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# Influence of Teachers' Synchronous Support on Students' Language Learning Behavioral Engagement in Online Courses

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**Abstract:** Currently, online courses such as MOOCs and micro-courses mainly adopt asynchronous online mode. Computer-aided synchronous online teaching involves live lectures, online feedback, etc., whose timely interactivity effectively resolves the problem of insufficient interactivity in the asynchronous online mode. Due to its learning environment and classroom management mode that is closer to the real classroom, computer-aided synchronous online teaching has been widely implemented in schools and universities. In online teaching, teachers' support has an important impact on students' online learning engagement, but the existing literature mainly focuses on the learning engagement of asynchronous online e-learning modes, and the related studies on computer-aided synchronous online modes are still scant. Therefore, grounded on the previous studies, this study classified computer-aided synchronous teacher support into behavior support, capacity support and affection support, and explored the contributions of perceived teacher support toward students' technology-based language learning behavioral engagement in online courses. Results showed that the Cronbach  $\alpha$  coefficient of the questionnaire designed in this study was 0.968, and the KMO value was 0.953, indicating its good reliability and validity. The study found teacher's computer-aided synchronous supports (teacher affection, teacher behavior support and teacher capacity support) significantly accelerate students' technology-based language learning behavioral engagement, and teacher behavior support was most correlated with online learning behavioral engagement. This study indicated the significance of teachers' computer-aided synchronous support, particularly teachers' behavior support, in enhancing students' learning behavioral engagement and would inform the future research of teachers' conscientious behaviors.

**Keywords:** Computer-aided teachers' synchronous support; Students' learning behavioral engagement; Teacher behavior support; Teacher affection support; Teacher capacity support



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## 1. Introduction

With the widespread use of web-based technologies in education, online learning has been an available means of personalized learning for students. The application of technology-enhanced online platforms has indeed provided a more convenient way for students to learn language programs, but it has also triggered a lot of debates and concerns, and the problems arising from students' immaturity and imperfections in the networked language learning process have become increasingly prominent (Winke et al., 2010; Baker et al., 2021; Sheridan & Gigliotti, 2023). To be specific, despite students are fresh and primed for online learning, the general paucity of teachers' technology-based pedagogical experience as well as students' low consciousness of self-regulated learning poses a great challenge to both students and teachers (Pedrotti & Nistor, 2019). What's more, the high dropout rate in online education attributed to students' perception of distance where they suffer from a lack of synchronous communication and social interaction, leading to their isolation, disconnection, and low motivation to learn foreign languages (Inoue, 2007). Therefore, an increasing number of scholars have identified the need to boost students' engagement in language learning behaviors in online learning environments. Theoretically, student's language learning behavioral engagement stems from the notion of participation in language learning, involving both academic and extracurricular activities, and is seen as a pivotal component in facilitating learning performance and deterring dropout (Gregory et al., 2014).

Learning behavioral engagement, as an important indicator of the positive psychological aspects of learning, is the key to students' academic success, and it reflects the cognitive or affective elements that effectively contribute to students' learning (Yusuf et al., 2023). Substantial research suggested that students' language learning behavioral engagement is influenced by schools' environments, teachers' supports, and individuals' intrinsic factors (Kelly & Turner, 2019; Nasir et al., 2011). A number of studies focusing on school characteristics have found that school size and rigid rules are strongly correlated with students' engagement in learning behaviors (Shernoff, 2013). The research from Kelly and Turner (2019) revealed

a high correlation between classroom instructional factors and students' language learning behavioral engagement. Students' interaction with teachers and peers is also seen as a critical factor in increasing students' engagement in language learning behaviors (Birch & Ladd, 2022; Cooper, 2014). By examining the relationship between teacher behaviors and students' learning behavioral engagement, Skinner and Belmont (1993) found that students with higher levels of engagement in language learning behaviors perceived more teacher involvement and support. In addition to these external factors, related research has found that students with more intrinsic motivation spontaneously devoted more effort, and persistence when they engaged in learning activities (Suárez et al., 2019). Among the widely used, varieties of factors were considered as the dominant determinant of students' language learning behavioral engagement. In online teaching, teachers' support has an important impact on students' online learning engagement, but the existing literature mainly focuses on the learning engagement of asynchronous online e-learning modes, and the related studies on synchronous online modes are still scant. Thus, this study aimed to investigate how perceived teachers' synchronous supports (hereafter referred to as teacher support) influenced students' language learning behavioral engagement. The present study's main contributions lie in highlighting the vital role of perceived teachers' synchronous support in students' language learning behavioral engagement and which category of teacher support may much influence students' language learning behavioral engagement in online courses.

## 2. Theoretical Foundation and Hypothesis Development

### 2.1 Theoretical Foundation

Language learning behavioral engagement is considered as a multivariate concept which refers to the amount of time and effort that students dedicate to the language learning process, as well as the level of institutional support for students engaged in learning activities. Language learning behavioral engagement mainly focuses on learners' behaviors and performances including learners' affect, effort, concentration, involved learning time, etc., which can be observed and regarded as a way to explicitly express

the emotional and cognitive engagement (Patrick et al., 1993). As an important factor affecting the learning process and learning outcomes of students, it is the common goal of teachers and schools to increase and improve students' learning engagement. With the popularity of the Internet and the development of information technology, the technology-based teaching model has emerged, which has replaced the traditional teacher-led teaching model. Besides, the design and implementation of the teacher's language tasks is closely related to the language learners' engagement, thus deserving to be explored in depth. As such, language learning behavioral engagement has attracted the attention of educators in recent years. For instance, Finn (1989) conceptualized language learning behavioral engagement as learners' performance in participating in academic and other extracurricular activities and proposed an 'engagement-identification' model consisting of a sequential process: engagement, school success, identification, disengagement, school underperformance and emotional withdrawal. Likewise, by comparing learners' engagement in learner-initiated and teacher-initiated tasks, Lambert (2017) explored foreign language learners' engagement in completing language learning tasks and found the significant influence of perceived teacher support on students' language learning behavioral engagement. Similarly, Phung (2017) found higher cognitive engagement in learners' foreign language use for tasks they preferred.

Numerous researchers expanded and supplemented the concept of language learning behavioral engagement by putting forward categories and measuring indexes about it (Suárez et al., 2019; Schaufeli et al., 2002), involving participation (Miles & Stipek, 2006), interaction (Hamane, 2014), persistence (Miller et al., 1996), academic challenge (Coates, 2006), and self-directed learning (Johnson et al., 2014). In addition to the definition and categories of students' language learning behavioral engagement, there has been a significant body of research exploring the relationship between engagement in language learning behaviors and other influencing factors such as social support and individual's learning motivation. To be specific, the degree of learners' language learning behavioral engagement was deeply influenced by external factors especially teacher supports which would apparently promote learners' learning behaviors

(Murray, 2009). In addition, learners' engagement in language learning behaviors is highly correlated with their internal factors (e.g., interest and self-efficacy). For instance, students' engagement in language learning behaviors is a prerequisite for affective engagement, such as an intrinsic interest in certain subjects (Rose-Krasnor, 2010). However, although there are some studies exploring students' language learning behavioral engagement and connecting it with educational issues, there are still few researches to further study how external support (i.e., perceived teacher supports) influence students' language learning behavioral engagement.

## 2.2 Hypothesis development

It is commonly recognized that perceived teacher supports play a significant role in influencing students' affective, cognitive and social behaviors (Davis, 2003; Pan & Chen, 2021). The effects brought from perceived teacher supports were acted on learners' intellectual and social engagement at school (Katyal & Evers, 2004). As advanced technologies are widely utilized in the educational landscape, perceived teacher support also manifested its importance in the aspect of helping students to learn second or foreign language academically, professionally and psychologically during online learning process. Ertmer et al. (2012) have reported that the guidance and support from teachers drove students' engagement in language learning especially online language learning, and helped students incorporate learning resources activities into their learning ecology. Due to the significance of perceived teacher supports, a large amount of literature has indeed approached it from different perspectives such as the categories (Ryan and Patrick, 2001), and the influence exerted on other pedagogical factors like learners' achievements, self-efficacy and learning engagement (Skinner et al., 2009). Three categories of perceived teacher support in online learning were clarified, respectively, teacher affection support, teacher behavior support and teacher capacity support (Carson & Mynard, 2012; Fagerlund, 2012; Lai, 2015).

Previous study has characterized teachers' affection support as "providing students with psychological support for affective management" (Lai, 2015, p. 75). In terms of teachers' affection support, teachers' encouragement and respect can increase students'

achievement motivation, self-efficacy, interest in learning, and enhance learners' social skills and academic self-confidence. At the same time, teachers' affection support can alleviate learners' emotional and behavioral problems (e.g., self-esteem, loneliness, peer bullying, maladjustment, etc.) (Descals-Tomás et al., 2021; Dörnyei, 2009). In practice, research on self-directed learning has shown that teachers' affection support helps students overcome negative emotions such as anxiety and motivates them to engage in highly engaging learning (Dörnyei & Chan, 2013). In the Small Private Online Course (SPOC) environment, teachers' affection support can promote deep learning. Two main research approaches, information processing and interaction, have been used for affectional support research (Feidakis & Daradoumis, 2013). The information processing approach argues that affection is information-like entity that can be conveyed in the same way that information is conveyed between people through multiple behavioral languages. The interaction approach, on the other hand, argues that affection is social and cultural artefacts that are constructed through interaction and expression (Rachel, 2010). Therefore, this study will explore the relationship between teacher affection support and students' learning engagement in online learning, thereby generating hypothesis 1:

*H1: Teacher affection support has a positive effect on students' technology-based language learning behavioral engagement.*

According to Gregory et al. (2014), perceived teacher support that promoted learners' language learning was identified into three aspects: (1) by raising students' learning awareness through elaborating the advantages of online course; (2) by offering methods to help students move the psychological obstacles of discovering useful resources online; and (3) by organizing varieties of technological activities to stimulate students interests in online course. In line with these studies which found the different characteristics and functions of perceived teacher support, researchers further made a clearer classification of perceived teacher support for the sake of specifically claiming the associations of perceived teacher support and learners' online learning behaviors. Teacher behavior support (TBS) involves teachers' organizing and managing capacities that can help students participate in online activities and tasks about language learning

(Patrick et al., 1993). In this study, teacher behavior support consists of three main dimensions, i.e. support for autonomy, structure and participation, which are mainly reflected in, the sociability support aspect of teacher-student interactions (Farley & Burbules, 2022) and factors affecting student satisfaction and perceptions of learning in teacher interaction design (Arbaugh, 2001). Autonomous support refers to teachers providing students with optionality and respecting students' self-determination. Structural support refers to teachers providing students with structured guidance, such as teachers indicating clear expectations and contingencies. Participatory support refers to the warmth of affection, resource contribution and understanding of students that teachers provide to learners (Ryan & Deci, 2000). Therefore, hypothesis H2 was proposed.

*H2: Teacher behavior support has a positive effect on students' technology-based language learning behavioral engagement.*

Teacher capacity support (TCS) mainly helps students to get some useful online resources and tell them how to select and use technological resources effectively (Gallivan et al., 2005). A lot of research concentrated on the association between teacher perceived support and other factors. For instance, some scholars have found the influence of perceived teacher support on learners' language learning behavioral engagement such as the promotion of learners' efforts, persistence and use of learning resources (Goodenow & Grady, 1993). Students are inclined to ask for teachers' help under the condition that they perceive teacher support (Ryan et al., 1998). Lai et al. (2014) demonstrated that perceived teacher support positively influenced learners' use of learning resources. In Lai's research, "the participants reported that teachers' recommendation of resources and guidance on how to use the resources for language learning affected their self-directed use of technology for learning through both strengthening their perceived usefulness of the resources and enhancing their access to, and knowledge of how to use, the resources more effectively for language learning" (p. 77). The resources and support that learners receive during the online learning process are the basis for online learning to support learner empowerment, which is characterized in this study by "facilitating conditions". It has been shown that facilitating conditions can

enhance learners' sense of community, sense of belonging, sense of identity, and knowledge sharing in a community of inquiry (Hao et al., 2017). When learners have resources and support that promote teacher-student and student-student interactions as well as collaborative learning, their online sense of presence is enhanced. In addition, Mamun et al. (2020) found that the availability of online learning materials and resources stimulates learners' interest and curiosity and promotes understanding and productive inquiry. Lai (2015) found that three forms of resources and support have a positive impact on learner empowerment, i.e., recommendations of useful technological resources, guidance and assistance in the efficient use of these resources, and encouragement to promote student use of these resources. Furthermore, Cole et al. (2014) characterized teacher capacity support as technologically instrumental support, which refers to the help teachers provide to students' needs, mainly involving guidance, assistance, tangible support and problem-solving actions. Therefore, the hypothesis H3 of this research was generated.

*H3: Teacher capacity support has a positive effect on students' technology-based language learning behavioral engagement.*

### 3. Methodology

#### 3.1 Questionnaire Design

Based on the existing research on perceived teacher support and online learning behavioral engagement, a questionnaire titled "the influence of perceived teachers' synchronous supports on technology-based learning behavioral engagement in online courses" was designed in this study. The questionnaire involved 2 parts: perceived teacher support and students' learning behavioral engagement. Each questionnaire item was measured on a 6-point Likert Scale, ranging from 1 (strongly disagree) to 6 (strongly agree). Higher scores indicated students' higher perceptions of teacher supports, and their learning behavioral engagement.

The Teachers' Synchronous Support Scale (TSSS) was designed to evaluate students' perception of teacher support during their online learning process. Items in the questionnaire originated from two major resources: (a) constructs related to perceived teacher support (Fagerlund, 2012; Lai, 2015); and (b) existing instrument assessing perceived teacher support (Lai,

2015). The TSSS was measured by total 14 items used in 3 scales: teacher affection support (4 items, e.g., My English teacher encourages us to use online courses to learn English); teacher capacity support (5 items, e.g., My English teacher recommends useful online resources to us), and teacher behavior support (5 items, e.g., My English teacher assigns some tasks about learning online courses). The Cronbach alpha values of teacher affection support, teacher behavior support and teacher capacity support are 0.937, 0.924, and 0.927, indicating a good reliability and acceptable validity.

Students' Technology-based Language Learning Behavioral Engagement Scale (SLBE) was developed for this study (Birch & Ladd, 1997; Fredricks et al., 2004; Hamane, 2014). The SLBE was measured by 10 items (e.g., I focus my attention on leaning online course.). The Cronbach alpha value for SLBE was 0.953, suggesting good reliability.

#### 3.2 Research Procedure and Participants

This study conducted a task-oriented blended teaching mode of college English courses through online platform for a semester of 15 weeks. Prominently, this teaching mode is the comprehensive integration of multimedia network technology in teaching content, teaching paradigm and teaching evaluation, the dominant effect of which is the stimulation of students' subjectivity and initiative in the whole learning process. Demonstrated as teacher behavior support, teacher's pedagogical behavior involves organizing students to use technology for effective learning by providing information about resources, demonstrating how to use them and helping students to experiment with them. In the perspective of teacher affection support, the teacher encourages students to use online resources by articulating their usefulness and reinforcing this understanding. In terms of teacher capacity support, the teacher recommends and provides guidance on how to use technology resources so as to enhance students' online learning capacity.

Specifically, in extracurricular learning, the following links were involved: 1) task layout. As the implementer of teaching design, the teacher arranges learning tasks, promotes, coordinates and participates in students' knowledge construction on the basis of the teaching objectives and the analyses of students and resource availability; 2) individual learning. As the main body

of knowledge construction, students make plans for their learning tasks, optimize the choice of learning resources, and launch personalized independent learning. In the above two links, the related activities, such as task layout, learning resource collection and sharing, can be conducted through the interactive network platform; and 3) group collaborative inquiry. On the basis of personalized learning, students conduct group collaborative inquiry, and interact with teachers, peers and network resources with the help of the interactive network platform. Students complete their knowledge construction through independent learning and collaborative group inquiry, and transform the obtained knowledge into specific results of group reports. To stimulate these activities of knowledge creation, the goal of group collaborative learning design is to achieve more productive collaborative outcomes in ways that promote interaction. This can also be done in the form of “problem solving” which sets up thematic tasks that inspire students to conduct deep exploration through collaborative learning behaviors.

This teaching mode echoed the research outcome of Hege (2011) who reported that instructors can design an engaged online learning community by creating opportunities for increased student interaction with fellow students, instructors, and digital course materials. In such an instructional design, collaborative resources can be internal, external, or integrated. In classroom learning, the following steps were included: 1) students made group reports on the completed learning tasks in class; 2) the teacher summarized the report of the group, and explained and guided the relevant knowledge acquisition in class; and 3) students then conducted group discussion according to the thematic tasks. In addition. It is worth noting that the linking activities in this teaching mode can help students to realize the docking between extracurricular learning and classroom learning. The knowledge content of classroom learning needs to be internalized and absorbed through linking activities. Therefore, linking activities are a necessary task for individual students with the following three purposes: to test the understanding of the classroom knowledge; to further expand the students’ learning space beyond the classroom; and to better mobilize the students’ learning subjectivity.

A total of 400 students from a large comprehensive university in eastern China who were taking or had taken compulsive college English courses participated in the study. 395 valid questionnaires were retained after discarding 5 incomplete questionnaires. Among the 395 questionnaires, there were 125 (31.65%) male participants and 270 (68.35%) female participants. All the participants were voluntary to complete the questionnaire on the spot at the class interval of college English course and were informed that they had the rights to decline at any time if they wanted.

- Phase 1: to collect, sort out and review literature of students’ perceived teacher supports on language learning behavioral engagement in task-oriented blended online courses, and then improve and refine research contents.

- Phase 2: to design and conduct the task-oriented blended online course. Instruments was constructed and selected based on literature in phase 1.

- Phase 3: to compile relevant questionnaires and complete data collection.

- Phase 4: to analyze the data and draw relevant research results.

## 4. Research Results

### 4.1 Reliability and Validity Tests

As an essential procedure in questionnaire research, reliability analysis is mainly used to examine the reliability and accuracy of the quantitative data answers. Generally, Cronbach’s  $\alpha$  coefficient is adopted to measure the reliability, as shown in Formula (1).

$$\alpha = \frac{K}{K-1} \left( 1 - \frac{\sum_{i=1}^K S_i^2}{S_x^2} \right) \quad (1)$$

where  $k$  represents the number of questions to be measured;  $S_i$  represents the variance of the score for the  $i$ -th question;  $S_x$  represents the variance of the total score of the test. Cronbach’s  $\alpha$  coefficient signifies the consistency between the scores of the items in the questionnaire. A value above 0.8 indicates high reliability, while values between 0.7 and 0.8 represent good reliability.

**Table 1** presents that all the measures had good reliabilities (Cronbach’s alpha ranging from 0.924 to 0.953), and the questionnaire also showed very good reliability overall, with the overall Cronbach’s  $\alpha$  coefficient of 0.968.

**Table 1.** Reliability Test Results (N = 395).

Variable Type	Variable Names	Variable No.	No. of Items	Cronbach $\alpha$	Overall Cronbach $\alpha$
Independent Variable	Teacher affection support	A	4	0.937	0.968
	Teacher behavior support	B	5	0.924	
	Teacher capacity support	C	5	0.927	
Dependent Variable	Students' technology-based language learning behavioral engagement	Y	10	0.953	

After the completion of the reliability analysis, the validity analysis was proceeded. The validity study was employed to examine whether the research instrument was rational and meaningful or not, and the validity analysis used factor analysis as a method of data analysis. The KMO test is performed on the basis of comparing the relative magnitude of the simple and

partial correlation coefficients between the original variables, as shown in Formula (2).

$$KMO = \frac{\sum \sum_{i \neq j} r_{ij}^2}{\sum_{i \neq j} a_{ij}^2 + \sum \sum_{i \neq j} r_{ij}^2} \quad (2)$$

where  $r_{ij}$  denotes the correlation coefficient and  $a_{ij}$  is the partial correlation coefficient.

**Table 2.** Validity Analysis Results

Measurement Item No.	Standardized Factor Loadings	
TAS1	0.717	
TAS2	0.734	
TAS3	0.752	
TAS4	0.745	
TBS1	0.716	
TBS2	0.727	
TBS3	0.780	
TBS4	0.805	
TBS5	0.778	
TCS1		0.743
TCS2		0.742
TCS3		0.804
TCS4		0.804
TCS5		0.816
SLBE1		0.725
SLBE2		0.745
SLBE3		0.771
SLBE4		0.750
SLBE5		0.766
SLBE6		0.787
SLBE7		0.774
SLBE8		0.794
SLBE9		0.770
SLBE10		0.754
KMO value	0.953	
Bartlett sphericity value	9371.242	
df	253	
p value	0.000	

Note: TAS = teacher affection support; TBS = teacher behavior support; TCS = teacher capacity support; SLBE = students' technology-based language learning behavioral engagement

As can be seen in Table 2, the KMO value was 0.953, and the corresponding p value of the Bartlett test was 0.000, which is less than 0.05, indicating quite good validity of this questionnaire.

#### 4.2 Linear Regression

The general formula for a linear regression equation is  $Y = a + bX$ , where  $a$  is the intercept of the regression line on the Y-axis and  $b$  is the slope of the regression, called the regression coefficient. As can be seen, this equation is determined once the values of the two key statistics,  $b$  and  $a$ , have been calculated from measured values.

The method of finding  $b$  and  $a$  is illustrated below using  $X$  as the independent variable and  $Y$  as the dependent variable, where  $a$  is  $a_{YX}$ , and  $b$  is  $b_{YX}$ . The following formula is used in this study to calculate the correlation regression coefficients, as shown in

Formula (3).

$$b_{YX} = \frac{\sum XY - (\sum X)(\sum Y) / n}{\sum X^2 - (\sum X)^2 / n}$$

(Estimate Y from X) (3)

As can be found in **Table 3**, using students' technology-based language learning behavioral engagement (SLBE) as the dependent variable and A (teacher affection support), B (teacher behavior support) and C (teacher capacity) as the independent variable, the calculations showed that the model complies with the F-test, which means that at a minimum one of the independent variables will exert an effect on the dependent variable. All VIF values in the model are less than 5, demonstrating that there is no problem of multicollinearity. Furthermore, the calculated D-W value of 1.835 is close to 2, thus signifying that no autocorrelation was found in the model and there was no correlation between the sample data.

**Table 3.** Linear Regression Results

Variable No.	Standardization Coefficient	T	P	95% CI	VIF
Constant	-	5.376	0.000***	0.573~1.235	-
A	0.609	5.415	0.000***	0.144~0.307	2.094
B	0.686	7.759	0.000***	0.320~0.538	2.631
C	0.661	1.965	0.048*	0.012~0.238	3.682

Note: \* $p < 0.05$ , \*\*\* $p < 0.001$ .

**Table 3** indicated noticeable correlations concerning the relationship between teacher affection support, teacher behavior support, teacher capacity support

and students' technology-based language learning behavioral engagement, with the standardization coefficient of 0.609, 0.686, 0.661, respectively.

#### 4.3 Analysis of Variance

**Table 4.** Results of Anova Analysis

Learning Behavioral Engagement (Mean ± Standard Deviation)	Teacher' Synchronous Support (Mean ± Standard Deviation)	F	P
4.394±0.986	4.484±0.953	154.970	0.000***

Note: \*\*\* $p < 0.001$ .

As delineated in **Table 4**, the teacher' synchronous support significantly influenced students' technology-based language learning behavioral engagement ( $F = 154.970$ ,  $p = 0.000$ ).

(1) H1 is supported. Teacher affection support has an obvious positive effect on students' technology-based language learning behavioral engagement.

Consistent with the previous research, teacher affection support such as oral persuasion and encouragement can motivate students' language learning behaviors such as self-directed learning via students' positive attitudinal and emotional changes (Pan & Chen, 2021). Students' perceptions of teachers' affection support were regarded as a positive factor related to their academic outcomes



and achievements (Descals-Tomás et al., 2021). Katyal and Evers (2004) also demonstrated that teachers' emotionally-supportive interactions with students would help create a more harmonious and respectful learning atmosphere which was able to stimulate students' spontaneous learning activities. Therefore, this study suggested that a great concern should be put on undertaking teachers' responsibilities of stimulating students' optimistic attitudes towards self-directed language learning by offering affection supports. In the online environment, teacher affection support can be realized through encouraging students, supervising the completion of assignments, asking questions, giving timely feedback on students' problems, facilitating communication, as well as trusting students, etc.

(2) H2 is confirmed. Teacher behavior support has an obvious positive effect on students' technology-based language learning behavioral engagement. According to the research results, among the three constructs in perceived teachers' synchronous support, teacher behavior support got the highest linear correlation with students' learning behavioral engagement in online courses, indicating that students perceived and realized more organization and management from teachers like finishing certain language learning tasks online than the other two kinds of teacher supports, and that students highly recognized and approved of teacher behavior support which practically promoted their participation and efforts to learn language (Hao et al., 2017), thus providing some evidence of the reason why teacher behavior support had the strong effect on students' language learning behavioral engagement. This research finding aligns with the previous research of Skinner and Belmont (1993) which found that students with more learning behavioral engagement reported more teacher participation and received higher perception of teachers' behavior support. Moreover, Lai (2015) discovered teacher behavior supports predicted students' online self-directed learning through enhanced self-efficacy. Students who perceive more teacher behavior support are inclined to conduct more self-directed language learning behavior (Pan & Chen, 2021). Teacher behavior supports such as clear task organization and management will positively trigger teacher-student connections which can improve students' interaction and peer learning with a language learning environment. Thus, an implication

of the research result for students' language learning engagement is that teacher behavior support needs to be more focused on influencing students by enhancing their capacity to use technologies and boosting their confidence in using online resources for learning. First, it is vital to establish and strengthen teachers' awareness of supporting students' language learning behavioral engagement. Second, teacher behavioral supports played a vital role in students' English learning behavioral engagement, which implied that teacher should provide students with behavioral supports such as assigning online language learning cooperative or self-directed tasks and offering some advice for students to solve the language learning problems met online. Third, it is highlighted to enhance teacher behavior support such as creating the opportunities for students to cooperate with each other or finish the language learning tasks individually.

(3) H3 is established. Teacher capacity support has an obvious positive effect on students' technology-based language learning behavioral engagement. This is in line with the previous literature which highlighted that it is important for teachers to guide students to access the resources effectively when students are confronting with the vast amount of online learning resources. This research result indicates that in the process of online learning, teachers should not only master modern information technology, but also be the emotional guide and information provider for students, and become students' "interlocutor", so as to successfully conduct effective teaching. Besides, teachers' technological instrumental support is the basic guarantee for learners to conduct online learning, and it is also the basic needs of learners, such as providing solutions to online technology, course teaching information. The basic technological instrumental support problems encountered in the online learning process, such as "technical failures" and "incomplete statistics of course scores", greatly affect the satisfaction of learners. As such, providing adequate and necessary instrumental support can increase learner satisfaction by making the platform perceived as easy to use by learners, which indirectly leads to increased learner satisfaction. Therefore, online platform administrators should pay enough attention and support in terms of technological instrumental support. Teachers' technological instrumental support is the foundation of

learners' smooth learning. Teachers provide technical support and guidance to solve the operational problems encountered by learners in learning online open courses in a timely manner. As Sasson et al. (2021) elaborated, teachers' technological instrumental support is not only conducive to the transformation of teachers from information transfer to learning guides, but also facilitates the formation of a learning community, which is indispensable for the development of collaborative group learning. Online open courses need to enhance and improve the interactive learning experience of learners from the dimensions of interface design, social tools, and other instrumental support, so as to attract more learners to actively participate in online courses (Roshier et al., 2011).

## 5. Conclusion

The study was designed to investigate the influence of perceived teachers' synchronous support on students' technology-based language learning behavioral engagement. Results showed that the Cronbach  $\alpha$  coefficient of the questionnaire designed in this study was 0.968, and the KMO value was 0.953, indicating its good reliability and validity. The study found: 1) teacher synchronous supports (teacher affection, teacher behavior support and teacher capacity support) significantly accelerate students' technology-based language learning behavioral engagement with the significance level of 5%; and 2) teacher behavior support was most correlated with online learning behavioral engagement with the standardization coefficient of 0.686. This study indicated the significance of teachers' synchronous support, particularly teachers' behavior support, in enhancing students' learning behavioral engagement. The results of the study are of great practical value to educators, teachers and network technicians in designing and applying a scientific, standardized and rational network ecosystem. This study also calls for researchers to devote more attention and effort to understanding the nature of teachers' influence on learners' synchronous online learning support and to explore effective ways in which teachers can leverage their influence to more effectively facilitate learners' use of technology for online learning. Based on the results of the study, it will be useful for college students to make rational and effective use of the online ecosystem to conduct

online learning and for teachers to carry out teaching interventions more effectively.

Despite rigorous research procedure adopted, this study has some limitations. Firstly, the small sample size in this study may lead to unreliable and less generalizable results. Therefore, future research may consider to expand the sample size to increase confidence in the results. Secondly, this study is constrained to a specific population and curriculum program, so caution may be needed in applying the conclusions to other areas. It is suggested that the scope of the future study should be further expanded to obtain more comprehensive and accurate conclusions. Thirdly, this study adopted cross-sectional research method rather than comparison of experimental methods. Future research is recommended to conduct comparative analysis to further improve the scientific and reliable nature of the study.

## Conflict of Interest

There is no conflict of interest.

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There are no funds and supports received in this study.

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