

The effect of online English learners' perceived teacher support on self-regulation mediated by their self-efficacy

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ABSTRACT: This study explored the relationships among online English learners' perceived teacher support, self-efficacy, and self-regulation in online learning based on social cognitive theory. Structural equation modeling (SEM) with bootstrapping estimation was conducted using data from 220 online English learners engaged in blended learning on the Chinese University MOOC platform. The results showed that online English learners' perceived teacher support positively influenced their self-efficacy and self-regulation. Moreover, self-efficacy was found to mediate the relationship between their perceived teacher support and self-regulation. On the whole, the findings detailed the effect of English learners' perceived teacher support on their self-efficacy and self-regulation, as well as empirically identifying the mediation effect of self-efficacy in the relationship between perceived teacher support and self-regulation in an online learning environment. Related pedagogical implications for teacher online teaching, student online learning, and the Chinese University MOOC platform, and limitations were discussed.

Keywords: perceived teacher support, self-efficacy, self-regulation, online learning.

El efecto del apoyo docente percibido por los alumnos de inglés online sobre la autorregulación mediada por su autoeficiencia

RESUMEN: En el presente estudio, basado en la teoría social cognitiva, se explora la relación entre el apoyo docente percibido por los alumnos de inglés online, la autoeficiencia y la autorregulación en el aprendizaje online. Se realizó un modelo de ecuaciones estructurales (MES), con la estimación Bootstrap utilizando los datos de 220 alumnos de inglés online de una universidad politécnica que participan en el aprendizaje combinado en la plataforma MOOC de las Universidades Chinas. Los resultados mostraron que el apoyo docente percibido por los alumnos de inglés online influyó positivamente su autoeficiencia y autorregulación. Además, se descubrió que la autoeficiencia podía mediar la relación entre el apoyo docente percibido y la autorregulación. En general, los resultados describieron con detalle el efecto del apoyo docente percibido por los alumnos de inglés online sobre su autoeficiencia y autorregulación, e identificaron empíricamente el efecto mediador de la autoeficiencia en la relación entre el apoyo docente percibido y la autorregulación en un entorno de aprendizaje online. Por último, se discutieron las implicaciones pedagógicas para la enseñanza online de los profesores, el aprendizaje online de los alumnos y la plataforma MOOC de las Universidades Chinas, así como las limitaciones del estudio.

Palabras clave: apoyo docente percibido, autoeficiencia, autorregulación, aprendizaje online.

1. INTRODUCTION

In recent years, there has been a boom in the number of Chinese colleges and universities providing courses via the Chinese University MOOC platform (Ministry of Education, 2022). The online learning environment differs from the traditional classroom-based environment in that it is characterized by autonomy. As such, online instruction eliminates the limitation of place, time, and physical materials and to a great degree gives students the control over when, what, and how to study (Yüce, 2022). Hence, learners have more room for self-regulated learning, then self-regulation is viewed as an essential element for academic success in online learning (Broadbent, 2017).

Bandura's (1977) Social Cognition Theory (SCT) points out that the development process of individual learners is influenced by the dynamic interaction among learning environment, subjective cognition and learning behavior, among which self-efficacy plays an important role. According to this theory, the physical environment of online learning (such as a learning platform) is the environmental factor that affects the engagement of online learning. Research findings have provided empirical evidence that there are associations among environmental factors (social support), personal cognitive resources (online-learning self-efficacy), and behaviors (Yu & Zhou, 2022). Studies also proved the promotion effect of moderately stimulated positive emotions on creative self-efficacy through the lens of SCT (He & Wong, 2022).

Self-regulation is endorsed as a multifaceted and dynamic construct influenced by personal characteristics and environmental events (Ifenthaler, 2012). Among these factors, the teacher is critical for English learners like the helmsman of the sea in online learning. Students have long been the focal point and subject of online learning, but there is no doubt that the teacher is the key to educational implementation (Jiang et al., 2018). Lai and Su (2021) also highlighted the significance of the teacher as a facilitator to assist students to become great self-regulated learners in Massive Open Online Courses (MOOCs).

Self-efficacy is regarded as an important personal factor in self-regulation and affects online learners' cognition regulation, metacognition regulation, time, and environment management (Sadi & Uyar, 2013). Many researchers have realized the significant role of the teacher in self-regulated learning (Yüce, 2019), however, the relationship between support from the teacher and self-regulation has not been confirmed by empirical studies in online English learning. Furthermore, the teacher can help students enhance their self-efficacy beliefs by supporting positive learning environments. And self-efficacy, as a personal influence, plays a crucial role in self-regulation (Yüce, 2023).

In light of this, the aims of the current study are to investigate the relationships between online English learners' perceived teacher support and their self-regulation, and then to explore the mediating effect of self-efficacy between perceived teacher support and self-regulation. In addition, the study intends to generate a Structural Equation Modeling (SEM) with perceived teacher support as an antecedent variable, self-efficacy as an intermediary variable, and self-regulation as a dependent variable, which makes up for the deficiencies of previous studies.

2. LITERATURE REVIEW

2.1. Self-regulation in online learning

As noted by Zimmerman and Kitsantas (2014, p.145), self-regulation in the field of second language acquisition refers to “the self-directive processes that language learners use to activate and maintain cognition, emotions, and behaviors in order to accomplish their academic aims in L2 learning”. Here, the self-directive processes for language learners entail the regulation of motivation, time, effort, and the physical learning environment to optimize their learning performance. Zimmerman (2000) explained that typical self-regulated learners have a good command of how to determine learning aim, choose learning methods, monitor the learning process, and appraise learning results. Therefore, due to the adversity in the process of mastering English, learners' self-regulated capacity is a significant factor that makes them persevere and then succeed.

In the past few years, much attention has been paid to the research about self-regulation in the field of Second Language Acquisition (SLA) (Chen, 2020; Xiao & Yang, 2019). Researchers have identified the critical role of self-regulation in understanding the psychology of second language learners (Dornyei & Ryan, 2015). Some studies mainly investigated the model of self-regulation for English language learners. For example, Tseng et al. (2006) adopted the concept of self-regulation for use in the field of SLA, and further presented a five-dimensional model of self-regulatory mechanisms used by English language learners. In addition, the relationship between self-regulation and other variables was examined in some studies. Shang (2016) explained the use of self-regulated learning (SRL) strategies and the correlation between SRL strategies and their academic performance. Thus, previous research has supported the self-regulated learning theory in either online or offline learning and implied that it has an important effect on English language learners.

There has been a growing body of research concerning the factors of English learners' self-regulation in two aspects in online settings. First of all, close attention has been paid to English learners' internal factors affecting their online self-regulation, such as technology acceptance (Zheng & Wang, 2020), achievement-related emotions (Anthony & Kenneth, 2012), motivation (Zheng et al., 2018), learning approaches (Ekici et al., 2014), and students' conceptions of language learning (Zheng et al., 2016). Furthermore, a substantial body of research focuses on the effects of external factors on online self-regulation, including elaborated online feedback (Maria & Henrik, 2022), learning environments (Deng et al., 2012; Shyr & Chen, 2018), and different score reports based on formative web-based test (Zou & Zhang, 2013).

In the online learning environment, learners' self-regulated learning is influenced by various factors, not only by individual factors (self-efficacy) but also by the external environment (teacher support), as a result of the combined effect of external conditions and internal regulation (Zimmerman, 1989). Deng and Zhou (2018) also pointed out that it is necessary to examine the influences of self-regulated learning in an online environment. Although much research has provided evidence for internal factors and external factors on online self-regulation, studies on the interplay between online English learners' perceived teacher support to their self-regulation are not established. Hence, this study attempts to explore the relationship between them and the mediating role of self-efficacy.

2.2. Perceived teacher support

Perceived teacher support is defined as “students’ perceptions that their teacher is concerned about them and will assist them in need” (Trickett & Moos, 1973, p.94). Teacher support of online learning is not only of significance for learners to avoid negative learning experiences but also an important impetus for deep and advanced learning (Koseoglu & Koutropoulos, 2016). Drawing upon Self-determination Theory (SDT) (Deci & Ryan, 2000) and Social Support Theory (SST) (Tardy, 1985), Jiang et al. (2018) constructed the model of student-perceived teacher support behavior composed of four dimensions, namely emotional support, social support, intellectual support, and instrumental support in online learning. Emotional support refers to the support obtained by learners in course learning, such as the positive atmosphere created by teachers, teachers’ sensitivity, and teachers’ attention to the views of learners. Social support is the support provided by teachers for student-to-student interaction as well as teacher-student interaction. Intellectual support refers to the knowledge structure and teaching strategies provided by teachers to advance learners’ knowledge and skills. Instrumental support represents the help provided by teachers to meet the learners’ needs, mainly including guidance, assistance, tangible support, and problem-solving actions.

A plethora of studies have found positive relations between self-regulation and perceived teacher support. Some researchers have investigated the relationship between teachers’ autonomy support and self-regulation. Sierens et al. (2009) examined how perceived autonomy support was associated with self-regulated learning. The results showed that students who felt their teachers’ feedback and help in an autonomy-supportive way actively carry on the regulation of cognition. Using a longitudinal design, Schuitema et al. (2016) showed that perceived teacher support and self-regulation correlated over time. Students who experienced higher levels of social support from their teachers tended to delay gratification and use metacognitive strategies more often. Yin et al. (2009) found that perceived social support aided students’ self-regulated learning. A close teacher-student relationship with the goal of support was extremely beneficial in improving students’ ability to self-regulate in classroom learning. Other research has discovered a link between perceived social support from teachers and effort regulation or behavioral engagement (Murdock & Miller, 2003). Overall, the results indicated that perceived teacher support had a notable correlation with self-regulation.

2.3. Self-efficacy

Self-efficacy is defined as “a person’s assessment of his or her ability to complete a specific task using the skills that he or she possesses” (Bandura, 1997, p.191), and it is typically described as task and context specific (Pintrich & Schunk, 1996). English learning self-efficacy is a construct that focuses on English subjects under the conceptual umbrella of self-efficacy. It refers to students’ subjective assessment of their ability to complete English studies, achieve satisfactory results, and avoid academic failure (Zhong & Wang, 2008). Students believe in themselves if they can reach English learning goals, complete English learning tasks, and deal with obstacles in English language learning. Ellis (2013) asserted that the learning process of a second language has much to do with learners’ beliefs, such as self-efficacy and self-confidence. Highly effective students tend to be more persistent than lowly effective students in the face of challenges and difficult tasks (Stevens et al., 2004).

Self-efficacy is a key personal influence playing an important role in the process of self-regulation (Zimmerman, 2000). Students' self-efficacy beliefs influence the choices they make and the effort they put into their performance (Monique & Eduardo, 2006). In many empirical studies, self-efficacy has been associated with self-regulation. For example, Yusuf (2011) conveyed that self-efficacy beliefs and self-regulated learning strategies were noted to be significantly related to each other. Furthermore, self-efficacy beliefs and self-regulation strategies were found to be closely related among Chinese students in learning English as a foreign language (Wang et al., 2012). As a result of quantitative analysis, Li (2016) found a significant positive correlation between self-efficacy and the four dimensions of English autonomous learning ability for non-English major college students.

As a core component of self-regulation, self-efficacy contributes to cognitive engagement and affects the forethought, performance, and self-reflection phases of self-regulation. Research indicated that low self-efficacy beliefs were associated with being more likely to quit when facing difficulties, and with more procrastination when it comes to assignments (Schunk, 1990). In summary, previous research has demonstrated that self-efficacy has an important influence on self-regulation.

2.4. Self-efficacy as a mediator between perceived teacher support and self-regulation

According to the social cognitive theory, environmental and personal influences interact with one another (Zimmerman, 1989). Teacher support is an essential environmental factor for students, and self-efficacy is a personal influence in the self-regulation framework.

Over the past few decades, a growing body of research has found a positive relationship between perceived teacher support and self-efficacy. Environmental structuring (e.g., creating a study area), seeking social assistance from teachers (e.g., regarding an assignment), and seeking or reviewing information (e.g. from literary sources) are all strategies used by self-regulated learners, according to Zhao and Liu (2009). Further, teacher-expectancy perception was positively related to student self-efficacy in English in junior high school (Zhang & Zhang, 2008). They emphasized that lowly efficacious students found it difficult to perceive teachers' expectancy and were more likely to doubt themselves, whereas highly efficacious students were capable of comprehending teachers' expectancy and more positive feelings, allowing them to believe in their own ability and actively come up with solutions.

The emotional support of the teacher, including encouragement, attention, and concern, significantly influenced academic self-efficacy (Jia, 2012). Whenever students feel that their teachers are encouraging and paying attention to them, they would gain more self-confidence and become more convinced of their ability to succeed academically. At the same time, the manifestation of the teacher's concern about students' hardness in the study was a greater booster to beneficial interaction and harmonious relationships between teacher and students. Using a 1-year longitudinal design, Jungert and Koestner (2015) identified that teachers' autonomy support positively predicted self-efficacy among high school students. Hence, teacher support has positive effects and can promote students' self-efficacy.

The distant relationship between teachers and students in the online learning environments makes students have more need for teachers' supportive behaviors because online learners lack self-monitoring and face-to-face communication with the teacher, teacher support has become a bit crucial for them to learn effectively and initially (Jiang et al., 2018). Online

learners perceived teacher support can enhance their satisfaction and mobilize their passion, more importantly, it plays a key part in increasing learning engagement and continuing to regulate learning strategies (Yin & Xu, 2016; Schuitema et al., 2016).

Zimmerman (1989) posited that students can be taught or prompted to become more self-regulated learners by acquiring teachers' support and by enhancing perceptions of self-efficacy. In addition, using self-regulated learning strategies allows students to be more in control of both their own behavior and their immediate environment. Self-efficacy is a personal variable that influences learners' self-regulation, whereas teacher support is an external resource that impacts learners' self-regulation. When learners obtain good external resources (teacher support), the personal factor (self-efficacy) will be activated to improve learners' self-regulation.

Therefore, we can come to the conclusion that learners' self-efficacy probably plays a mediating role in the relationship between perceived teacher support and self-regulation in online learning.

2.5. Research hypotheses

Based on the aforementioned theoretical framework, the hypothesized model (Figure 1) was constructed with online English learners' perceived teacher support as the predictor, their self-efficacy as the mediating variable, and their self-regulation as the outcome variable. Therefore, four hypotheses were put forward in the following:

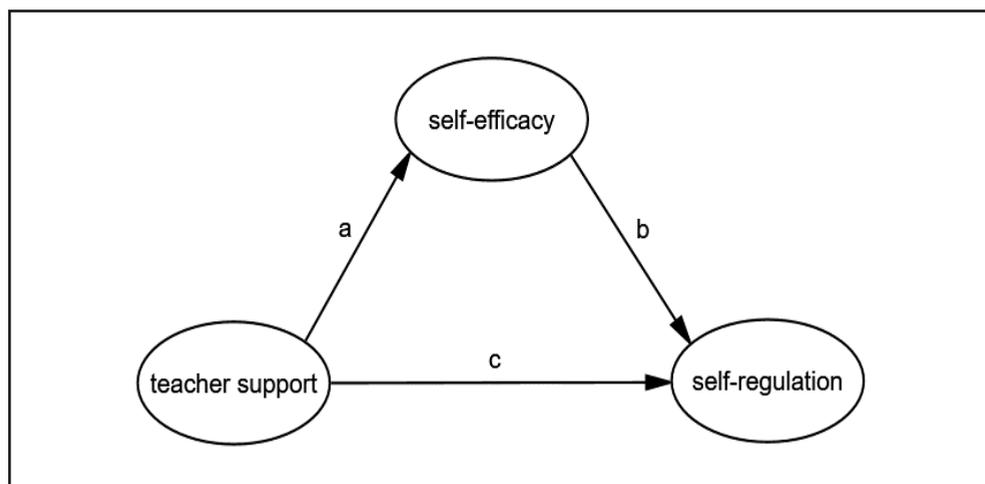


Figure 1. The hypothesized model

H1: Online English learners' perceived teacher support positively predicts their self-efficacy (see Figure 1, Path a).

H2: Online English learners' self-efficacy positively predicts their self-regulation (see Figure 1, Path b).

H3: Online English learners' perceived teacher support positively predicts their self-regulation (see Figure 1, Path c).

H4: Online English learners' self-efficacy mediates the relationship between their perceived teacher support and self-regulation (see Figure 1, Path a→b).

3. METHOD

3.1. Research Design

We adopted quantitative method in the present study. The purpose of the quantitative data in the study is to describe the current situation of online English learners' perceived teacher support, English learners' self-efficacy and online self-regulated learning. At the same time, correlational design is also used to explore the relationship among these three variables.

3.2. Participants

Convenience sampling (Punch, 2005) was adopted to investigate 220 undergraduates in a Chinese university with questionnaires. The participants chosen for this study were undergraduates who enrolled in the "Business English Writing and Practice" course having a blended teaching on the Chinese University MOOC platform in a university of science and engineering in China. They learned the "Business English Writing and Practice" course on the Chinese University MOOC platform, accordingly, completed learning tasks every week, and spent more than 4 hours per week on self-regulated English learning in a semester. The students watched the course videos to learn content, finished writing assignments and tests, and had a discussion on the Chinese University MOOC platform every week. At the same time, the teacher met students for two hours in the classroom to provide some help in their online English learning. They were invited to take part in this study at the end of the semester in 2021.

Among the participants, 38% of are males ($n = 84$) and 62% are females ($n = 136$) among these subjects. There were 30% freshmen ($n = 65$), 16% sophomores ($n = 36$), 46% juniors ($n = 101$), and 8% seniors ($n = 18$). All the samples are from the following disciplines: humanities ($n = 58$, 26%), economics and management ($n = 41$, 19%), science and engineering ($n = 121$, 55%).

3.3. Instruments

This research employed the questionnaire to collect a wide of data and surveyed English learners' perceived teacher support, self-efficacy, and self-regulation in online learning. The questionnaire was composed of 27 items. All items were in Chinese and used a five-point Likert-type items ranging from 1 (completely disagree) to 5 (completely agree).

3.3.1. Online learner-perceived teacher support

24 items for online English learners' perceived teacher support were adapted from the Online Learner-Perceived Teacher Support (OLTS) (Jiang et al., 2018). The original

questionnaire was faced with all online learners, so the items were modified by changing the statements to more specifically targeting online English learners. Using a 5-point Likert-type items, participants responded to questions on how strongly they agree or disagree with teachers' support of them. The four subscales were designed to measure online English learners' perceived teacher support: emotional support, social support, intellectual support, and instrumental support. The instrument showed high reliability in the present sample (Cronbach' s alpha=0.968).

3.3.2. *English self-efficacy*

32 items for online English learners' self-efficacy were adopted from Questionnaire of English Self-Efficacy (QESE) (Wang et al., 2013). Participants were asked to respond on a five-point items, ranging from 1 (I cannot do it at all) to 5 (I can do it very well), about their online English self-efficacy beliefs. In every item, students indicate their ability to perform a given task using English in the areas of listening, speaking, reading, and writing. Questionnaire of English Self-Efficacy (QESE) includes self-efficacy for listening, self-efficacy for speaking, self-efficacy for reading, self-efficacy for writing. The internal consistency (Cronbach' s alpha)was as high as 0.974.

3.3.3. *Online self-regulated learning*

24 items for English learners' online self-regulation were adapted from Online Self-regulated Learning Questionnaire (OSLQ) designed by Barnard et al. (2009). The questionnaire items were changed slightly by adding "English" to suit online English learners. Online self-regulated English learning (OSEL) measures six factors, including the goal setting, environment structuring, time management, help seeking, task strategies and self-evaluation. All items are rated on a five-point Likert-type items, from 1 (I don't agree at all) to 5 (I strongly agree). The data in the present study showed that Online self-regulated English learning (OSEL) has a desirable reliability (Cronbach' s alpha=0.955).

3.4. **Data analysis**

The collected data through questionnaire were imported into Microsoft Excel format and then put into SPSS 25.0 and AMOS 25.0. The first step was to test the reliability and validity of the instruments. Next, descriptive statistics were performed using mean, standard deviation, and frequency to reflect the participants' general perceptions of self-efficacy, teacher support, and self-regulation.

To test the first, second, and third research hypotheses, Pearson's correlation analysis was performed to analyze the relationships among online English learners' perceived teacher support, self-efficacy, and self-regulation. As for the fourth research hypothesis, structural equation modeling (SEM) was used to test the hypothesized model and the moderating effect of self-efficacy between online English learners' perceived teacher support and self-regulation.

4. RESULTS

4.1. Reliability and validity analysis

Reliability analysis and confirmatory factor analyses were conducted to measure the internal consistency reliability, convergent validity and discriminant validity of Online Learner-Perceived Teacher Support (OLTS), Questionnaire of English self-efficacy (QESE), and Online self-regulated English learning (OSEL).

The alpha values of three scales were above 0.9, showing satisfactory overall reliability. In addition, the alpha value for each latent factor is greater than 0.7, again indicating satisfactory internal consistency. Furthermore, all factors had an Average Variance Extracted (AVE) value ranging from 0.41 to 0.55, higher than the cut-off value of 0.4. The Composite Reliability (CR) values ranged from 0.6 to 0.79, also higher than the cut-off value of 0.6. As a result, the questionnaires were sufficient in terms of reliability and validity. Besides, the model fit indices for OSEL, OLTS and QESE in the CFA ($\chi^2 = 202.001$ [159.577, 87.866]; $df = 91$ [90, 44]; $p < 0.001$; $\chi^2/df = 2.22$ [1.773, 1.997]; CFI = 0.915 [0.963, 0.963]; TLI = 0.902 [0.957, 0.954]; IFI = 0.916 [0.963, 0.963]; RMSEA = 0.075 [0.059, 0.067]) all fell within the acceptable range.

4.2. Descriptive statistics

The descriptive statistics of online English learners' perceived teacher support, self-efficacy, and self-regulation as well as each factor are summarized in Table 1.

Table 1. *Descriptive statistics*

SCALES AND FACTORS	MEAN	SD
<i>Online Learner-Perceived Teacher Support (OLTS)</i>	3.53	0.53
Emotional support (ET)	3.47	0.60
Social support (S)	3.46	0.58
Intellectual support (I)	3.57	0.67
Instrumental support (IS)	3.56	0.65
<i>Questionnaire of English self-efficacy (QESE)</i>	3.44	0.50
Self-efficacy for listening (SL)	3.39	0.70
Self-efficacy for speaking (SS)	3.32	0.63
Self-efficacy for reading (SR)	3.43	0.66
Self-efficacy for writing (SW)	3.47	0.61
<i>Online self-regulated English learning (OSEL)</i>	3.43	0.48
Goal setting (GS)	2.86	0.68
Environment structuring (ES)	3.46	0.81
Time management (TM)	3.39	0.71
Help seeking (HS)	3.57	0.71
Task Strategies (TS)	3.32	0.67
Self-evaluation (SE)	3.44	0.68

The mean of students' perceived teacher support was 3.53, which demonstrated that students had a stronger perception of support from their teacher. For students' perceived teacher for support, the mean of "intellectual support" was up to 3.57, displaying that students felt a good sense of satisfaction in learning knowledge of the online course. The mean of "social support" was 3.46, which showed that interaction between students and teacher or among students was not very frequent.

The mean of self-efficacy was 3.44, which manifested that students were confident about learning online English. In four fundamental skills, the mean of "self-efficacy for writing" was 3.47, reflecting that students believed in their ability to write formal and normative English business letters. The mean of "self-efficacy for speaking" was as low as 3.32. Students had less faith that they could understand knowledge when the teacher gave the lecture online.

The mean of self-regulation was 3.43, which indicated that online English learners had high self-regulated learning abilities. Among six factors of online self-regulation, the mean of "help seeking" was highest, showing that online learners actively asked their classmates or teacher for help when they confronted difficulties. The mean of "goal setting" was lowest, which reflected that students seldom set goals for the online English course.

4.3. Correlation analysis

Person's correlation analyses were conducted to reveal the relationships between online learners' perceived teacher support, self-efficacy, and self-regulation. Firstly, "emotional support", "social support", "intellectual support" and "instrumental support" factors of online English learners' perceived teacher support was significant in relation to all online self-regulated English learning factors, with correlation coefficients ranging from 0.417 to 0.639 ($p < 0.01$). Secondly, "emotional support", "social support", "intellectual support" and "instrumental support" factors of online English learners' perceived teacher support had a positive correlation with all the factors of self-efficacy, with correlation coefficients ranging from 0.206 to 0.567 ($p < 0.01$). Thirdly, English listening, speaking, reading, and writing self-efficacy had a positive relationship with goal setting, environment structuring, time management, task strategies, help seeking, and self-evaluation of self-regulated learning, with correlation coefficients ranging from 0.230 to 0.567 ($p < 0.01$).

4.4. Structural model

Three latent variables were included in the structural model, namely online learners' perceived teacher support, self-efficacy, and self-regulation, and fourteen observed variables, namely emotional support, social support, intellectual support, instrumental support, self-efficacy for speaking, self-efficacy for listening, self-efficacy for reading, self-efficacy for writing, goal setting, time management, task strategies, environment structuring, help seeking and self-evaluation. The structural modeling results indicated that the hypothesized model fit the data well ($\chi^2 = 172.46$, $df = 74$, $\chi^2/df = 2.33$, CFI = 0.946, IFI = 0.947, TLI = 0.934, and RMSEA = 0.078).

Baron and Kenny (1986) suggested using a causal steps strategy to examine the first condition of mediation with regard to Hypotheses 1 and 2. As shown in Table 2, the correlation coefficients indicated that online English learners' perceived teacher support was

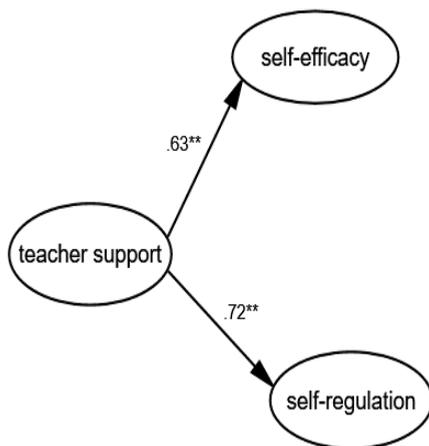
positively and significantly related to self-efficacy ($r = .698, p < .01$), and was also positively and significantly related to online self-regulation ($r = .873, p < .01$).

Table 2. *The correlation among PTS, SEE and OSR*

	PTS	SEE	OSR
PTS	1		
SEE	.698**	1	
OSR	.873**	.839**	1

Note: (1) PTS = perceived teacher support, SEE = self-efficacy, OSR = self-regulation; (2) ** $p < 0.05$; * $p < 0.01$

In addition, the results of the direct effect of online English learners' perceived teacher support on self-efficacy (standardized direct effect = .63, $p < .01$, see Fig. 2), and the direct effect of online English learners' perceived teacher support on self-regulation (standardized direct effect = .72, $p < .01$) were both statistically significant. Hypotheses 1 and 2 were thus supported.

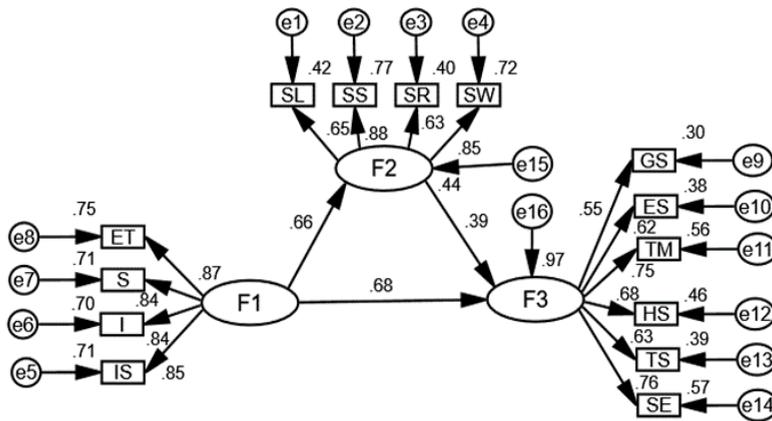


Note: ** $p < 0.05$; * $p < 0.01$

Figure 2. Direct effects of teacher support on self-efficacy and self-regulation

For testing hypothesis 4, we measured the second condition of mediation. As the results showed in Table 2, the correlation coefficients indicated that online English learners' self-efficacy was positively and significantly related to online self-regulation ($r = .839, p < .01$). Hypothesis 3 was thus supported. In addition, the results of the direct effect of online English learners' perceived teacher support on self-efficacy (standardized direct effect = .66,

$p < .01$, see Fig. 3), the direct effect of online English learners' perceived teacher support on self-regulation (standardized direct effect = $.68$, $p < .01$), and the direct effect of online English learners' self-efficacy on self-regulation (standardized direct effect = $.39$, $p < .01$) were all statistically significant. Therefore, the second condition of mediation in our proposed model was supported.



Note: F1 = teacher support; F2 = self-efficacy; F3 = self-regulation

Figure 3. Final model

To investigate the indirect effects of the dependent variable through the mediators, the bootstrapping and bias-corrected percentile bootstrapping were conducted at a 95% confidence interval using 5,000 bootstrap samples (Taylor, MacKinnon, & Tein, 2008).

Table 3. Total, the indirect and direct effect of the final model

	POINT ESTIMATE	PRODUCT OF COEFFICIENTS		BOOTSTRAPPING				TWO-TAILED SIGNIFICANCE
				PERCENTILE 99% CI		BIAS-CORRECTED PERCENTILE 99% CI		
				SE	Z	Lower	Upper	
Total effect	0.682	0.093	7.33	0.504	0.873	0.504	0.874	0.00(**)
Indirect effect	0.188	0.056	3.36	0.101	0.319	0.106	0.334	0.00(**)
Direct effect	0.494	0.091	5.43	0.321	0.675	0.327	0.689	0.00(**)

Note: standardized estimating of 5,000 bootstrap sample, ** $p < 0.01$

According to Preacher and Hayes (2008), the confidence interval of the lower and upper bounds was calculated to test whether the indirect effects were significant. As shown in Table 3, based on the bootstrap test results, there was a significant mediation effect between teacher support and self-regulation for online English learners' self-efficacy (standardized indirect effect = .188, $p < .01$). Additionally, Z value for total effect, indirect effect, and direct effect was greater than 1.96, and the percentage 99% confidence intervals and bias-corrected percentage 99% confidence intervals did not contain 0, which indicated that total effect, indirect effect, and direct effect of final model reached significance level (Sobel, 1982). Hypothesis 4 was thus supported.

5. DISCUSSION

This study aims to make a deep exploration of the relationships among English learners' perceived teacher support, self-efficacy, and self-regulation in the online learning environment. The structural equation model was established and examined with a good model fit. The main contribution of this study is thus this model, which has a strong theoretical foundation and can be used to assess the influences of teacher support on online self-regulation by self-efficacy in China. Although several past studies have reviewed the relationship between learners' perceived teacher support and self-regulated learning, this may be the first to investigate the mediating effects of English learners' self-efficacy between their perceived teacher support and self-regulation in an online learning context. Here are the four major findings of this study.

Firstly, online English learners' perceived teacher support significantly predicted their self-efficacy. Learners who perceived emotional support, social support, intellectual support, and instrumental support from their teacher were more likely to view all aspects of their online self-regulation positively. This research result is consistent with Yüce's research that teachers can help students enhance their self-efficacy beliefs and communication competences by supporting positive learning environments (Yüce, 2023). Their tendency was to make learning-related goals, manage their time, and adapt their methods of learning accordingly. Additionally, they seemed more likely to seek out help from their classmates or teachers and to evaluate their learning to determine the pace and sequence they should follow. Students who perceive teacher support usually have a high level of self-efficacy. Conversely, those who don't perceive teacher support lack confidence. Students' belief in their ability to finish learning tasks may generate good learning performance when teachers provide students with emotional, social, intellectual, and instrumental support.

Secondly, online English learners' perceived teacher support significantly predicted their self-regulation. Learners who felt teacher support were more likely to be confident of their English listening, speaking, reading, and writing self-efficacy. If learners perceived that English teacher not merely imparted knowledge but also offered various support, they would be more inclined to hold more positive views regarding their English learning self-efficacy. With respect to the relationship between online English learners' perceived teacher support and their self-efficacy, previous literature has reported similar findings. Yu (2019) found that students with more teacher support have high academic self-efficacy and make more efforts to get good grades. This study confirms that teachers' support is important for the

development of English self-efficacy among learners. It also validated that environmental factors, in particular, teacher support, played a significant role in determining self-efficacy.

Thirdly, online English learners' self-efficacy significantly predicted their self-regulation. When online learners had confidence in English listening, speaking, reading, and writing, they would be more inclined to engage in experiences of utilizing self-regulated learning strategies. This conclusion echoes the findings of the previous studies which found that self-efficacy is a powerful factor for the development of self-regulation (Zimmerman, 2000; Li & Yu, 2008). English learners' self-efficacy predicts independent learning abilities, including setting up goals, using learning strategies, evaluating their progress, and becoming motivated to learn. Those who have a relatively high level of self-efficacy utilize cognitive and metacognitive strategies more effectively to manage learning materials, monitor, and manage external stimulation, and persist when faced with obstacles. To attain learning/mastery goals, they adjust their strategies consciously throughout the learning process (Komarraju & Nadler, 2013).

Finally, online English learners' self-efficacy mediates the relationship between their perceived teacher support and self-regulation. The finding was generally consistent with this of Zimmerman (1989), which portrayed that environmental influence (teacher support) enhanced students' self-regulated learning ability through the promotion of their self-efficacy. As mentioned above, online learners believe they are capable of effectively learning English speaking, listening, reading, and writing once they gain teacher support. Then, when being more confident, online English learners would take the initiative to utilize self-regulated learning strategies.

6. CONCLUSION AND IMPLICATIONS

In general, the current study revealed that teacher emotional, social, intellectual, and instrumental support contributed to the improvement of EFL learners' self-efficacy in learning English, and further increased their capacity for goal setting, environment structuring, time management, help seeking, task strategies, and self-evaluation.

The findings from the present study provided several implications for online English teachers, online English learners, and the Chinese University MOOC platform. Firstly, the teacher should attach importance to offering multiple support for students. Emotional support can be expressed by interactive activities. In the process of interaction, the teacher should properly encourage them to adapt to online learning.

Secondly, it is important for English learners to promote their self-efficacy which plays a critical role in enhancing their self-regulated learning ability. According to Bandura (1997), the main factors that affect the formation of self-efficacy are: direct experiences, vicarious experiences, verbal persuasion, and emotion arise. Therefore, students should predict the level of development that may be achieved, and finish reasonably difficult teaching tasks to stimulate their own enthusiasm and increase successful experience in learning.

Thirdly, the Chinese University MOOC platform needs to construct supplementary mechanisms to forge convenient channels for teacher support and cultivate students' self-regulated learning ability. The teacher should take advantage of students' learning behaviors data on the Chinese University MOOC platform to facilitate students realizing personalized and self-regulated learning.

7. LIMITATIONS AND FUTURE DIRECTIONS

Although the significant relationship among online English learners' perceived teacher support, self-efficacy, and self-regulation was found in a positive way and this study offers a fine analysis and significant findings, certain limitations still should be addressed moving forward.

Firstly, the participants of this study are all undergraduates from one university in north China, but students from other universities in China are not involved. Future studies will be suggested to sample as widely as possible and try to include subjects from various types of universities. Secondly, the sample of 220 subjects in the present study had a semester-long experience of online learning. Future research could address this issue by finding students who will study longer in the online learning environment.

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