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Relationship among Perceived Teacher Support, Academic Self-Efficacy, and Online Learning Engagement in College EFL Learning

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Abstract

In the era of education digitalization and informatization, online English learning has already become normalized, in which students' online learning engagement determines their English learning effectiveness. Boosting students' involvement in online English learning is a crucial task of student-centered instruction, and is highlighted in current pedagogical initiatives for English as a Foreign Language (EFL) teaching. Although perceived teacher support and academic self-efficacy have been identified as robust predictors of students' learning engagement, there is limited research investigating the relationship among perceived teacher support, academic self-efficacy, and online learning engagement in the college EFL learning context. With 501 non-English major undergraduates as participants, this study employed quantitative and qualitative research methods to explore the relationship among perceived teacher support, academic self-efficacy and online learning engagement in college EFL learning. The research findings showed that: 1) participants' perceived teacher support and online learning engagement are at a high level, and their academic self-efficacy is at a medium to high level; 2) the correlations between perceived teacher support, academic self-efficacy and online learning engagement are significant; 3) the structural equation modeling (SEM) results reveal that perceived teacher support and academic self-efficacy directly and positively predict online learning engagement. Moreover, academic self-efficacy plays a mediating role in the relationship between perceived teacher support and online learning engagement. In light of the above findings, this paper presents corresponding suggestions on how to enhance perceived teacher support so as to bolster EFL learners' academic self-efficacy, boost their online learning engagement, and consequently contribute to their enhanced subjective well-being and improved academic achievement.

Keywords

Online Learning Engagement, Perceived Teacher Support, Academic Self-Efficacy, Mediating Role

1. Introduction

Prior to the pandemic, online learning, with the rapid evolution of information technology in education, was already gaining increasing attention, but it was primarily used as a complementary tool to traditional classroom teaching. However, with the outbreak of COVID-19 pandemic in 2020, online education has developed quickly into one of the most widely accepted modes of teaching. During the pandemic, the Ministry of Education of the People's Republic of China implemented a series of emergency measures, including shutting down schools and initiating online learning sessions, also known as "Suspending Classes without Stopping Learning". Consequently, approximately 30 million university students, who were in quarantine, experienced an unexpected and unscheduled transition, shifting from the traditional face-to-face learning environment to remote online learning within their homes. Since then, online learning has become the norm. Many offline courses are gradually transformed into pure online ones or hybrid online and offline ones, which is particularly evident in Chinese higher education. The nationwide large-scale online education practice has further spurred the development of online learning in China, while also revealing a series of noticeable problems in regard to online learning quality among college students, such as low engagement, low completion rate of online courses (Wang et al., 2021a). Under this background, how to improve students' online learning engagement and identify the potential affecting factors have also become a research hot spot (Jang et al., 2021).

Learning engagement refers to the extent to which learners actively participate in learning activities (Newmann, 1992). It is perceived as a crucial measuring indicator of students' progress made toward desired academic outcomes (Henrie, et al., 2015), and has a significant impact on students' academic achievements (Zhang, 2022). Prior researches have shown that learning engagement can be influenced by various factors such as teacher support (Liu et al., 2018) and learners' self-efficacy (Fredricks et al., 2004). Social support theory suggests that external supportive behaviors have a real and direct impact on a person's sustained engagement (Hilkevitch, 1977). Teacher support, as an important component of social support was found to be a key factor influencing students' learning engagement (Wang et al., 2017). The more teacher support students perceive, the higher their investment in online learning (Rao & Wan, 2020). Additionally, teacher support is also influential in improving learners' social-emotional well-being (Liu et al., 2018), then enhancing their academic self-efficacy (Villegas-Puyod et al., 2020), motivating them to be more engaged in learning activi-

ties, and benefiting their academic success.

Furthermore, academic self-efficacy, in addition to being correlated with teacher support, is also one of the widely researched individual factors contributing to students' success in language learning (Cotterall, 1999). Students with higher academic self-efficacy are documented to be more likely to invest effort and time, so they are more actively engaged in language learning activities. Nevertheless, in the online learning environment, whether supportive behaviors from teachers could bolster students' online learning engagement through the mediating role played by academic self-efficacy deserves to be further explored.

The existing literature indicates correlations between learning engagement, teacher support, and academic self-efficacy, and academic self-efficacy mediates the relationship between teacher support and learning engagement. However, support for this mainly comes from the research based on math or science classroom teaching. There is limited research investigating the relationships among perceived teacher support, academic self-efficacy and online learning engagement in EFL learning. Besides, domestic research on the relationships among the three variables is mainly theoretical, with little empirical study, let alone research centering on EFL learning and collecting data from non-English major undergraduates. Hence, the purpose of this study is to explore the relationships among perceived teacher support, academic self-efficacy and online learning engagement in college EFL learning. More specifically, the study intends to address the following three questions:

1) What is the status quo of college EFL learners' perceived teacher support, academic self-efficacy and online learning engagement?

2) Are there any correlations between perceived teacher support, academic self-efficacy, and online learning engagement?

3) To what extent do college EFL learners' perceived teacher support and academic self-efficacy predict their online learning engagement?

2. Literature Review

2.1. Teacher Support

Teacher support is commonly regarded as an essential source of social support in students' academic pursuits (Ghaith, 2002), which can be divided into perceived teacher support and received teacher support. The assessment of students' perceived teacher support is a common choice because perceived teacher support is proven to be more determinative of students' performance and subjective well-being than received teacher support (Chen, 2008). Scholars have varied views with regard to the classification of students' perceived or received supportive behaviors from their teachers. Ghaith (2002) defined teacher support as students' perception of informational, appraisal and emotional assistance given by their teachers. Zhang et al. (2021) defined teacher support as academic support and emotional support. In online learning, teacher support perceived by students mainly includes emotional support, autonomous support, and cognitive

support (Liu et al., 2017), or emotional support, knowledge-based support, social support, and instrumental support (Jiang et al., 2018). Despite the variation in defining teacher support, a general agreement is that when teacher support is perceived by students, students may not only get access to assistance to achieve goals but also liking and caring (Ghaith, 2002). In this thesis, perceived teacher support includes three dimensions, including autonomy support, cognitive support and emotional support. To be more specific, autonomy support refers to providing learners with sufficient freedom to choose the designed tasks, the learning content and problem-solving methods so as to enhance their learning autonomy; cognitive support refers to providing learners with learning challenges, learning strategies, and exercises with appropriate difficulty; emotional support refers to providing learners with positive attention and emotional support to help them cope with academic pressure and challenges (Liu et al., 2017).

2.2. Learning Engagement

Learning engagement refers to a student's degree of active participation in a learning activity (Newmann, 1992). Schaufeli et al. (2002) were the first ones proposing the concept of learning engagement and identifying learning engagement as a multi-dimensional construct and defined it as a continuous, positive emotional state in the learning process with the characteristics of vigor, dedication and absorption. Early researchers tended to conceptualize learning engagement as a two-dimensional construct, which contained behavioral (i.e. classroom participation) and emotional (or affective) dimensions (Finn, 1993). More recently, learning engagement was widely regarded as a three-dimensional construct, which reflected students' efforts (behavioral engagement), strategic thinking (cognitive engagement) and enthusiasm (emotional engagement). To date, scholars in fields such as education and psychology at home and abroad have conducted a body of research on learning engagement from the perspectives of definition, classification, and influencing factors, and provided much valuable research findings. Engagement in foreign language learning has also attracted increasing attention (Guo, 2018), but there are limited research results on learning engagement in online foreign language teaching. In light of this, this thesis intends to investigate college students' online learning engagement in EFL learning from three dimensions: behavioral engagement, cognitive engagement and emotional engagement.

2.3. Academic Self-Efficacy

Self-efficacy is viewed as personal judgments of one's abilities in whether one can use skills to achieve specific goals (Bandura, 1997), which, for the last four decades, has sparked considerable enthusiasm among researchers at home and abroad who are concerned with how self-conception affects human cognition and behaviors. In fact, Self-efficacy does not only have an impact on people's cognitive and affective structures, but also help determine how much efforts and

time they put into the task (Pajares & Miller, 1995). Most scholars argued that self-efficacy needed to be integrated into specific disciplines. In academic settings, academic self-efficacy can be interpreted as the learners' belief in their capability with regard to the completion of academic assignments with success (Bandura, 1997). Students with high academic self-efficacy are inclined to devote more effort and energy and be more persistent in completing their selected academic tasks. Likewise, in the EFL learning, academic self-efficacy refers to the extent to which EFL learners feel capable of attaining English learning goals and achieving satisfying English levels in certain English learning activities. In this regard, students with high level of academic self-efficacy tend to have a stronger belief or confidence in using English to complete various learning tasks. On the contrary, less efficacious EFL students have a weak belief and low confidence in using English to perform various tasks.

2.4. The Relationship between Teacher Support and Learning Engagement

It has been evidenced that there is a correlation between teacher support and learning engagement (Yang et al., 2021). According to ecosystem theory, perceived teacher support, as an important component of the school's micro-system, has a significant impact on students' confidence, values, and behaviors (Zheng & Zhang, 2008). Teacher support perceived by the students can be understood as their perception of teachers' care about their learning and life (Babad, 1990). Influences from teachers, as a contextual factor, were framed within several theoretical frameworks, such as social support theory and self-determination theory. According to social support theory, people perceive supportive behaviors from their social environment as universally beneficial and contributing to their psychological well-being and development (Berkman & Syme, 1979). Based on self-determination theory, the external environment can boost their internal motivation, facilitate the internalization of external motivation, and sustain engagement by satisfying three psychological needs: autonomy, competence and belonging (Deci & Ryan, 1985). Generally speaking, teacher support, as a form of social support, is very likely to influence students' learning engagement. Previous researches have reported that perceived teacher support can contribute to students' learning engagement (Roorda et al., 2017; Strati et al., 2017). Wentzel (1997) discovered that perceived teacher support can enhance students' willingness to engage in learning tasks behaviorally and cognitively, and perceived teacher support was positively related to students' interest in classroom interaction engagement. Does perceived teacher support promote students' online learning engagement? Shea and Bidjerano (2009) found that teacher support was conducive to enhance online learners' social presence and improve their online learning engagement. A majority of existing researches on online learning engagement indicate that influences from teacher, such as engagement, attitudes, expectations, teaching mode selection, learning task design or learning feedback can all affect the learning engagement of online learners

(Yin & Xu, 2017). As evidenced by these studies, perceived teacher support can lead to the improvement of students' learning engagement.

2.5. The Mediating Role of Academic Self-Efficacy

Academic self-efficacy is one of the significant influencing factors of students' learning engagement (Fredricks et al., 2004). The latest studies have suggested that students with higher academic self-efficacy tend to put into more effort and time, thus being more engaged in language learning. Han et al. (2021) conducted a study to investigate the sustainable development of university EFL learners regarding their engagement, self-efficacy, and satisfaction in online learning environments during the COVID-19. By taking 438 college EFL learners as the sample, they discovered that academic self-efficacy was positively associated with students' behavioral engagement, emotional engagement and learning satisfaction. Additionally, academic self-efficacy has been regarded as a significant mediator between the learning environment and learning outcomes due to its close relationship with learning environmental factors and learning outcomes. For example, Liu et al. (2018) conducted a research which indicated that perceived teacher support could not only directly influence the four-dimensional engagement construct (i.e., behavioral, cognitive, social and emotional engagement), but also affect it indirectly through the mediation of academic self-efficacy and enjoyment. Taking 17,341 Chinese middle school students as subjects, Wang et al. (2021b) found that students' learning adaptability could positively predict their English learning engagement through the mediating effect of English learning self-efficacy.

2.6. Summary

Through a review of the existing literature, quite a few studies have demonstrated that there are direct or indirect relationships between teacher support, learning engagement, and self-efficacy. However, these findings should be interpreted with an awareness of their limitations. First of all, there is a lack of research based on the setting of EFL learning, not to mention the EFL learning in the online learning environment. Most of the research on perceived teacher support, academic self-efficacy, and learning engagement has focused on math or science classroom learning contexts. Secondly, there is limited research that combines the three variables: perceived teacher support, learning engagement and academic self-efficacy together. Most of the previous studies are limited to two variables. Thirdly, little previous research has been conducted with university students as the target population. Most of the known studies have been conducted on middle school or high school students. Given that perceived teacher support, academic self-efficacy, and online learning engagement are pivotal indicators of college EFL learners' academic and psychological functioning, there is an urgent need for more in-depth investigation on the internal mechanism among these three variables with college students as the target.

Accordingly, this study aims to examine the relationships among perceived teacher support, academic self-efficacy and online learning engagement in college EFL learning. It intends to provide a valuable reference for college English teachers, and relevant researchers to improve students' online learning engagement under the background of the deep integration of education and information technology. A hypothetical model (Figure 1) based on the literature review is given and the hypotheses of this study are as follows.

Hypothesis 1 (H1): Perceived teacher support is directly and positively associated with online learning engagement.

Hypothesis 2 (H2): Perceived teacher support is directly and positively related to academic self-efficacy.

Hypothesis 3 (H3): Academic self-efficacy has a direct and positive correlation with online learning engagement.

Hypothesis 4 (H4): Academic self-efficacy mediates the relationship between perceived teacher support and online learning engagement.

3. Research Design

3.1. Participants

A total of 501 non-English major college students from Zhejiang Yuexiu University (ZYU), a private university in southern China where the author works, participated in this study. An effective sample of 465 students was obtained after eliminating the invalid questionnaires (92.8% effective rate).

To be specific, the basic information of the participants is shown in Table 1. Of the 465 samples, 22.15% (N = 103) were male, and 77.85% (N = 362) were female. It should be noted that since ZYU is a language university, the ratio of boys to girls is always uneven. 23.23% (N = 108) were freshmen, 49.25% (N = 229) were sophomores, 18.92% (N = 88) were juniors and 8.60% (N = 40) were seniors. Besides, the participants' majors were distributed in 10 disciplines, including Chinese language and literature (27.72%), Communication (15.48%), Korean (13.76%), Editing and publishing (13.34%), International trade (12.47%), Hotel management (10.97%), and other majors (12.26%).

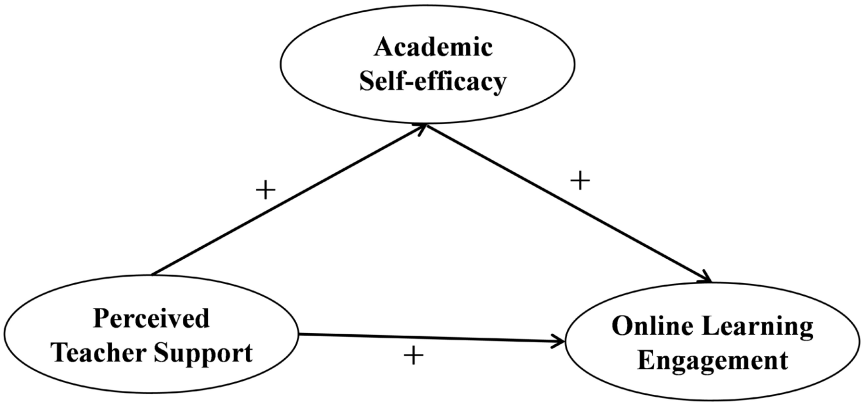

Figure 1. Hypothesized research model.

Table 1. Demographic statistics (N = 465).

Items	Options	Numbers	Percentage
Gender	Male	103	22.15%
	Female	362	77.85%
Grade	Freshmen	108	23.23%
	Sophomore	229	49.25%
	Junior	88	18.92%
	Senior	40	8.60%
Major	Chinese Language and Literature	101	21.72%
	Communication	72	15.48%
	Korean	64	13.76%
	Editing and Publishing	62	13.34%
	International Trade	58	12.47%
	Hotel Management	51	10.97%
	Others	57	12.26%

3.2. Measuring Instrument

In this study, three scales are encompassed in the questionnaire, namely the *Perceived Teacher Support Scale*, *Self-Efficacy in English Learning Scale*, and *Online Learning Engagement Scale*.

The variable "perceived teacher support" was measured using *Online learners' perceived teacher support* (Liu et al., 2017). The scale is an 11-item self-report scale containing three dimensions: autonomy support (four items, e.g., "*My English teacher gives me enough time to complete the online learning according to my own learning pace.*"), cognitive support (four items, e.g., "*My English teacher provides me with abundant Learning resources to help extend my English learning.*"), emotional support (three items, e.g., "*My English teacher cares about my learning.*"). The scale has been proved to be reliable and valid among Chinese college students in previous studies (Liu et al., 2017; Liu & Wang, 2022). The participants were requested to react to the items on a five-point Likert scale, from 1 (completely not true of me) to 5 (completely true of me) depending on their felt teacher support. Higher scores are indicative of higher levels of perceived teacher support.

The variable "academic self-efficacy" was assessed by using the *Self-Efficacy in English Learning Scale*. The scale was adapted from the Academic Self-efficacy Scale by Liang (2000), which has been extensively validated in the previous studies, showing adequate concurrent and construct validity. The scale is a two-dimension scale consisting of 18 items: self-efficacy in learning ability (nine items, e.g., "*I believe I have the ability to learn English well.*") and self-efficacy in learning behavior (nine items, e.g., "*I always take notes while learning English online.*"). Students were requested to respond to the statements on a 5-point

scale from 1 (completely not true of me) to 5 (completely true of me). Thus, as an indicator of academic self-efficacy, higher scores indicate higher levels of self-efficacy in online English learning.

The variable "online learning engagement" was measured using *Online Learning Engagement Scale* (Liu et al., 2017). The scale was compiled by Sun & Rueda (2012) and translated and revised by Liu et al. (2017). The revised scale is adapted to Chinese college students and was proven to have good reliability and validity. The scale consists of three dimensions: behavioral engagement (four items, e.g., "*I complete the online learning tasks on time.*"), cognitive engagement (five items, e.g., "*While learning online*, *I ask myself questions to make sure that I understand the learning contents.*"), emotional engagement (6 items, e.g., "*I like learning English online.*").

In addition to the three scales, participants' basic information, including gender, grade and majors also need to be reported in the questionnaire.

3.3. Data Collection and Analysis

In this study, an online questionnaire link was first sent to the teachers in the Department of College English of ZYU, who are either conducting online teaching by utilizing teaching platforms such as UMOOC, Zhihuishu, or Xuexitong or carrying out hybrid teaching with teaching Apps such as Yunbanke or We-learn. And then those teachers send the online questionnaire link to the WeChat or QQ group of the classes that they were teaching. The targeted students were directed to a website via a shared link, whereupon accessing the site, they were presented with detailed guidelines to navigate and truthfully respond to the questionnaire items. It was clearly communicated in the introductory statements that the collected information was solely for research purposes and that their identities and responses would remain strictly confidential. Moreover, respondents were instructed to provide accurate and honest answers to the best of their abilities, and they were required to complete the questionnaire independently without engaging in discussions or seeking external answers, as each question did not have a predetermined correct response. It is worth noting that this was a blind test, so participants were uninformed about the contents beforehand, thus minimizing potential bias.

Once the survey questionnaires were disseminated online, the study successfully collected responses from 501 participants, and after eliminating the invalid questionnaires, an effective sample of 465 participants was obtained.

Then, all the valid and cleansed data collected from the 465 participants were imported into two specialized software tools: IBM SPSS Statistics version 26.0 for initial data management and basic statistical procedures, while the more advanced structural equation modeling was conducted by using AMOS version 23.0. At first, an internal consistency reliability test was carried out to test the three scales employed in this study. The values of the Cronbach's alpha for the 44 items measuring the perceived teacher support, academic self-efficacy in English learning, and online learning engagement are 0.97, 0.949, and 0.965 respec-

tively. (Table 2)

When the Cronbach's alpha value exceeds 0.6, it generally signifies acceptable internal consistency; surpassing 0.7 suggests a good internal consistency for the scale in question. As evident from the table, the Cronbach's alpha coefficients for each dimension surpassed the threshold of 0.6, demonstrating favorable internal consistency for all dimensions. Specifically, the Cronbach's alpha coefficients for Autonomy Support, Cognitive Support, Emotional Support, Behavioral Engagement, Cognitive Engagement, Emotional Engagement, Self-Efficacy in Learning Abilities, and Self-Efficacy in Learning Behaviors were recorded as 0.916, 0.927, 0.902, 0.881, 0.903, 0.856, 0.934, and 0.933, respectively—all of which are notably above 0.7. This outcome indicates that the internal consistency for each dimension of the questionnaire is indeed strong, suggesting that the overall reliability of the survey results is very high. Therefore, the data obtained from this questionnaire possesses substantial reliability, making it suitable and robust for further analysis.

In conducting an exploratory factor analysis to condense and explore the underlying structure of the information in the study, the first step involves assessing whether the research data is suitable for such an analysis. From Table 3, it can be observed that the KMO value is 0.969, which is greater than the threshold of 0.6, fulfilling the prerequisite condition for factor analysis, indicating that the data is amenable to factorial investigation. Moreover, the data has passed the

Table 2. Results of the internal consistency reliability test.

Variables	Number of Items	Cronbach's Alpha
Autonomy Support	4	0.916
Cognitive Support	4	0.927
Emotional Support	3	0.902
Perceived Teacher Support	11	0.97
Behavioral Engagement	4	0.881
Cognitive Engagement	5	0.903
Emotional Engagement	6	0.856
Online Learning Engagement	15	0.949
Self-efficacy in Learning Ability	9	0.934
Self-efficacy in Learning Behavior	9	0.933
Academic Self-efficacy	18	0.965

Table 3. KMO and Bartlett's test.

KMO Value		0.969
Bartlett's test of Sphericity	Approximate Chi-Square	17759.195
	df	946
	p-value	0.0

Bartlett Test of Sphericity (with p-value less than 0.05), signifying that the research data is indeed appropriate for factor analysis.

Following the KMO and Bartlett's Sphericity tests, it is essential to delve into the specifics of the extracted factors and their corresponding loadings on individual indicators. It was found that factor analysis resulted in the extraction of three distinct factors. The rotated variance explained by these three factors stands at 25.681%, 20.054%, and 19.895%, respectively. Cumulatively, these factors account for a rotated cumulative variance explanation of 65.63%. In other words, the number of factors derived from the analyzed data corresponds exactly to the number of dimensions addressed in our questionnaire, implying that there is a certain degree of alignment between the structure of the questionnaire design and the patterns reflected in the resulting data. This congruence suggests that the questionnaire effectively captured the constructs it was designed to measure. However, it remains unclear whether each individual question's data accurately corresponds to its intended factor (questions belonging to the same dimension should theoretically map to the same factor). To verify that each question indeed aligns with the correct factor, a Varimax rotation method was employed. The outcomes of this procedure are as follows:

To verify the correspondence between the items and the extracted factors, we applied the Varimax rotation method to the factor analysis results, aiming to clarify these relationships. Table 4 presents the communalities, which represent how well each item fits into the extracted factors, along with the factor loading matrix detailing the specific associations between factors and items. Notably, all the research items show communalities above 0.4, signifying that the relationship between these items and the extracted factors meets a satisfactory threshold, indicating that the factors effectively capture the information embedded in the items.

Additionally, as is displayed in Table 5, in the confirmatory factor analysis

Table 4. Factor loading matrix.

Items	Factor Loadings			Communalities
	Factor 1	Factor 2	Factor 3	
A1			0.825	0.742
A2			0.798	0.73
A3			0.837	0.765
A4			0.861	0.788
B1			0.861	0.791
B2			0.853	0.789
B3			0.817	0.747
B4			0.854	0.792
C1			0.862	0.792
C2			0.864	0.791

Continued

C3			0.855	0.77
D1		0.683		0.627
D2		0.679		0.607
D3		0.687		0.582
D4		0.735		0.617
E1		0.806		0.699
E2		0.765		0.615
E3		0.786		0.677
E4		0.767		0.626
E5		0.765		0.644
F1		0.734		0.585
F2		0.701		0.58
F3		0.713		0.608
F4		0.762		0.628
F5		0.583		
F6		0.762		0.614
G1	0.78			0.64
G2	0.791			0.648
G3	0.744			0.572
G4	0.787			0.643
G5	0.807			0.672
G6	0.828			0.7
G7	0.773			0.617
G8	0.763			0.6
G9	0.758			0.588
H1	0.759			0.606
H2	0.828			0.688
H3	0.778			0.626
H4	0.806			0.658
H5	0.814			0.677
H6	0.748			0.586
H7	0.751			0.587
H8	0.782			0.63
H9	0.746			0.589

Table 5. Model fit indices.

Indices	χ^2/df	GFI	RMSEA	CFI	NFI	TLI	AGFI	IFI
Standards	<5	>0.9	<0.10	>0.9	>0.9	>0.9	>0.9	>0.9
Values	4.331	0.964	0.085	0.986	0.982	0.977	0.924	0.986

model of this study, most of the model fit indices, including χ^2/df, GFI, RMSEA, CFI, NFI, TLI, and IFI, meet the standards, hence indicating an acceptable model fit.

4. Research Results

4.1. Descriptive Statistics

To investigate the status quo of college students' perceived teacher support, academic self-efficacy and their online learning engagement, this study undertakes a comprehensive descriptive statistical analysis of the data from 465 participants, which includes the mean, standard deviation, skewness, and extremum values (highest and lowest scores) pertaining to the questionnaire data. The scoring system for this questionnaire ranges from a minimum of 1 to a maximum of 5 points, with a mid-point value of 3. The detailed numerical outcomes of this calculation are illustrated in Table 6.

1) Perceived Teacher Support

Students' evaluations of the autonomy support, cognitive support, and emotional support provided by teachers during online learning were generally positive. Among these, emotional support scored the highest average rating (M = 4.02), indicating that students widely recognized the effectiveness of teachers' emotional care and motivation. Meanwhile, autonomy support and cognitive support averaged closely, at 3.98 and 4.01 respectively, suggesting that teachers also performed commendably in fostering independent learning environments and offering cognitive guidance.

2) Online Learning Engagement

In the three dimensions of the online learning engagement: behavioral engagement, cognitive engagement, and emotional engagement, the mean values of the three dimensions of online learning investment are all above 3.9, with the mean value for behavioral engagement particularly reaching 4.10. This indicates

Table 6. Descriptive statistics.

Variables	minimum	maximum	mean	Std. deviation	skewness	kurtosis
Autonomy support	1.5	5	3.98	0.922	−0.624	−0.661
Cognitive support	1.5	5	4.01	0.922	−0.644	−0.695
Emotional support	1.67	5	4.02	0.943	−0.72	−0.601
Perceived teacher support	1.889	5	4.00	0.903	−0.647	−0.77
Behavioral engagement	2	5	4.10	0.760	−0.547	−0.385
Cognitive engagement	1.4	5	3.95	0.810	−0.388	−0.542
Emotional engagement	1.5	5	3.91	0.727	−0.235	−0.371
Online learning engagement	2.15	5	3.99	0.715	−0.335	−0.492
Self-efficacy in learning ability	1.44	5	3.47	0.829	0.134	−0.805
Self-efficacy in learning behavior	1.67	5	3.45	0.825	0.139	−0.823
Academic self-efficacy	1.889	5	3.46	0.810	0.168	−0.853

that students are not only highly involved in practical participation in the process of online English learning but also demonstrate active engagement in cognitive understanding. Moreover, the smaller standard deviations across these investment measures suggest that students' performances in these aspects are relatively concentrated and stable.

3) Academic Self-efficacy

The mean scores for the self-efficacy in learning capability, self-efficacy in learning behavior, and academic self-efficacy range between 3.45 and 3.47. Although these values are lower than the values of perceived teacher support and students' online learning investment, they still fall within the moderate level. The data suggests that students exhibit a medium-to-high level of confidence in their abilities and the effectiveness of their actions in online English learning. However, the data analysis also indicates that there exists an element of uncertainty among them and highlights potential room for improvement in their self-efficacy perceptions.

4.2. Correlation Analysis

Based on the results of the normality test, this research proceeded to carry out Pearson correlation analyses aimed at examining the interconnections among perceived teacher support (PTS), students' involvement in online learning (OLE), and their academic self-efficacy (AS). The research result is shown in Table 7.

The correlation coefficient between perceived teacher support and online learning engagement is 0.519, and it exhibits statistical significance at the 0.01 level, thus indicating a significant positive correlation between the two variables. Additionally, the correlation coefficient between perceived teacher support and academic self-efficacy is 0.218, also demonstrating statistical significance at the 0.01 level, thereby suggesting a significant positive relationship between perceived teacher support and academic self-efficacy.

This finding indicates that among college students, the more teacher support they perceive during the process of online English learning, the higher the likelihood that their learning self-efficacy will increase, and correspondingly, the higher their level of learning engagement tends to be.

4.3. Structural Equation Modeling Construction

The measurement model was comprised of three potential factors and eight indicators. Specifically, perceived teacher support had three indicators (i.e., emotional

Table 7. Pearson correlation coefficient.

	PTS	OLE	AS
PTS	1		
OLE	0.519**	1	
AS	0.218**	0.321**	1

*$p < 0.05$, **$p < 0.01$.

support, autonomy support, cognitive support); online learning engagement had three indicators (i.e., behavioral engagement, cognitive engagement, emotional engagement); academic self-efficacy had two indicators (i.e., self-efficacy in learning ability, self-efficacy in learning behavior). Then the study runs the structural equation modeling (SEM) to test the hypothesized model. Figure 2 demonstrates the standardized parameter estimates for perceived teacher support, academic self-efficacy and online learning engagement model. The results manifest that perceived teacher support positively predicts online learning engagement ($\beta = 0.47$) and academic self-efficacy ($\beta = 0.22$). Therefore, both H1 and H2 were verified. Additionally, academic self-efficacy positively predicts online learning engagement ($\beta = 0.23$), thus validating H3. Furthermore, the indirect effect of perceived teacher support on participants' online learning engagement via academic self-efficacy was significant ($\beta = 0.22 \times 0.23 = 0.052$), which confirmed H4.

The model fit indices of the hypothesized structural model are as follows: GFI = 0.964, CFI = 0.986, NFI = 0.982, IFI = 0.986, TLI = 0.977, CMIN/DF = 4.321, and RMSEA = 0.085, which demonstrate that this model has an excellent fit. By using the Maximum Likelihood Estimation (MLE) method, the estimated path coefficients along with their standardized regression coefficients and corresponding levels of significance are presented in Table 8.

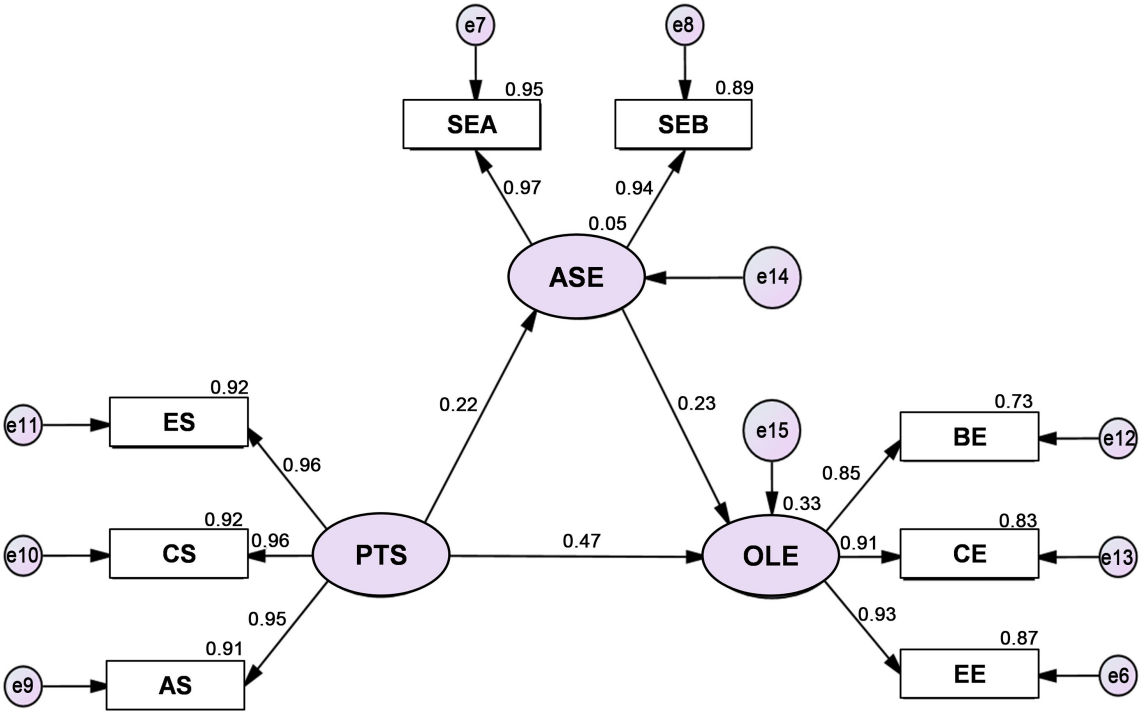

Figure 2. Structural model of perceived teacher support, academic self-efficacy and online learning engagement. All relationships are at a very significant level ($p < 0.01$); PTS = perceived teacher support, ES = emotional support, CS = cognitive support, AS = autonomy support, OLE = online learning engagement, BE = behavioral engagement, CE = cognitive engagement, EE = emotional engagement, ASE = academic self-efficacy, SEA = self-efficacy in learning ability, SEB = self-efficacy in learning behavior.

As is demonstrated in Table 8, all three path coefficients reach a significant level ($P < 0.05$). In the path "PTS → ASE", the standardized path coefficient is 0.222, indicating a significant positive influence along this path. Specifically, with every unit increase in perceived teacher support, there would be a corresponding increase of 0.222 units in academic self-efficacy. In the path "PTS → OLE", the standardized path coefficient is 0.471, indicating a significant positive effect. This suggests that for every unit increase in perceived teacher support, there is a corresponding 0.471 unit increase in online learning engagement. In the path "ASE → OLE", the standardized path coefficient is 0.234, signifying a significant positive impact. This implies that with every unit increase in academic self-efficacy, there would be a corresponding 0.234 unit increase in online learning engagement.

Finally, we did the mediation effect analysis to evaluate whether the mediating effects of academic self-efficacy was significant. As is shown in Table 9, in the mediating pathway "PTS → ASE→ OLE", the mediation effect value is 0.052, and the bootstrap sampling interval is [0.027, 0.089]. Since the interval does not include zero, this indicates that a mediating effect is present.

5. Discussion

5.1. The Status Quo of Perceived Teacher Support, Academic self-Efficacy and Online Learning Engagement in College EFL Learning

Firstly, the descriptive statistic data in Table 6 demonstrate the average score of EFL learners' perceived teacher support (M = 4.00) and the four dimensions: autonomy support (M = 3.98), cognitive support (M = 4.01) and emotional support (M = 4.02). All the indexes are much higher than the median value of 3, indicating that EFL learners' perceived teacher support in online English learning is at a high level. This finding is consistent with the research finding of Zhang & Lu (2023). The reason behind this phenomenon can be summarized as

Table 8. Path coefficients.

Paths	Standardized Path Coefficients	Non-standardized Path Coefficients	S.E.	C.R.	*P*
PTS → ASE	0.222	0.204	0.043	4.708	***
PTS → OLE	0.471	0.347	0.033	10.628	***
ASE → OLE	0.234	0.188	0.035	5.365	***

Table 9. Mediation effect analysis.

Effects	Paths	Estimate	Lower	Upper	*P*
Direct effects	PTS → OLE	0.471	0.394	0.55	0.001
Indirect effects	PTS → ASE → OLE	0.052	0.027	0.089	<0.001
Total effects	PTS → OLE	0.523	0.447	0.594	0.001

follows. Firstly, under the background of the rapid and steady progress in informatization, the formulation and implementation of the national educational policies has provided a solid foundation for the development of the blended teaching practice of the College English courses and the advancement of teachers' digital competence. Furthermore, the outbreak of the pandemic has played a role as a pivotal turning point in the evolution of China's educational landscape. Universities nationwide systematically engaged teachers in educational technology training, which contributed to a notable improvement in teachers' proficiency in information-based instruction. Moreover, with the advent of the pandemic, information teaching platforms have been further developed and refined, and an increasing number of college English teachers made efforts to reform the teaching model by means of digital empowerment, which was of great significance for students to improve their online learning experience, and hence experiencing a heightened sense of teacher support throughout their online English learning journey.

Secondly, as seen from **Table 6**, the overall mean score for the online learning engagement in college EFL learning is 3.99, which is also much higher than the median value, reflecting that college students' online learning engagement in EFL learning is also at a high level. This indicates that China's foreign language education has achieved notable progress in promoting the shift of students' role from being passive recipients of knowledge to active agents in language learning process. With the guidance of the latest pedagogy, College English teachers are expected to play the role of knowledge promoters, and students are encouraged to be active knowledge discoverers and constructors. Looking at the data per indicator, it can be noted that students' behavioral engagement (M = 4.10) stands out as slightly higher compared to the other two dimensions, while emotional engagement (M = 3.91) is recorded as the lowest. This echoed the research finding of a previous study conducted by Gao (2016), which identified that the online learners' emotional investment was lower than cognitive engagement and behavioral engagement. This finding implies to a certain extent that in the context of online learning, although students can indeed engage in pertinent learning activities and complete required tasks at a behavioral level, they tend to be in a passive state. Their utilization of cognitive strategies, self-regulatory management, and other aspects of cognitive engagement, as well as their emotional investment such as recognition of the value of online learning, are generally not very satisfactory. Further analysis revealed that online learners exhibit a distinct score-driven characteristic in their behavioral engagement (Liu et al., 2016), showing heightened initiative when engaging in activities and assignments closely tied to their academic outcomes.

Thirdly, the average score of college students' academic self-efficacy is 3.46. This score is lower than the other two variables' mean scores, but is still over the median value, which reflects that college students' self-efficacy in online English learning is at a medium to high level. This finding contradicts the belief that Chinese students show low self-efficacy in EFL learning due to the cultural fac-

tors. According to Wang et al. (2007), Chinese EFL learners, influenced by the cultural emphasis on implicit communication are inclined to be quiet and experience discomfort when engaging in oral participation in EFL classes. However, in online learning, students can express their ideas by posting in the forum, which would be much "safe" for them. Besides, with the deep integration of technology and education, the availability of abundant online learning resources, the construction of the online learning platforms and the establishment of the intelligent learning systems are all providing college students with great learning support. When confronted with problems or challenges in their learning, students tend to seek help from the internet. This does not only foster students' abilities to address problems independently, but also promote their adaptability in solving problems, enrich their experiential learning, and subsequently enhance their academic self-efficacy.

5.2. The Relationship among Perceived Teacher Support, Online Learning Engagement and Academic Self-Efficacy

The Pearson Correlation analysis results displayed in **Table 7** indicate that there are correlations between perceived teacher support, online learning engagement and academic self-efficacy.

Firstly, in the context of online English learning, a higher level of perceived teacher support corresponds to a greater degree of online learning engagement among college students. Perceived teacher support has a significant influence on students' confidence, quality and behavioral attitude (Bronfenbrenner, 1979); on one hand, it effectively stimulates students' learning interest, activates their proactive involvement, and reduces their feelings of academic helplessness. Once students experience a strong sense of belonging and respect, they tend to develop a stronger thirst for knowledge and desire to perform, thus becoming more actively engaged in their studies. On the other hand, constructive teacher-student interactions enable students to better perceive teacher presence and support. Through shared visions and common goals, they foster positive peer relationships, which in turn reinforce their sense of belonging and emotional investment in their studies. **Figure 2** presents that all the three dimensions of perceived teacher support are influential predictors of students' online learning engagement. Autonomy support embodies the notion that teachers respect students' viewpoints and feelings, and provide ample freedom and support to students in aspects such as choosing learning content, assigning academic tasks, fostering independent thinking, and solving problems (Chai & Gong, 2013). Compared to middle and high school students, college students have a stronger need for autonomy (Ruzek et al., 2016), requiring much more opportunities to make autonomous choices and decisions. Thus, in college English teaching, when teachers respect students' autonomy in decision-making, encourage their independent thinking, and provide opportunities for students to make choices, students can feel that their actions are self-determined, and their need for autonomy is more likely to be fulfilled. As a result, students who perceive this autonomy tend to

display heightened curiosity and eagerness to take on challenges, investing themselves more deeply in learning activities (Deci & Ryan, 2000). Meanwhile, teacher emotional support and cognitive support also demonstrate strong predictive power over students' online learning engagement in EFL learning. This means that college English teachers can optimize students' learning experience through fostering harmonious teacher-student relationships, designing challenging tasks, and offering learning strategy support. These measures can enhance students' sense of belonging and competence in English learning, motivating them to proactively engage in learning.

Secondly, a higher level of perceived teacher support is associated with a higher sense of academic self-efficacy. Studies concerning the relationship between teacher support and academic self-efficacy often concentrate more heavily on the secondary education, with relatively less attention given to its role in the tertiary education. A prevailing belief among educators is that, since college students are usually 18 years old or above, they possess a certain level of independent thought and emotional maturity, which leads to the perception that teacher support might wield less influence over them at this stage. Despite the assumption that college students have reached a certain level of mental maturity, numerous undergraduates, affected by familial and environmental factors, still exhibit immaturity in their psychological development, especially freshmen transitioning from the highly structured environment of high school to the relatively open college setting, who may not yet possess a mature and stable analytical mindset or the ability to solve problems efficiently. Therefore, teacher support continues to play a critical role in the university phase, which coincides with the results displayed by the regression analysis equation. Furthermore, self-efficacy theory posits that with emotional support from teachers, such as respect and encouragement, and teachers' academic support including providing diverse teaching resources and various teaching methods, students develop profound perceptions that lead to increased self-efficacy.

Lastly, the enhancement of academic self-efficacy among college students further promotes their online learning engagement. Academic self-efficacy fosters students' self-determined motivation, participation in learning activities, persistence in effort, and utilization of learning strategies. When academic self-efficacy is enhanced, students become more confident in their abilities, leading to heightened confidence in their learning process, increased eagerness to participate actively in online learning activities designed by teachers, and ultimately, a higher level of investment in their studies.

5.3. The Mediating Effect of Academic Self-Efficacy

In this study, academic self-efficacy has a mediating effect on the relationship between perceived teacher support and students' online interaction engagement. Put differently, the improvement of teacher support can enhance the academic self-efficacy of the EFL learners, which in turn boosts their online interaction engagement. This is aligned with the research findings of Ferrell (2012) that

academic self-efficacy plays a mediating role in the relationship between social classroom environment features to students' math engagement. The current research extends these findings by manifesting that students' online learning engagement also observes this underlying mechanism in EFL learning context. According to the social cognitive theory, personal factors and environmental influences interact with and determine people's behavior change (Bandura, 1997). To be specific, external environmental determinants can spur learners' learning engagement through influencing their self-motivating beliefs. Self-efficacy is perceived as an important motivational construct for students which can impact their learning results (Bandura, 1997). When learners believe they possess the ability to complete assigned learning tasks, they tend to invest greater effort into them, demonstrating heightened levels of commitment, dedication, and tenacity. In line with the social cognitive theory, when perceiving care, respect, and affection from teachers, college students would be more confident in overcoming language barriers and display a stronger sense of autonomy in their language learning process. On the contrary, when perceiving less teacher supports, students' self-efficacy would suffer and their attention and information processing during online learning activities would be disturbed, which would negatively impact their learning engagement.

6. Conclusion

6.1. Major Findings of the Study

The current study is aimed at investigating the relationships among perceived teacher support, academic self-efficacy, and online learning engagement in college EFL learning. The major findings are as follows. Firstly, the descriptive statistical analysis results display that participants' perceived teacher support and online learning engagement are at a high level, and their academic self-efficacy is at a medium to high level. Secondly, the correlation analysis results indicate that online learning engagement is directly and positively related to perceived teacher support and academic self-efficacy. Additionally, perceived teacher support has a significant positive correlation with academic self-efficacy. Thirdly, the structural equation modeling results reveal that perceived teacher support and academic self-efficacy directly and positively predict online learning engagement. Moreover, academic self-efficacy plays a mediating role in the relationship between perceived teacher support and online learning engagement.

6.2. Implications

The current research contributes to the existing research by providing insights that enable educators to further understand the relationships among perceived teacher support, academic self-efficacy, and online learning engagement in college EFL learning. It provides college English teachers with some practical guidance regarding the practice of online teaching.

With respect to the fact that perceived teacher support significantly and posi-

tively predicts students' online learning engagement, teachers are supposed to provide students with more support, and at the same time, nurture students' ability to perceive external support. In terms of providing autonomy support, teachers should provide learners with ample time to autonomously regulate their own learning pace and offer learners challenging and interesting learning activities and tasks. In terms of providing cognitive support, teachers are anticipated to adopt various teaching strategies, such as teaching learning strategies, cultivating students' autonomous learning ability and recommending learning resources. In terms of providing emotional support, teachers are supposed to give timely feedback and encouragement to students, set high expectations, and show respect and genuine care for students' emotions. As for guiding students to perceive support consciously and systematically, one approach involves cultivating students' positive personality traits, such as gratitude and optimism. Individuals who possess a profound sense of gratitude and an optimistic mindset tend to view benefactors as genuinely benevolent and helpful and believe that the benefactors' behavior is worthy and costly (Wood et al., 2008), thus enabling them to interpret the world in a more positive and optimistic light. Hence, they are more likely to perceive help from teachers and their peers.

Regarding that academic self-efficacy mediates the relationship between perceived teacher support and online learning engagement, teachers are supposed to better harness students' academic self-efficacy. Students' academic self-efficacy can be improved by teachers' deliberate cultivation. For example, teachers can give students more encouragement and praise, and give them timely and efficient feedback in the process of online learning. Furthermore, the training focused on bolstering student's positive self-perception is a sound strategy to boost their self-efficacy. It is noteworthy that more attention should be given to students with a low level of academic self-efficacy. As for these students, teachers should take intervention measures, such as providing counseling, giving them more time to complete the online tasks and adopting a diverse evaluation method.

Generally speaking, perceived teacher support, academic self-efficacy, and online learning engagement are all malleable (Perry & Steck, 2015). Therefore, efforts to enhance teacher support and students' academic self-efficacy can prompt feedback loops that fuel students' online learning engagement. Students' high-quality online learning engagement would, in turn, boost their positive self-perception, and bolster their self-efficacy which is of great importance to the improvement of student's academic performance and academic enjoyment.

6.3. Limitations and Future Directions

The current study has several limitations. First of all, it used a cross-sectional research design. The analysis of the relationships among the three variables is restricted to a specific time. This indicates that future studies are needed to explore longitudinally the links among online learning engagement, perceived teacher support, and academic self-efficacy, and may assess causal relationships

in these directions. Secondly, the current research sampled only students from one private university in southern China. It might be difficult to reveal the relation among the variables among university students in all areas of China. Therefore, in future research, it is useful to involve more universities across the country and use a multi-level model for analysis. Third, this study relied on self-reported data acquired only from students, which may result in social desirability bias and common methodological discrepancies. Hence, follow-up research can examine the relationships among the three variables by collecting data from many respondents, including teachers, students and parents. What's more, other data collection techniques are also needed, such as case studies and semi-structured interviews, which may yield more in-depth results. In addition, the current research only examined the mediating effect of one variable. Future studies can consider the mediating effects of other variables such as learning motivation, technology acceptance, and positive emotions to assess the correlation between perceived teacher support and students' online learning engagement.

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Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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