Web-Based Learning Environment and Effectiveness of Zoom Classes: The Moderating Role of Teacher Attitude in Online Setting

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ABSTRACT

The aim of this study was to determine the impacts of web-based learning environment (WBLE), online interaction quality (OIQ) and technology-based learning (TBL) on the effectiveness of Zoom classes (EC) for Chinese students during the Coronavirus disease 2019 (COVID-19) pandemic. Teacher attitude (TA) in the online setting was also included as a moderator in the relationship amongst WBLE, OIQ, TBL and EC. In this quantitative study, data were collected from 326 Chinese students, the analysis of which suggested significant and positive impacts of WBLE, OIQ and TBL on EC. The moderation of TA in the online setting was significant and positive for the relationships between WBLE and EC and between TBL and EC. However, the moderation of TA in the online setting between OIQ and EC was insignificant. Two novel variables, TA in the online setting and EC, were considered. This research is valuable for policy making regarding the effective design and planning of web- and technology-based learning environments to enhance the effectiveness of online classes for students around the world. The study is, however, limited to five variables. Therefore, future researchers are also recommended to consider the impacts of proactive personality and Internet self-efficacy.

Keywords: Web-based Learning Environment; Zoom Classes; Teacher Attitude; Online Setting

INTRODUCTION

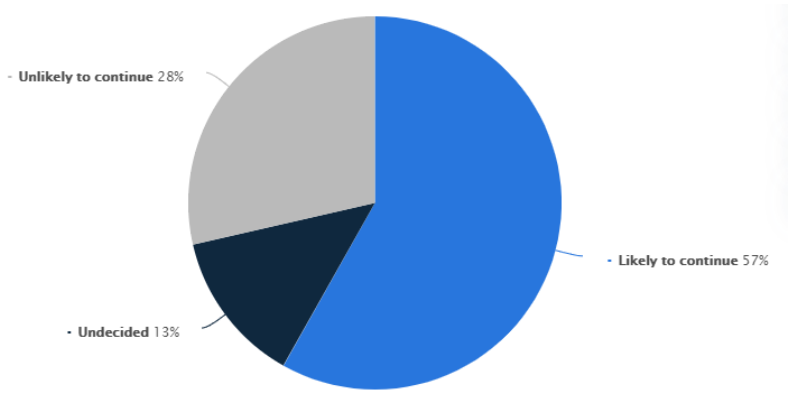
The impacts of Coronavirus disease 2019 (COVID-19) are being observed all around the world linked with different sectors. After the declaration of the pandemic by the World Health Organisation, almost all countries have been instructed to keep their citizens at home and institutions and organisations closed, as they have the most chances of physical contact and spreading of the virus (Zheng, Khan & Hussain, 2020). As a result of this situation, educational institutions all around the world have been shut down, and online classes are being arranged for the purpose of keeping the educational activities going on; however, this huge change has significantly impacted the quality of the interaction between students and tutors; it has also affected the teaching methodologies and learning abilities of students (Yoshida, 2020). Given the condition of the spread of the coronavirus, online classes have been proposed by the governments of different countries to be the sole solution as a medium of communication between students and teachers; similar to previous virus-based pandemics, the COVID-19 pandemic has also impacted the mental health and personality of students (Yoon & Leem, 2021). Zhen et al. (2020) revealed that during the COVID-19 crisis, almost 8.1% of the Chinese general public was found to be under medium to severe level of stress because of the pandemic.

Different researchers have also provided evidence that stress is found amongst the Chinese public because of the COVID-19 pandemic. However, the level of stress varies according to the specific factors related with the residents of China (Yoon & Leem, 2021). The major impact is observed in the education sector, that is, on the rapid need to adopt different technological changes due to the shutting down of educational organisations and institutions, which has affected the smooth flow of educational activities and curricula significantly (Yonafri & Gani, 2021). Research reveals that tutors and students have faced significant challenges in the process

of shifting from physical classes towards taking online classes with the help of different web-based applications, including Cisco WebEx Meetings, Google Meet, GoToMeeting, join.me, Slack and Zoom. At the same time, students are still facing significant challenges in the process of adapting to the system of online learning and that is why the main focus of this study will be on the effectiveness of Zoom classes (EC) (Yin, Goh, Yang & Xiaobin, 2021). Zoom is an application that has been designed for the purpose of video communications, primarily for enterprises, because of its reliable and easy properties; at present, it has been significantly recommended and used for the purpose of providing education to students online all around the world (Virani, Saini & Sharma, 2020).

Even with all of these effective tools and web-based technologies, the pandemic is severely impacting the residents of China and other people around the world; specifically, students are affected in a significant and multidimensional way due to the pandemic (Virani et al., 2020). The pandemic is significantly life threatening to people, especially students who are also dealing with problems of disruption and damaged education wise because the pandemic has disrupted their studies (Thomas & Cinganotto, 2021). Nevertheless, in this disrupting time, different web-based applications, out of which Zoom is the most prominently used one, is being utilised for the purpose of encouraging educational institutions and students around the world to continue with their academic schedules; so that students can be educated and polished for a better future, even in this distressing time of the pandemic (Ugli, 2020). On the one hand, web-based learning environment (WBLE) involves advantages of continuity of educational and academic activities through the processes of e-learning, material sharing through emails, video conferencing through different web applications and live lectures (Thomas & Cinganotto, 2021). However, WBLE is being criticised for the disadvantages and ineffectiveness due to several problems, including the poor Internet infrastructure at some specific areas, involvement of smartphones in the process of educating students and the significantly unfriendly digital environment of classrooms (Taghizadeh et al., 2021). Moreover, the COVID-19 outbreak has significantly impacted the study plans of several Chinese students. These figures can be assessed from the percentages provided in Figure 1, which includes 28% of students who are unlikely to continue with their present degrees, 13% who have not decided on either continuing or discontinuing their studies, and almost 57% of students who are likely to continue with their present degrees amidst the pandemic.

FIGURE 1. Intentions of Chinese students to continue their studies due to the COVID-19 outbreak in China in 2020



Source: Statista.com

Therefore, the role of tutors as moderators between students and WBLE is also being criticised and questioned on the basis of some negative outcomes of WBLE and online interaction quality (OIQ). Several researchers and experts are interested in determining the impacts of WBLE and OIQ and the moderating role of tutors on EC (Sulisworo, Basriyah, Sari

& Toifur, 2019; Susilawati, Darmawan & Desiasni, 2020). Thus, the major objectives of this study include the following:

- To assess the impact of technology-based learning (TBL) on EC.
- To determine the impact of WBLE on EC.
- To check the impact of OIQ on EC.
- To measure the moderating impact of teacher attitude (TA) in the online setting in the relationship amongst WBLE, OIQ, TBL and EC.

This study plays a constructive and valuable role in the WBLE for tutors and students. The outcomes of this study contribute to the promotion towards the betterment of WBLE and OIQ for the purpose of a positive enhancement of EC for students. Most negative outcomes of WBLE must be tackled with positively and effectively designed policies regarding the environment of online classes and the quality of the interaction between tutors and students for the purpose of maximising the quality of online classes (Sulisworo et al., 2019). The study highlights TA in the online setting as a major role, which can significantly impact the quality and effectiveness of online classes. As a result, tutors can be assisted to manage, plan and carry out online classes with maximum quality and effectiveness significantly and effectively. The research also emphasises major novel factors, such as OIQ and WBLE, to significantly and positively enhance EC for educational institutions, students and tutors.
The study is divided into five parts. Section 1 presents the introduction of the study, including the background, problem statement, justification, rationale for choosing the topic, research objectives and significance of the study. Section 2 is the literature review, which includes related studies on the variables under investigation. Section 3 involves the methodology that is adopted for the purpose of pursuing this study. Section 4 presents the results, data analysis and interpretation. Section 5 includes the discussion, conclusion, implications, limitations and future research recommendations.

LITERATURE REVIEW

CONGNITIVISM LEARNING THEORY

Cognitivism learning theory is basically introduced to learn and assess the reaction of students to the external environment stimulus; the theory has been introduced as a rigid emphasis against the response-and-stimulus situation (Singh & Thurman, 2019). Cognitive theorists have put forward the idea that a significant role of the mind of students exists to focus on and learn about the situations that occur between the happening of a specific environmental stimulus and the response of students (Sarwar et al., 2020). Theorists have also observed the cognitive processes related with the mind, including imagination and motivation, and critical factors, such as the relationship between the environmental stimuli and the student responses (Sarfati et al., 2019). This theory is being applied in the present study because of its relevance to the situation of the external stimuli in the forms of the COVID-19 outbreak and the shutting down of educational organisations and institutions, which have affected students, educational institutions and tutors significantly (Saiyad, Virk, Mahajan & Singh, 2020). Cognitivism learning theory also significantly explains the student responses towards such kinds of environmental stimuli and changes to their regular routine. This theory is related to the WBLE of students, OIQ and TBL as environmental stimuli because all of these situations are results of the outbreak of the pandemic, which itself is a significant stimulus for everyone around the world. The theory explores TA in the online class setting and EC on the basis of the student responses towards online classes during the pandemic (Rosenblum, 2020).

IMPACT OF TBL ON EC

Several different technologies have been proven effective in significantly driving the learning and teaching processes to another significant level in the online learning environment; some of these technologies are listed during the time of the COVID-19 pandemic, such as Moodle, Skype, Zoom, WebEx and Moocs (Rosenblum, 2020). All of the mentioned technologies are related to information and communications technology. They have also implemented the concept of e-learning positively and significantly, thereby enhancing the experiences of learning and teaching for students and tutors. Several studies have provided evidence in support for TBL and the further enhancement of the effectiveness and experience of online classes (Pei & Wu, 2019; Ramadhani, Rofiqul, Abdurrahman & Syazali, 2019). Pee (2020) proposed that TBL systems have significant and positive impacts on the effectiveness and enhancement of the experience of online classes for students, specifically during the distressing time of the COVID-19 pandemic. Several researchers and authors support TBL for the enhancement of the experience of online classes, for the continuity of academic and educational activities and for the maintenance of social distancing and staying at home (Odero, 2019; Oh, Sudarshan, Jin, Nah & Yu, 2020; Pee, 2020). According to a recent study (Nam-Nguyen, Truong, Ly & Dagamac, 2021), TBL has made the procedure of online education and learning simple and easy for students and tutors, with the inculcation of different communication methods and significantly cooperative and student-friendly academic web-based tools and techniques. During Zoom classes, students and tutors interact and get help from different technological tools, devices and techniques, including interactive web applications for making and presenting presentations and interactive tools for enhancing the subject knowledge and having tutors at home, in just one click (Murphy, Roschelle, Feng & Mason, 2020; Muslimat et al., 2021). Online examinations, assessments and feedback have also been proven effective for students in terms of keeping them engaged in academic and educational activities, even during this disruptive pandemic (Molnár & Csapó, 2019b). Based on the literature and evidence from the studies on TBL, we propose our first hypothesis. Hypothesis 1 (H1): The impact of TBL on EC is significant.

IMPACT OF WBLE ON EC

Web-based learning is not a newly introduced concept; instead, it has been in existence since long and is being utilised by different high-end institutions in significantly developed countries for an enhanced level and experience of communication between tutors and students (Molnár & Csapó, 2019a). WBLE includes different discussion forums, which are approached by tutors and students through emails, online course contents, communication and knowledge transfer through video conferencing and live lectures. Experts have promoted the idea that web-based learning significantly and positively enhances the effectiveness and experience of online classes (Lemmetty & Collin, 2021; Lin & Hwang, 2019). Positively planned web-based learning materials and schedules also significantly enhance the effectiveness of online classes (Klein et al., 2021; Lei & So, 2021). Different studies have also criticised the role of WBLE due to its negative impact, which involves the significant usage of smartphones and different digital devices by students; some authors have referred to these devices as distractions for students (Islahi, 2019; Jares, Wilcox, Cahalan & Dickey, 2019). However, during the COVID-19 pandemic, WBLE has been recommended and appreciated by several researchers for the purpose of continuing academic and educational activities (Heliawaty & Rubini, 2020; Hodges, Moore, Lockee, Trust & Bond, 2020; Hofer, Nistor & Scheibenzuber, 2021). Heliawaty and Rubini (2020) proposed that WBLE promotes and positively impacts the effectiveness of online classes. Several studies have also put forward WBLE as a significant solution for the

disruptions of the pandemic, thus promoting the idea of online classes (Feroz, Zulfiqar, Noor & Huo, 2021; Geng, Law & Niu, 2019). However, previous studies failed to effectively point out practices, which can be adopted in WBLE, to significantly and positively enhance the effectiveness of online classes. Therefore, the current research mainly aims to determine the impact of WBLE on the effectiveness of online classes or Zoom classes. In this way, WBLE can be designed for enhancing the effectiveness and experience of these classes for students. Based on the evidence from previous studies, the following hypothesis is proposed. Hypothesis 2 (H2): The impact of WLBE on EC is significant.

IMPACT OF OIQ ON EC

Interaction quality is defined as the quality that is perceived in between the relationship of a system and students, specifically in the case of a computer-supported or web-supported learning environment (Feroz et al., 2021). OIQ has a direct and significant impact on the effectiveness of online classes (Chu, Reynolds, Tavares, Notari & Lee, 2021), as this factor defines the quality of the relationship between the system and students. According to this study, OIQ is perceived from the point of view of the students present in an online learning environment or a WBLE during the COVID-19 pandemic to continue their academic and educational activities (G. Chen, 2019). OIQ also impacts other important factors, including the understanding of students and the quality of the relationship between students and tutors during online classes; in this way, OIQ also significantly impacts the effectiveness of online classes (Chang & Hwang, 2019; C.-H. Chen & Yang, 2019). Various researchers have proposed that OIQ also impacts the level of interest of students during online classes; in turn, the involvement of students in the content of online classes is also affected, suggesting that OIQ has a significant impact on the effectiveness of online classes (Baker, Unni, Kerr-Sims & Marquis, 2020; Castro & Tumibay, 2019). Previous studies highlighted the significant impact of OIQ on the effectiveness of online classes. Therefore, we propose that: Hypothesis 3 (H3): The impact of OIQ on EC is significant.

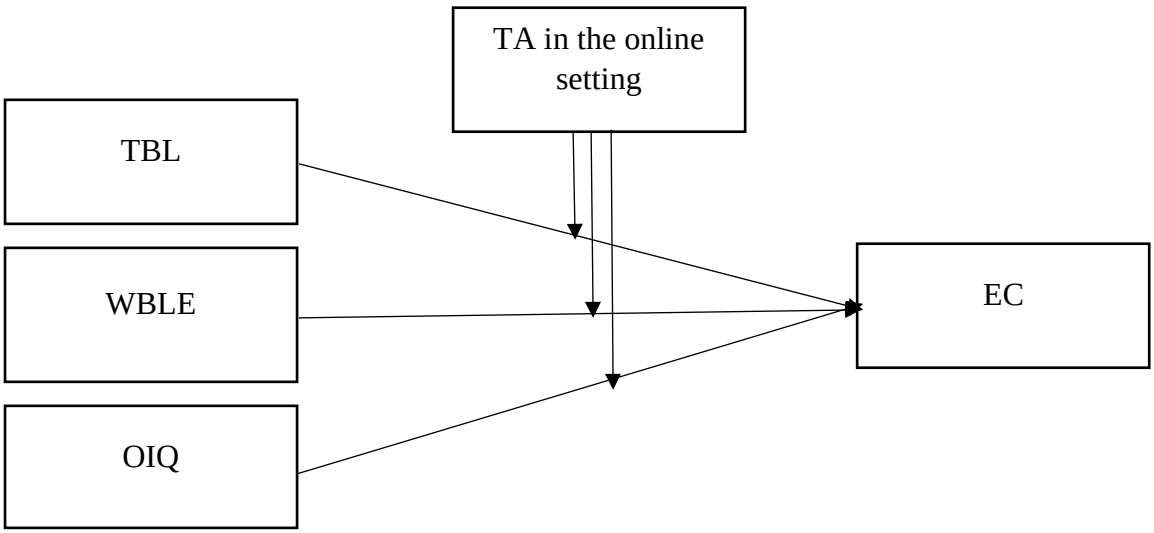
MODERATION OF TA IN THE ONLINE SETTING

According to Baker et al. (2020), the COVID-19 pandemic and the environmental stimulus of shutting down educational organisations and institutions have significantly affected students and tutors. Nevertheless, tutors, being the mentors of students, have the prime responsibility of adapting to the technological and environmental changes and to make students adapt to the same situation in the smoothest way possible. Bahasoan, Ayuandiani, Mukhram and Rahmat (2020) proposed that the level of seriousness of tutors during online classes significantly and directly relates to the positive experience and effectiveness of online classes for students. Bacher-Hicks, Goodman and Mulhern (2021) suggested that the familiarity of tutors with TBL tools and techniques is important in enhancing the level of effectiveness of online classes during the COVID-19 pandemic. They also proposed that tutor awareness significantly and directly relates to the significantly enhanced understanding of students during online classes. Some studies have reported the casual behaviour of tutors and students when attending online classes during the pandemic; this behaviour has been proven to be significantly opposite to physical classes, indicating that the casual behaviour of tutors will cause the casual and non-serious behaviours of students (Baber, 2021; Bacher-Hicks et al., 2021). Tutor attitude during online classes also plays a significantly moderating role between students and the system for the effectiveness of technology- and web-based online classes. Recent studies (e.g. Agarwal & Dewan, 2020; Alfadda & Mahdi, 2021; Alzahrani & Althaqafi, 2020) have also argued that the level of teacher preparation for online classes, the level of teacher seriousness for online classes

and the level of clarity from the side of teachers for students during online classes significantly and positively impact the OIQ for students, significantly and positively impacting the effectiveness of online classes. Based on the significant moderating role of TA in the online setting highlighted in previous research, we propose the following: Hypothesis 4 (H4): The moderation of TA in the online setting between the relationship of TBL and EC is significant. Hypothesis 5 (H5): The moderation of TA in the online setting between the relationship of WBLE and EC is significant. Hypothesis 6 (H6): The moderation of TA in the online setting between the relationship of OIQ and EC classes is significant.

THEORETICAL FRAMEWORK

Figure 2. Theoretical framework of this study.



In the study, TBL, WBLE and OIQ are the independent variables; TA in the online setting is added as a moderator, and EC is the dependent variable.

RESEARCH METHODOLOGY

RESEARCH METHOD

This study adopted deductive reasoning, which involves the testing of the already present theories, on the basis of previous theories and developed hypotheses, which are then exposed to different testing techniques to reject or accept the hypotheses (Adnan & Anwar, 2020). The hypotheses derived during the review of previous literature and theories were tested in the procedure of data collection and analysis. The adopted research method for this study is quantitative (Agarwal & Dewan, 2020), which uses and applies quantitative tools and techniques for the purpose of data collection and analysis. Quantifiable data were collected and then exposed to quantitative tools and techniques to conclude results regarding the acceptance and rejection of the generated hypotheses. Moreover, the study is based on the positivist research philosophy, which involves the understanding of the social world in an objective way (Alfadda & Mahdi, 2021). Thus, the researcher independently worked on the study problem by disassociating from personal values. As such, the researcher aimed to determine the impacts of TBL, WBLE, OIQ and TA in the online setting on EC as a one-time phenomenon. Therefore,

the cross-sectional time horizon was adopted, which involves data collection from certain participants for a single time only.

POPULATION AND SAMPLING

Research population involves groups of people who have characteristics that intrigue researchers or are of the interest of researchers. The population for this research involved Chinese students who utilise Zoom as a medium of online classes during the COVID-19 pandemic. However, conducting research on a vast population was difficult for the researcher. Therefore, the purposive sampling technique was adopted to select a sample out of this population. With the use of personal judgment, the researcher selected participants from which the data were collected. The sample contains all of the characteristics of the population; hence, it represents the population significantly and completely. The sample from which the data were collected comprised 326 individuals.

DATA COLLECTION

The data were collected with the help of an online survey. The questions were formulated on the basis of the research objectives and the variables that were considered in this study. These questions were utilised for the formation of a structured questionnaire, and the participants were reached out through emails. The researcher sent the online survey to the participants and received 326 valid responses, which were then analysed.

DATA ANALYSIS

Confirmative factor analysis and structural equation modelling (SEM) were applied on the data. The researcher utilised SPSS and AMOS for the data analysis.

MEASURES

The measures for OIQ were adopted from the study of Zheng et al. (2020), but only three items were kept. The sample items include, 'During the COVID-19 crisis, my online interaction with my classmates provided me with various information sources to explore problems posed in this course.' The three measures for WBLE were kept from the research of Chandra and Fisher (2009). For TBL, two items were kept from the study of Geng et al. (2019). Four items were taken and kept from the study of Islahi (2019) for TA in the online setting. Moreover, the measures for EC were adopted from the study of Bahasoan et al. (2020), and a total of three items were kept.

DATA ANALYSIS AND INTERPRETATION

This section involves the details regarding the data collected, the results of the analysis performed on the collected data and the interpretation of the results. The first three tables presented in this section provide the demographical details of the respondents.

Table 1. Gender of the respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	178	54.6	54.6	54.6
	Female	148	45.4	45.4	100.0
	Total	326	100.0	100.0	

Table 1 shows the gender of the respondents. In summary, 178 males participated in the study, and 148 females provided valid responses for the research.

Table 2. Age of the respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 25 years	104	31.9	31.9	31.9
	25–35 years	131	40.2	40.2	72.1
	35–45 years	76	23.3	23.3	95.4
	More than 45 years	15	4.6	4.6	100.0
	Total	326	100.0	100.0	

Moreover, 31.9% of the respondents were of the age less than 25 years, 40.2% were aged 25–35 years, 23.3% were 23–45 years, and 4.6% of the respondents were more than 45 years old.

Table 3. Experience of the respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than two years	46	14.1	14.1	14.1
	2–5 years	144	44.2	44.2	58.3
	5–8 years	105	32.2	32.2	90.5
	More than eight years	31	9.5	9.5	100.0
	Total	326	100.0	100.0	

A total of 46 respondents had an experience of less than two years, 144 respondents had 2–5 years of experience, 105 respondents had an experience from five to eight years, and 31 respondents had more than eight years of experience.

Table 4. Descriptive statistics

	N	Minimum	Maximum	Mean	Standard Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Standard Error
WBLE	326	1.00	5.00	3.2776	1.06843	−.182	.135
OIQ	326	1.00	5.00	3.3482	1.01714	−.389	.135
TBL	326	1.00	5.00	3.2556	1.15356	−.333	.135
TA	326	1.00	5.00	3.5713	1.15146	−.478	.135
EC	326	1.00	5.00	3.3211	1.14602	−.364	.135
Valid N (listwise)	326						

The descriptive statistics represented the summary of the collected data. A total of 326 respondents were reported. The minimum and maximum values of the obtained responses ranged between 1.00 and 5.00, indicating that neither an outlier nor an abrupt value was present in the data. Low-level skewness and standard deviation also indicate that the data were normally distributed. Therefore, the data are suggested for further analysis.

Table 5. Kaiser–Meyer–Olkin (KMO) and Bartlett's test

KMO Measure of Sampling Adequacy	.898

Bartlett's Test of Sphericity	Approximate chi-square	4271.221
	df	105
	Sig.	.000

The KMO Measure of Sampling Adequacy should have a value less than 0.50 for the usefulness of the factor analysis. Here, the value is .898, which represents the significant usefulness of the factor analysis. Bartlett's Test of Sphericity also represents a significant value of less than .05, which shows that the variables are related at the df level of 105, as the level of significance must be lower than .05, for the factor analysis to be valid and useful.

Table 6. Rotated component matrix[a]

	Component				
	1	2	3	4	5
OIQ1		.822			
OIQ2		.900			
OIQ3		.852			
WBLE1			.846		
WBLE2			.828		
WBLE3			.842		
TBL1					.775
TBL2					.866
TA1	.874				
TA2	.832				
TA3	.876				
TA4	.868				
EC1				.778	
EC2				.750	
EC3				.835	

Rotated component matrix represents the level of correlation present amongst variables and items. All values are more than 0.7, which shows a significant correlation present amongst the five variables and all of the adopted items. Factor 1 is significantly correlated with TA1, TA2, TA3 and TA4. Similarly, Factors 2, 3, 4 and 5 are also significantly correlated with the items with values more than 0.7.

Table. 7 Convergent and discriminant validity

	CR	AVE	MSV	TA	OIQ	WBLE	TBL	EC
TA	0.944	0.809	0.320	**0.900**				
OIQ	0.907	0.764	0.312	0.494	**0.874**			
WBLE	0.922	0.798	0.366	0.566	0.559	**0.893**		
TBL	0.838	0.721	0.667	0.416	0.372	0.450	**0.849**	
EC	0.914	0.780	0.667	0.566	0.505	0.605	0.817	**0.883**

The results for the discriminant and convergent validity are provided in Table 7. The CR and AVE values are supposed to be above .7 and .5, irrespectively. In this case, all CR values against all variables and all AVE values against all variables are above points .7 and .5, respectively. These results confirm the validity of the model. The values present at the diagonal top represent the discriminant validity, which should be more than .7. All values are also valid.

Table 8. Model fit indices

CFA Indicator	CMIN/DF	GFI	IFI	CFI	Root Mean Square Error of Approximation (RMSEA)
Threshold Value	≤ 3	≥ 0.80	≥ 0.90	≥ 0.90	≤ 0.08
Observed Value	2.484	0.929	0.972	0.972	0.068

In Table 8, the CMIN value is according to the threshold value and is equal to 2.484. The value of the goodness-of-fit indexes also follows the threshold value and is equal to 0.929. In addition, the values of the incremental fit index and competitive fit index are according to the threshold value and are equal to 0.972 each. Moreover, the RMSEA value is valid and follows the threshold value, representing the model fitness significantly.

Table 9. SEM

	Path		Estimate	S.E.	C.R.	P
EC	<---	WBLE	.373	.056	7.245	***
EC	<---	OIQ	.470	.053	9.591	***
EC	<---	TBL	.476	.052	9.754	***
	Moderation		**Estimate**	**S.E.**	**C.R.**	**P**
ZEC	<---	WBLExTA_Int1	.189	.055	3.481	***
ZEC	<---	OIQxTA_Int1	.010	.047	.222	.824
ZEC	<---	TBLxTA_Int1	.096	.046	2.119	.034

Table 9 displays the SEM results. The impact of WBLE on EC has been observed to be significant and positive, as the P value is less than .05. Such an impact is equal to 37.3%, indicating that with every 1% enhancement in WBLE, EC will be enhanced by 37.3%. Similarly, the impact of OIQ on EC is significant and positive. The impact of TBL on EC is also significant and positive; the value is equal to 47.6%, suggesting a 47.6% positive enhancement in EC. The moderation of TA in the online setting between OIQ and EC is insignificant because the P value is more than .05. By contrast, the moderation of TA in the online setting between TBL and EC is positive and significant with a P value less than .05 and an impact value of 9.6%, indicating that TA in the online setting enhances the impact of TBL on EC by 9.6%. Similarly, the moderation of TA in the online setting is significant and positive in the case of WBLE and EC. Figure 3 below illustrates the SEM.

Figure 3. SEM

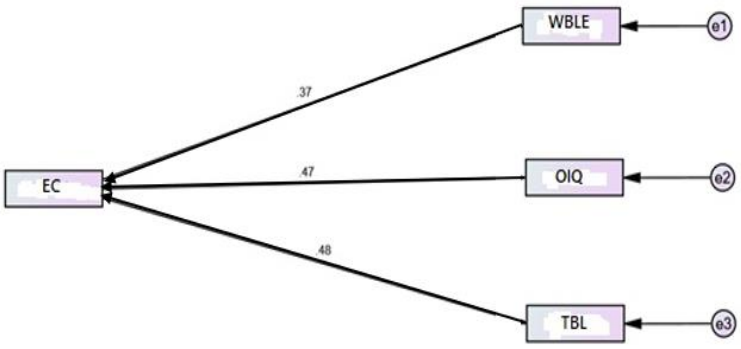


Figure 4 displays the moderation of TA in the online setting between WBLE and EC. The moderation is positive and significant.

Figure 4. Moderation of TA between WBLE and EC

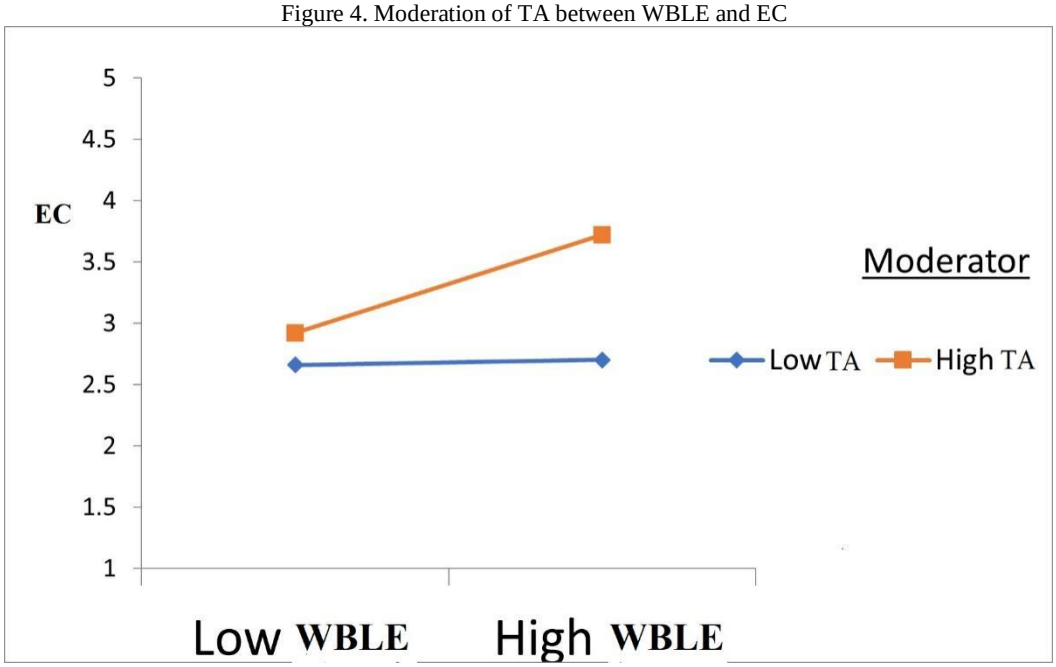


Figure 5 presents the moderation of TA between OIQ and EC, and it can be observed to be insignificant.

Figure 5. Moderation of TA between OIQ and EC

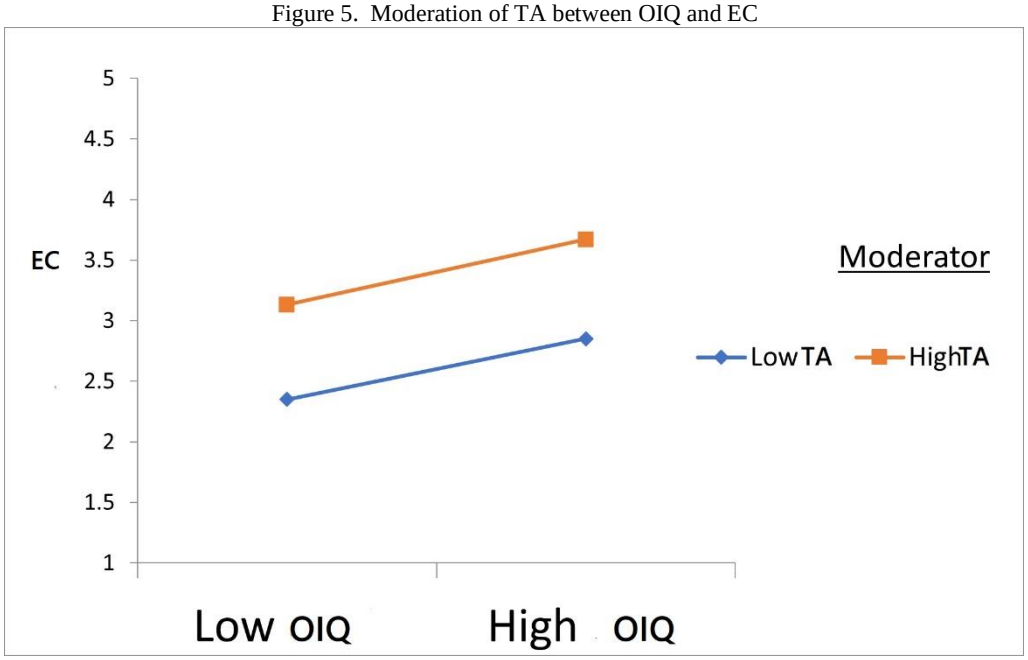
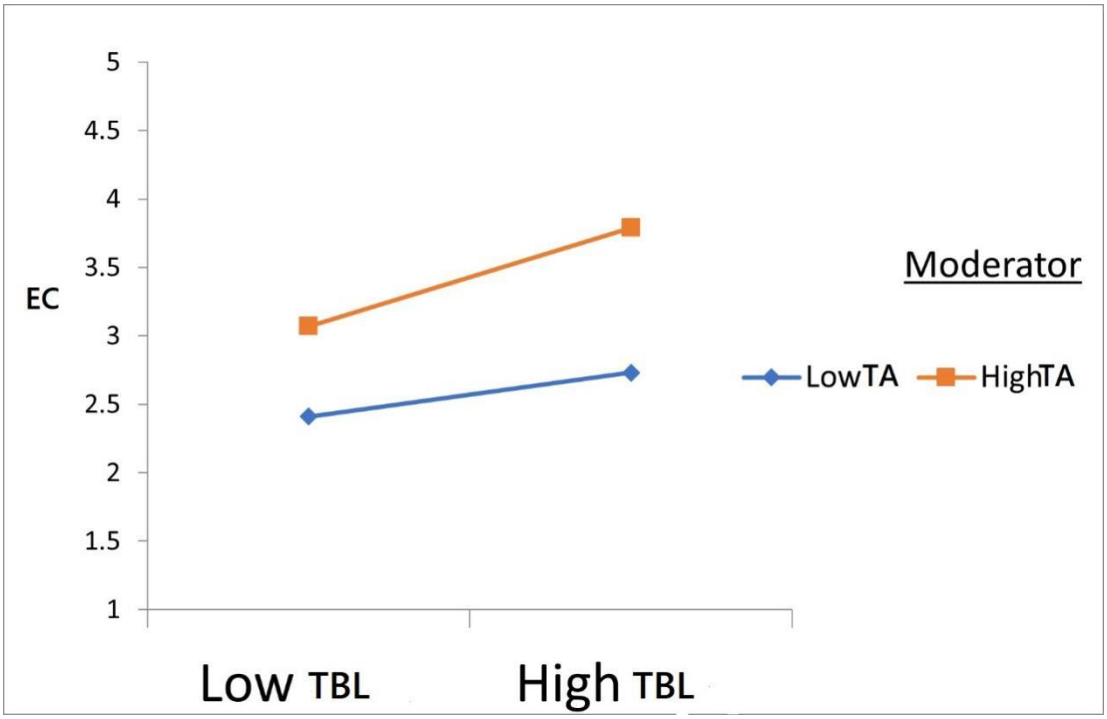


Figure 6 illustrates the moderation of TA in the online setting between TBL and EC. The moderation is positive and significant, and it enhances the impact of TBL on EC by 9.6%.

Figure 6. Moderation of TA between TBL and EC



DISCUSSION AND CONCLUSION

DISCUSSION

The objectives of this study are to assess the impact of WBLE on EC in China to determine the impact of OIQ on EC and to measure the impact of TBL on EC in China. Moreover, TA in the online setting is taken as a moderator in the relationship amongst WBLE, OIQ, TBL and EC in China during the COVID-19 pandemic. H1 is accepted, as the impact of TBL on EC is significant and positive, and the results resonate with the findings of recent studies (e.g. Yonafri & Gani, 2021; Yoon & Leem, 2021; Zheng et al., 2020). These studies have proposed that technological tools and techniques, which are positively utilised to enhance the experience of online classes, engage and intrigue students significantly and thus enhance the effectiveness of WBLE or online classes. According to past research, a significant and positive impact of WBLE exists on EC in China. Thus, H2 is also accepted, consistent with the results of recent research (e.g. Ugli, 2020; Virani et al., 2020; Yin et al., 2021). Such research has proposed that positively planned and delivered WLBE to students significantly and positively enhance the experience and effectiveness of online classes. The impact of OIQ on EC is also significant and positive, thereby supporting H3. This result resonates with the studies of Susilawati et al. (2020), Taghizadeh et al. (2021) and Thomas and Cinganotto, 2021 who argued that positively generated OIQ enhances the interest and involvement of students in online learning and thus significantly impacts the effectiveness of such classes. Furthermore, H4 is supported, as the moderation of TA in the online setting between TBL and EC is significantly positive (Singh & Thurman, 2019; Sulisworo et al., 2019). Similarly, H5 is accepted because the moderation of TA in the online setting between WBLE and EC is significantly positive. These results are consistent with the findings of previous studies (e.g. Sarfati et al., 2019; Sarwar et al., 2020), as they have argued that a positive TA enhances the interest and experience of students towards online classes significantly and positively, thereby enhancing EC. However, H6 is rejected, as neither an effective moderation nor a significant moderation of TA in the online setting is observed between OIQ and EC in China (Saiyad et al., 2020).

CONCLUSION

The study primarily investigated the impacts of WBLE, OIQ and TBL on EC in China during the COVID-19 pandemic. According to the analysis of the data collected from Chinese students, WBLE, OIQ and TBL have significant and positive impacts on EC in China during the pandemic. The moderation of TA in the online setting, considering the relationships amongst WBLE, OIQ, TBL and EC in China during the pandemic, was also assessed. TA in the online setting positively and significantly moderates the relationships amongst WBLE, OIQ, TBL and EC in China. However, the moderation in the case of OIC and EC in China is insignificant.

IMPLICATIONS OF THE STUDY

The study has considered two novel variables, namely, TA in the online setting and EC, which have further enhanced the theoretical importance and value of the research. This work has also added novelty in studies regarding WBLE and TBL, including the two novel variables. Moreover, significant data regarding the impacts and dynamics of these variables have been contributed to literature. Furthermore, the study has considered China as a country of research, on which significant data are available concerning how Chinese students have been significantly impacted by the pandemic and how educational methods have been modified. Therefore, the generalisability of the research is high. Such generalisability is not only applicable in China but also in other countries because the whole world is currently dealing with the COVID-19 pandemic. Similar to China, students around the world have been significantly affected in terms of education and changing teaching methodologies. Hence, this research has significant outcomes and conclusions regarding students around the world. The study is also valuable for educational institutions and tutors that are looking forward to enhancing the effectiveness of online classes or Zoom classes for students during the current pandemic. Note that WBLE can be planned and delivered in such a way that enhances EC, as the study proposes a significant and positive impact of WBLE on EC. Moreover, educational institutions and governments can formulate policies for making OIQ significantly high, so that EC can be positively and significantly enhanced.

LIMITATIONS AND FUTURE RESEARCH RECOMMENDATIONS

Firstly, access to participants is limited, given the COVID-19 pandemic situation. The researcher had to collect data through an online survey. However, in ideal conditions, future works are recommended to conduct a self-administered questionnaire-based survey. Secondly, the availability of variables is also limited. The researcher only considered five variables. Thus, future researchers are also recommended to include proactive personality and Internet self-efficacy to assess their impacts on the effectiveness and efficiency of online classes. Thirdly, this study only considered China, but the whole world is currently in the distressing situation of the pandemic. Future researchers can expand the horizon of the study.

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