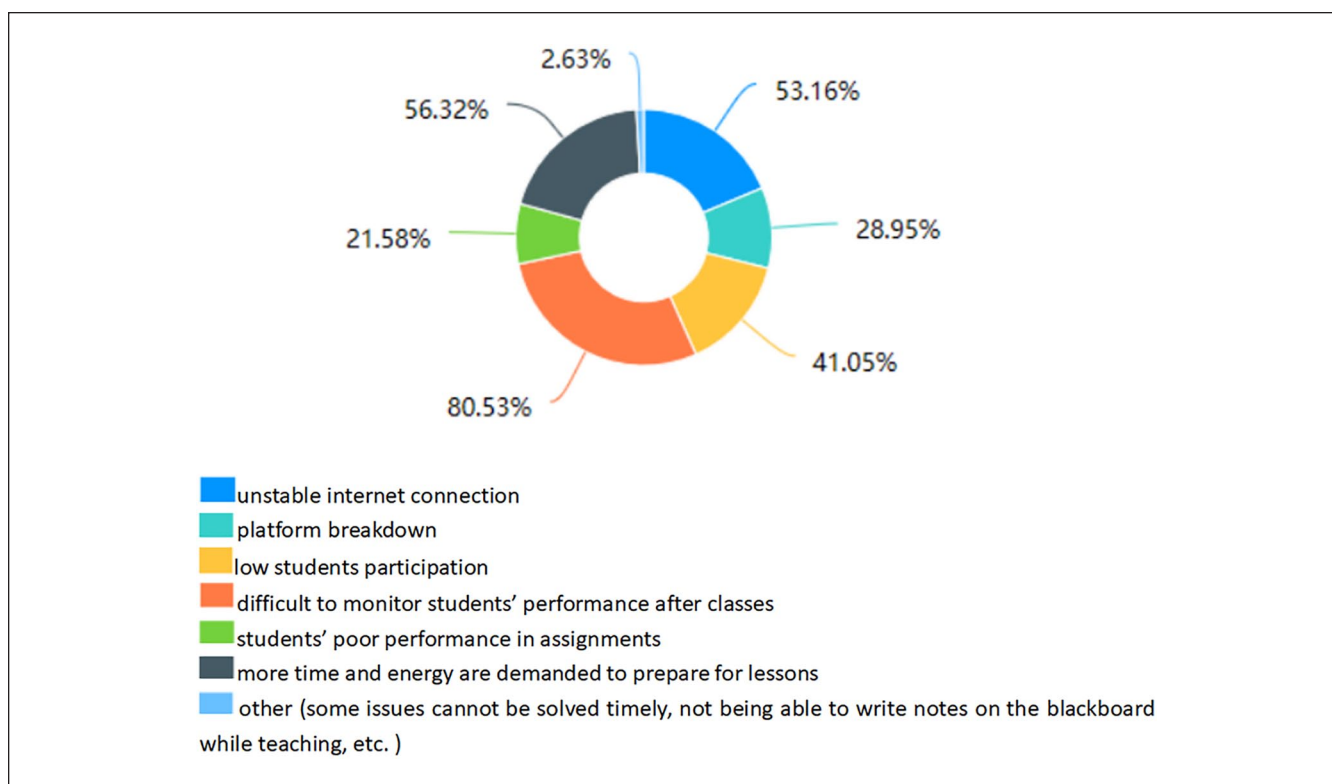


Figure 2. Problems during online courses from teachers' perception.

the importance of online teaching in this special period gained the most support from teachers. It is quite reasonable because in this period when traditional face-to-face teaching is unavailable, an available, and efficient choice is online teaching.

Moreover, the statistical data showed correlations among these areas above. As is shown in Table 5, the four items in this factor positively correlated with each other ($p < .01$)

and the effect sizes (Spearman correlation coefficient, r) were all above .30, which is considered as a medium effect. The Spearman correlation coefficient of confidence in online teaching and the importance of online teaching in this special period was .55 and that of confidence in online teaching and liking the teaching mode of online teaching was .55. Both of which were above .50 and thus, both are large effects.

Table 3. Effectiveness of interactions in TAM.

Descriptive analysis						
Items	No. of samples	Min	Max	Mean	Standard deviation	Median
Do you think the interaction between teachers and students is effective?	181	1	4	1.873	0.683	2
Do you think the class discussion among students is effective?	181	1	4	2.392	0.629	2
When I ask students to respond to me, I always get a response from them	181	1	3	1.994	0.592	2

Table 4. Online teaching in TAM.

Items	Mean	Standard deviation
I think online teaching is very important in this special period (A)	1.32	0.491
I think the online (live or recorded) class system is very simple to operate (B)	1.912	0.599
I like the teaching mode of online teaching very much (C)	1.989	0.667
I have confidence in online teaching (D)	1.718	0.661

Table 5. Correlation for online teaching in TAM.

Spearman correlation (detail)					
		A	B	C	D
I think online teaching is very important in this special period (A)	Coefficient	1			
	p-Value				
I think the online (live or recorded) class system is very simple to operate (B)	Coefficient	0.392**	1		
	p-Value	0			
I like the teaching mode of online teaching very much (C)	Coefficient	0.343**	0.489**	1	
	p-Value	0	0		
I have confidence in online teaching (D)	Coefficient	0.549**	0.412**	0.547**	1
	p-Value	0	0	0	

* $p < .05$. ** $p < .01$.

Furthermore, in Table 6, it is clear that the perception of the effectiveness of online teaching is positively correlated with all the four items listed in the table below ($r > .10$, $p < .01$). Among the four items listed, the perception of the effectiveness was most significantly related to the confidence in online teaching ($r = .40$, $p < .01$). This reveals that the more confident teachers were about online teaching, the more effective they perceived online teaching. Similarly, the perception of the effectiveness is higher when teachers like the teaching mode of online teaching, are more aware of the importance of online teaching during COVID-19 and consider the operation of online class systems simpler.

Evaluating Teachers' Skills in Online Teaching in TPACK Mode. Teachers were asked how they effectively conducted online teaching within a variety of factors. In Table 7, five factors related to online teaching effectiveness were discussed. As shown in the table, the means of the five items were around 2, with two below it and three above it. With means below 2, the first and last item listed generally received agreements

from teachers. This indicates that teachers generally believed that they can properly integrate teaching content, teaching method, and technology into online teaching. In addition, they were confident that they can effectively combine network teaching platform with teaching content to help students master the knowledge. Although the means of the remaining three items are above 2 but under 2.5, the results still indicate that the majority of teachers think they can help other teachers to coordinate TPACK, use the evaluation tools on the online teaching platform to assess online teaching and learning, or improve students' language skills through the online teaching platform.

Meanwhile, statistical data in Table 8 demonstrated correlations among these factors. It is shown that there were significant correlations between every item ($r > .50$, $p < .01$). There were three effect sizes above 0.60. The use of online teaching platform to strengthen students' language skills correlated with the use of assessment tools on the platform to evaluate online teaching and learning ($r = .64$, $p < .01$). Additionally, the former was significantly related to teachers'

Table 6. Teachers' perception of the effectiveness of online teaching in TAM.

Spearman correlation (detail)		A	B	C	D
How do you think about the effectiveness of online teaching?	Coefficient	0.306**	0.266**	0.365**	0.409**
	p-Value	0	0	0	0
I think online teaching is very important in this special period = A					
I think the online (live or recorded) class system is very simple to operate (B)					
I like the teaching mode of online teaching very much (C)					
I have confidence in online teaching (D)					

* $p < .05$. ** $p < .01$.

Table 7. Effective teaching analysis in TPACK.

Items	Mean	Standard deviation
I can properly integrate ① the teaching content, ② teaching method, and ③ Technology (Internet, digital media, etc.) into online teaching (A)	1.917	0.504
I can help other teachers coordinate ① teaching content, ② teaching method, and ③ Technology (Internet, digital media, etc.) (B)	2.171	0.556
I can use the assessment tools provided by the network technology platform to evaluate online teaching and learning (C)	2.083	0.595
I can use online teaching platform to strengthen students' language skills (D)	2.099	0.578
I can effectively combine network teaching platform with teaching content to help students master knowledge (E)	1.934	0.467

Table 8. Spearman correlation of the five factors in TPACK.

Spearman correlation (detail)		A	B	C	D	E
I can properly integrate ① the teaching content, ② teaching method, and ③ Technology (Internet, digital media, etc.) into online teaching (A)	Coefficient	I				
	p-Value					
I can help other teachers coordinate ① teaching content, ② teaching method, and ③ Technology (Internet, digital media, etc.) (B)	Coefficient	0.447**	I			
	p-Value	0				
I can use the assessment tools provided by the network technology platform to evaluate online teaching and learning (C)	Coefficient	0.534**	0.523**	I		
	p-Value	0	0			
I can use online teaching platform to strengthen students' language skills (D)	Coefficient	0.553**	0.562**	0.643**	I	
	p-Value	0	0	0		
I can effectively combine network teaching platform with teaching content to help students master knowledge (E)	Coefficient	0.637**	0.339**	0.521**	0.682**	I
	p-Value	0	0	0	0	

* $p < .05$. ** $p < .01$.

effective combination of network teaching platform with teaching content to help students master knowledge ($r = .68$, $p < .01$), which was significantly related to teachers' being able to properly integrate teaching content, teaching method, and technology into online teaching ($r = .64$, $p < .01$).

Moreover, all the five factors listed in Table 9 were positively correlated with teachers' perception of the effectiveness of online teaching ($r > .3$, $p < .01$) except the third item ($r = .26$, $p < .01$). These results revealed that teachers' capacities in using online platforms listed in the table below can strengthen teachers' perception of the

effectiveness of online teaching. To be more specific, when teachers can properly integrate TPACK into online teaching and help other teachers coordinate TPACK, they consider online teaching is effective. Likewise, their abilities to use assessment tools provided by the online platform to evaluate online teaching and learning, use online teaching platform to improve students' language skills, and effectively combine network teaching platform with teaching content to help learners grasp knowledge are positively correlated with teachers' perception of the effectiveness of online teaching.

Table 9. Spearman correlation between five items in TPACK and the teachers' perception of the effectiveness of online teaching.

Spearman correlation (detail)		A	B	C	D	E
How do you think about the effectiveness of online teaching?	Coefficient	0.369**	0.345**	0.261**	0.374**	0.338**
	p-Value	0	0	0	0	0
I can properly integrate ① the teaching content, ② teaching method, and ③ Technology (Internet, digital media, etc.) into online teaching = A						
I can help other teachers coordinate ① teaching content, ② teaching method, and ③ Technology (Internet, digital media, etc.) = B						
I can use the assessment tools provided by the network technology platform to evaluate online teaching and learning = C						
I can use online teaching platform to strengthen students' language skills = D						
I can effectively combine network teaching platform with teaching content to help students master knowledge = E						

* $p < .05$. ** $p < .01$.

Table 10. Evaluating online teaching with Hubbard's (2019) eight principles.

Items	Mean	Standard deviation
I think the courses I teach are suitable for online teaching (A)	2.326	0.666
In my online teaching (Teaching/tutoring before and after class), students' participation is high and interaction between teachers and students is frequent (B)	2.011	0.76
Online teaching (Teaching/tutoring before and after class) can make teaching activities easier and more convenient (C)	2.193	0.616
My students can use less energy and master knowledge faster (D)	2.431	0.616
My students tend to easily remember the knowledge presented on the online teaching platform, and they have mastered more knowledge than I actually taught (E)	2.304	0.838
My students experience more diverse interactive ways (e.g., human-computer interaction, students do questions through computers and get feedback, etc.) (F)	2.133	0.521
My students participate in teaching more actively (G)	2.138	0.78
The teaching effect of the courses I teach has been improved (H)	2.215	0.832

Effectiveness of Online Teaching With Hubbard's Eight Principles in Evaluating Language Teaching With the Technology. This section discusses how Hubbard's (2019) eight principles are used to evaluate online EFL teaching in COVID-19 outbreak. As is shown in Table 10, the means of the eight items were all above 2 but below 2.5, suggesting that more teachers agreed to the corresponding statements in these eight items than those who did not. Among these items, the one related to students' being able to use less energy and master knowledge faster has the largest mean, indicating just above half of the teachers thought students may use less energy and time to master knowledge. Similarly, more than half of the teachers believed that the courses they taught are suitable for online teaching; their students can easily remember the knowledge presented on the online teaching platform or master more knowledge than actually taught; the teaching effect of the course they taught has been improved; and so on.

In Table 11, it is noteworthy that all the items were significantly related to each other ($r > .50$, $p < .01$), and there were even five effect sizes exceeding 0.70, which were the r between items B and G, E and G, B and H, E and H, as well as G and H. Therefore, it can be claimed that students'

participation in online teaching and frequent interaction between teachers and students as well as students' tendency to remember knowledge easily and grasp more knowledge than actually taught are positively related to students' participation in teaching more actively as well as the improvement of the effectiveness of the courses taught. In addition, students' participation in teaching more actively is positively correlated to the improvement of the effectiveness of the courses taught.

Further, Table 12 demonstrated the relationship between teachers' perception of the effectiveness of online teaching and all eight items. It can be seen that the eight items (except the first one) in the table below positively influenced teachers' perception of the effectiveness of online teaching ($r > .30$, $p < .01$). Among the eight items, teachers' belief that students' participation is high and interaction between teachers and students is frequent was most significantly correlated with teachers' perception of the effectiveness of online teaching, meaning that the greater perception of students' participation and interaction between teachers and students, the more effective instructors considered online teaching.

Table 11. Spearman correlation of the eight items in Hubbard’s (2019) eight principles.

Spearman correlation (detail)		A	B	C	D	E	F	G	H
I think the courses I teach are suitable for online teaching (A)	Coefficient p-Value	1							
In my online teaching (Teaching/tutoring before and after class), students’ participation is high, and interaction between teachers and students is frequent (B)	Coefficient p-Value	0.522** 0	1						
Online teaching (Teaching/tutoring before and after class) can make teaching activities easier and more convenient (C)	Coefficient p-Value	0.467** 0	0.559** 0	1					
My students can use less energy and master knowledge faster (D)	Coefficient p-Value	0.457** 0	0.496** 0	0.481** 0	1				
My students tend to easily remember the knowledge presented on the online teaching platform, and they have mastered more knowledge than I actually taught (E)	Coefficient p-Value	0.385** 0	0.663** 0	0.481** 0	0.660** 0	1			
My students experience more diverse interactive ways (e.g., human-computer interaction, students do questions through computers and get feedback, etc.) (F)	Coefficient p-Value	0.398** 0	0.450** 0	0.457** 0	0.450** 0	0.406** 0	1		
My students participate in teaching more actively (G)	Coefficient p-Value	0.415** 0	0.720** 0	0.509** 0	0.553** 0	0.773** 0	0.496** 0	1	
The teaching effect of the courses I teach has been improved (H)	Coefficient p-Value	0.551** 0	0.763** 0	0.536** 0	0.614** 0	0.728** 0	0.491** 0	0.763** 0	1

*p < .05. **p < .01.

Table 12. Spearman correlation between eight items in Hubbard (2019) and the teachers’ perception of the effectiveness of online teaching.

Spearman correlation (detail)		A	B	C	D	E	F	G	H
How do you think about the effectiveness of online teaching?	Coefficient p-Value	0.276** 0	0.423** 0	0.388** 0	0.236** 0.001	0.335** 0	0.335** 0	0.369** 0	0.349** 0
I think the courses I teach are suitable for online teaching=A									
In my online teaching (Teaching/tutoring before and after class), students’ participation is high and interaction between teachers and students is frequent=B									
Online teaching (Teaching/tutoring before and after class) can make teaching activities easier and more convenient=C									
My students can use less energy and master knowledge faster=D									
My students tend to easily remember the knowledge presented on the online teaching platform, and they have mastered more knowledge than I actually taught=E									
My students experience more diverse interactive ways (e.g., human-computer interaction, students do questions through computers and get feedback, etc.)=F									
My students participate in teaching more actively=G									
The teaching effect of the courses I teach has been improved=H									

*p < .05.**p < .01.

How is the Effectiveness of Online Teaching From Students’ Perspective?

Apart from teachers’ evaluations of effectiveness for online teaching, participating students also offered their comments. The effectiveness of online teaching from students’ perceptions is shown in Figure 3. It can be seen that the majority of students considered online teaching very effective (9.86%) or effective (64.32%), while only just above a quarter of the

participants did not think so. Thus, it is apparent that the effectiveness of online teaching was well recognized by most students.

However, there still remains necessity to explore the reasons behind this result. In the interview, students also generally admitted that online teaching is effective, for example, “online teaching is flexible in terms of time and location”; “live online teaching enables we to communicate with teachers timely”; “recorded lessons allow me to

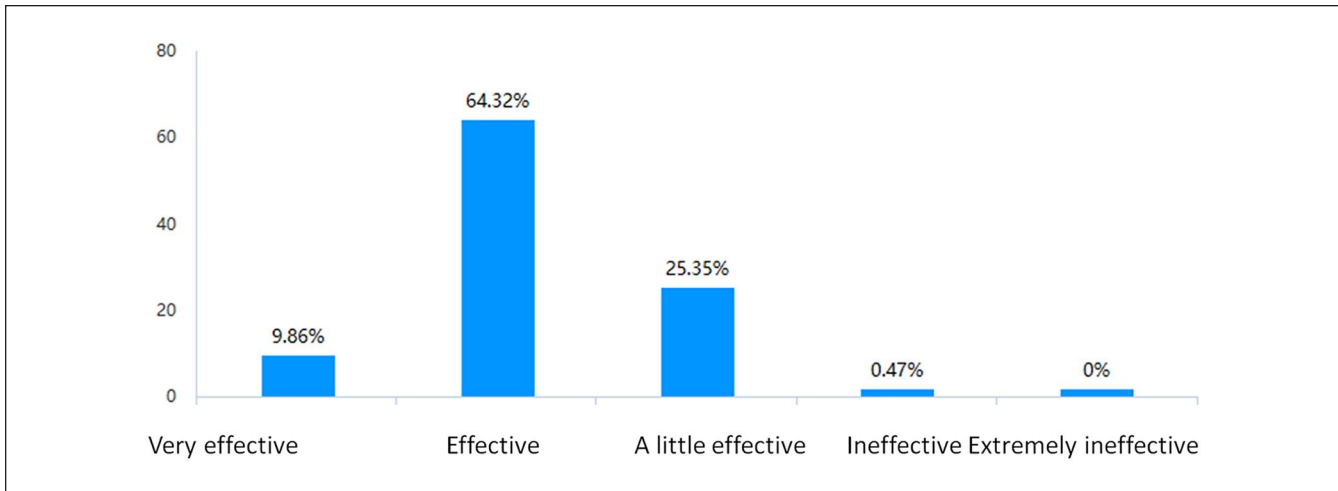


Figure 3. Students' perception of the effectiveness of online teaching.

Table 13. Descriptive analysis of interaction from students' perspectives.

Descriptive analysis						
Items	No. of samples	Min	Max	Mean	Standard deviation	Median
Do you think the interaction between teachers and students is effective?	191	1	4	2	0.533	2
Do you think the class discussion among students is effective?	191	1	4	2.068	0.616	2

review the parts that are difficult or important"; etc. Nevertheless, some of them also pointed out that there are several reasons contributing to their dissatisfaction of online teaching. S2 said "I just felt very lonely when I sat before the computer, and I really like the academic atmosphere when we all sat together in one classroom." Similarly, S5 stated, "Since no one is monitoring me, I always was easily distracted by other stuff."

Students' Perception of Interaction. The descriptive analysis of interaction from the questionnaire is presented in Table 13. The mean of these two items were both around 2, which means students generally accepted the effectiveness of interaction during online courses. In the interview, students gave some reasons to support interaction with teachers as well as classmates:

S1: "Interacting with teachers can enable me to get timely feedback."

S3: "Interacting with teachers online is similar to that in face-to-face class."

S6: "Interacting with my classmates can inspire me."

S9: "Interacting with my classmates can solve my puzzles."

Regarding the relationship between online teaching and interactions, according to Table 14, these two items were

found positively correlated with students' perception of the effectiveness of online teaching ($r > .3, p < .01$), indicating that students' preference of interaction during online courses can strengthen their judgment of the effectiveness of online teaching.

Students' Perception of their Teachers' Performance According to TPACK. Students also provided their understanding of TPACK in the online teaching context. As is shown in Table 15, the means of all the four items in this part were below 2, suggesting that students generally thought their teachers can have a good command of teaching content, teaching method and technology, and their teachers were capable of utilizing modern technologies (e.g., network, online teaching platform) to enhance their teaching practice. In the interview, students also admitted that it is important for their teachers to use various modern technologies to make their lessons more attractive. Besides, one interviewee mentioned that online assessment tools can give more timely feedback to some online quizzes. Furthermore, in Table 16, it is quite evident that students' confidence in their teachers' using of teaching content, teaching method and technology was positively related to their perception of the effectiveness of online teaching ($r > .3, p < .01$).

Students' Perception of Hubbard's Eight Principles. In terms of Hubbard's eight principles, it is presented in Table 17 that

Table 14. Spearman correlation between interaction and the students' perception of the effectiveness of online teaching.

Spearman correlation (detail)		A	B
How do you think about the effectiveness of online teaching?	Coefficient	0.332**	0.357**
	p-Value	0	0
Do you think the interaction between teachers and students is effective? = A			
Do you think the class discussion among students is effective? = B			

* $p < .05$. ** $p < .01$.

Table 15. Descriptive analysis of TPACK from students' perspectives.

Descriptive analysis						
Items	No. of samples	Min	Max	Mean	Standard deviation	Median
My English teacher can properly integrate ① the teaching content, ② teaching method, and ③ Technology (Internet, digital media, etc.) into online teaching	191	1	3	1.832	0.439	2
My English teacher can use the assessment tools provided by the network technology platform to evaluate online teaching and learning	191	1	4	1.885	0.51	2
My English teacher can use online teaching platform to strengthen students' language skills	191	1	3	1.838	0.481	2
My English teacher can effectively combine network teaching platform with teaching content to help students master knowledge	191	1	3	1.812	0.454	2

Table 16. Spearman correlation between TPACK and the students' perception of the effectiveness of online teaching.

Spearman correlation (detail)					
		A	B	C	D
How do you think about the effectiveness of online teaching?	Coefficient	0.354**	0.320**	0.396**	0.379**
	p-Value	0	0	0	0
My English teacher can properly integrate ① the teaching content, ② teaching method, and ③ Technology (Internet, digital media, etc.) into online teaching = A					
My English teacher can use the assessment tools provided by the network technology platform to evaluate online teaching and learning = B					
My English teacher can use online teaching platform to strengthen students' language skills = C					
My English teacher can effectively combine network teaching platform with teaching content to help students master knowledge = D					

* $p < .05$. ** $p < .01$.

the means of some items in this factor were below 2 and the those of the others were above 2 but below 2.5, which still can lead to the conclusion that most students agreed on the statements in these items. Students considered teachers' teaching style and methodologies were similar in both online and face-to-face teaching, which can be supported by interviewees' ideas in the interview. All interviewees thought that their teachers could deliver online lessons efficiently as well as those conducted face-to-face. However, some of them believed that students' abilities to control themselves may make a difference. To students who have very good self-control capacity, online courses may benefit

them in the same way as face-to-face courses do. Nevertheless, online courses may provide more excuses for less self-disciplined students to be lazy.

The questionnaire data (Table 18) also showed that 10 items (except item B) were positively correlated with students' perception of the effectiveness of online teaching ($r > .3$, $p < .01$), indicating that if students find online lessons can be easily followed in the same way as traditional lessons, online teaching can have more advantages than face-to-face courses, and their perception of its effectiveness will be high. Among these items, the r of item H was above .5, which means that students' mastering knowledge

Table 17. Descriptive analysis of Hubbard’s eight principles from students’ perspectives.

Descriptive analysis						
Items	No. of samples	Min	Max	Mean	Standard deviation	Median
Most of my classmates can understand and follow online lessons	191	1	3	1.911	0.467	2
There was no significance difference in the teaching style of my English teacher when the courses were delivered online and face-to face.	191	1	4	1.979	0.523	2
I think the teaching methodologies were similar when the courses were delivered online and face-to-face.	191	1	4	2.209	0.679	2
I think the courses my teachers delivered are suitable for online teaching	191	1	4	2.257	0.682	2
My English teachers have various electronic resources for the students	191	1	3	1.906	0.494	2
In my online learning (Teaching/tutoring before and after class), students’ participation is high, and interaction between teachers and students is frequent	191	1	4	2.105	0.598	2
Online teaching (Teaching/tutoring before and after class) can make teaching activities easier and more convenient	191	1	4	2	0.513	2
I can use less energy and master knowledge faster	191	1	4	2.267	0.638	2
I tend to easily remember the knowledge presented on the online teaching platform, and they have mastered more knowledge than I actually taught	191	1	4	2.33	0.666	2
I experienced more diverse interactive ways (e.g., human-computer interaction, students do questions through computers and get feedback, etc.)	191	1	4	2.005	0.548	2
I need not pay expensive fees (tuition, books, other resources)	191	1	4	2.052	0.716	2

Table 18. Spearman correlation between Hubbard’s eight principles and the students’ perception of the effectiveness of online teaching.

Spearman correlation (detail)											
	A	B	C	D	E	F	G	H	I	J	K
How do you think about the effectiveness of online teaching?	Coefficient 0.479**	0.293**	0.315**	0.429**	0.419**	0.455**	0.400**	0.566**	0.457**	0.414**	0.303**
	p-value 0	0	0	0	0	0	0	0	0	0	0
Most of my classmates can understand and follow online lessons = A											
There was no significance difference in the teaching style of my English teacher when the courses were delivered online and face-to face = B											
I think the teaching methodologies were similar when the courses were delivered online and face-to-face = C											
I think the courses my teachers delivered are suitable for online teaching = D											
My English teachers have various electronic resources for the students = E											
In my online learning (Teaching/tutoring before and after class), students’ participation is high and interaction between teachers and students is frequent = F											
Online teaching (Teaching/tutoring before and after class) can make teaching activities easier and more convenient = G											
I can use less energy and master knowledge faster = H											
I tend to easily remember the knowledge presented on the online teaching platform, and they have mastered more knowledge than I actually taught = I											
I experienced more diverse interactive ways (e.g., human-computer interaction, students do questions through computers and get feedback, etc.) = J											
I need not pay expensive fees (tuition, books, other resources) = K											

*p < .05. **p < .01.

faster with less energy can have more positive influence on their perception of the effectiveness of online teaching compared with other items in this factor.

Discussion

The results above demonstrated a variety of approaches in online EFL teaching delivery in COVID-19 pandemic in China. In general, both teachers and students were satisfied with online teaching and they perceived that online teaching were effective, which echoes recent studies on benefits of online teaching and learning (e.g., Ding, 2020; Hiscock, 2020; Oskoz & Gimeno-Sanz, 2020). Teachers have confidence and are aware of efficient methods to enhance online teaching. The findings demonstrated that the group of teachers who have asked their students to share their screens during live online courses tend to have a lower mean than the other group. Thus it is reasonable to suggest that when delivering online lessons, instructors can require their students to share their screens. Then, compared with other methods of teachers' responses to students' questions, the group of instructors who answered students' questions immediately during online lessons receive the lowest mean (2.09), as such, teachers are advised to give timely feedback to students' uncertainty during online education. Moreover, teachers are encouraged to turn on cameras and require students to do so because the perception of the effectiveness of online teaching is higher when teachers and students can see each other compared to when only the teachers or the students can be seen.

The findings also revealed effective aspects of online EFL teaching including different types of interactions. This result is consistent with Selim (2007) and Cheng's (2011) studies on the key role of interaction for effective online teaching. At the same time, the effectiveness of online EFL teaching was evaluated by TAM, TPACK, and eight principles for using technology in language teaching, highlighted by Hubbard (2019). The findings show that students-teachers interaction or student-student interaction either by video, audio, or typing messages are perceived crucial and effective in online EFL teaching, echoing previous studies of the vital role of the interaction in an online teaching environment (Garrison et al., 1999; Pineda et al., 2021; Warner-Ault, 2020; Wei, 2018). According to Spearman correlation, the four items in TAM positively correlated with teachers' perception of the effectiveness of online teaching, which verified theories from Davis (1989) TAM. To be specific, positive correlation was found between (1) teachers thought that it is simple to operate the online class system, and (2) teachers' considering using online teaching very important during this special period and teachers' perception of the effectiveness of online teaching. The positive correlations prove that if a user finds a technology easy to use and useful, he/she will have an optimistic attitude toward this technology, which is consistent with the mode of Davis et al. (1989). Moreover, the positive

correlation between teachers' enjoyment of online teaching and teachers' perception of the effectiveness of online teaching is in accordance with the conclusion that perceived enjoyment has a positive influence on the use of a technology (Venkatesh & Bala, 2008). Further, the positive relationship between teachers' confidence in using online teaching and teachers' perception of the effectiveness of online teaching also supports the view from Fathema et al. (2015) that self-efficacy, the confidence a user has toward a technology, was a vital factor in the application of technology.

In addition, the positive correlation between teachers' perception of the effectiveness of online teaching and each item in Technological Pedagogical Content Knowledge (TPACK) provides support to TPACK, which plays a vital role in delivering effective teaching (Koehler et al., 2013). One purpose of the TPACK framework is to promote teachers' use of technology (Koehler et al., 2013). It has been proved by the results of this research that both teachers' ability to integrate teaching content, teaching method, and technology into online teaching and their capacity to help other teachers coordinate these aspects can have a positive influence on teachers' perception of the effectiveness of online teaching. In addition, TPACK is more than a simple combination of content, pedagogy, and technology (Koehler et al., 2013). The remaining three items in eight principles suggest that using assessment tools on network technology platform to evaluate online teaching and learning, utilizing an online platform to improve students' language skills, and integrating network teaching platform with teaching content to help students grasp knowledge have a positive impact on teachers' perception of delivering effective lessons.

The descriptive analysis of the eight items provides evidence supporting the suggestion from Hubbard (2019) that there are several areas where technology positively influences teaching and learning of a language. All the means of the eight items are below 2.5, indicating that the majority of teachers agree with these statements. The frequent interaction between teachers and students during this special period supports Hubbard's (2019) argument that technology can exert a positive influence on access which means learners can experience interactions that may be difficult without the help of technology. Similarly, teachers' belief that students can use less energy and master knowledge faster indicates learning efficiency (language knowledge or skills can be picked up by students quicker or more easily) is enhanced by technology (Hubbard, 2019). Further, the item which addresses that students easily remember the knowledge presented on the online teaching platform, and they master more knowledge than actually taught confirms the improvement of learning effectiveness, which reveals that students pick up what is aimed and learn more than what they have been expected (Hubbard, 2019). Finally, teachers perceived that interactions can enhance the effectiveness of online teaching and learning.

However, despite these positive findings above, it should be noted from the statistical data that due to limited training, the effectiveness of online teaching could be reduced among teachers who lack experience and training in online teaching, which is corresponded with Young and Duncan (2014) and Thomas and Graham's (2019) indications that lack of training can hinder the effectiveness of online teaching. The findings also revealed that some teachers did not identify the vital role of interaction and lacked the skills to effectively integrate content in online teaching as they did in a face-to-face classroom teaching context. Thus they lacked confidence in online teaching and did not feel easy nor comfortable to use and control the online tools. They, therefore, disliked online teaching and did not think online teaching is effective. As such, the effectiveness of online teaching among these teachers may be impaired. Hence, training should be provided more frequently before and during the period of online teaching to help teachers conduct online teaching more effectively and use technology more efficiently so that teachers can become experts in using technology, supported by Miller and Sisk (2019).

Conclusion

This paper evaluated university EFL online teaching during COVID-19 period in China. The results from the quantitative and qualitative data analysis from both teachers and students have provided and recommended effective methods in delivering online EFL teaching in a university context, but it can also be adopted and generalized by EFL teachers in other levels and contexts. Evaluation of the effectiveness of online EFL teaching based on TAM, TAPCK and the eight principles recommended by Hubbard (2019) has provided in-depth evidence and examples to teachers, institutions, and policy-makers. The statements of all the items which have a positive correlation with teachers' perception of the effectiveness of online teaching should be carefully considered in future online EFL education. Teachers may adapt methods found from this study to achieve higher teaching effectiveness in online EFL teaching environments in the specific time or normal teaching period. Nevertheless, there are some limitations in this study. The qualitative data is only from students' interviews. Teachers' interviews may strengthen the results and add more insight in online EFL teaching.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This work was supported by the Project of Discipline Innovation and Advancement-Foreign Language Education Studies at Beijing Foreign Studies University (Grant number: 2020SYLZDXM011);

and Chongqing Higher Education Teaching Reform Research Project Major Project "Deepening THE PTMF Teaching Mode, Training students 5C English Language Ability Teaching Reform Research and Practice" (Project No.: 181019).

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