

# Measuring Students' Online Language Learning Engagement: Towards the Development and Validation of a Scale

Lin LUAN<sup>ab\*</sup>, Yan DONG<sup>b</sup> & Miao CAO<sup>b</sup>

<sup>a</sup>*Department of Foreign Languages, Beijing University of Posts and Telecommunications, China*

<sup>b</sup>*School of Educational Technology, Beijing Normal University, China*

\*luanlin32@126.com

**Abstract:** Language educators face significant challenges of engaging language learners especially in the online course of target language learning. Low participation and disinterest in online learning activities are commonly related to low student engagement in online classes. Along with the adversity in the online course of target language learning, student engagement is considered to play a pivotal role on learners' continuous effects and academic achievements in second language learning. Although there has been a growing interest in the conceptualization of student engagement, the literature lacks a subject-specific measuring instrument to operationalize engagement in an online setting. This study attempts to fill this gap by developing and validating an online language learning scale (OLLE) scale for university students. The sample included 454 students at a large comprehensive university in China. Both exploratory and confirmatory factor analyses were conducted to determine construct validity and reliability. Consistent with the adopted theoretical framework, the 19-item OLLE scale comprised four components: behavioral engagement, cognitive engagement, emotional engagement, and social engagement. It is also indicated that EFL learners had the highest level of behavioral engagement and the lowest level of emotional engagement in the process of online language learning. These results along with their implications within the pedagogical and research contexts are also discussed in this study.

**Keywords:** student engagement, scale development, online language learning, English as a foreign language (EFL), higher education

## 1. Introduction

Due to the COVID-19 across the world, a growing number of learning activities is taking place in online contexts such as tutoring systems or virtual learning communities. However, due to the temporal and spatial separation among teachers and learners in the technology-enhanced learning environment, students may suffer a sense of loneliness, disconnectedness and other negative feelings. Low participation (Thomas, 2002) and disinterest in online learning activities (Xie, Durrington, & Yen, 2011) are commonly related to low student engagement in online classes. Confronting the difficulties and challenges in the online course of target language learning, learners need to depend on a series of cognitive, affective, and behavioral components in order to persist and then to complete the learning tasks (Zheng, Liang, Li, & Tsai, 2018). Among these components, learners' engagement are crucial element for enhancing learner motivation and their academic achievement (e.g. Connell, Spencer, & Aber, 1994; Fredricks et al., 2016; Wang & Holcombe, 2010).

## 2. Literature Review

Engagement can be viewed as active participation in the learning process, and contributes to deeper and more meaningful learning. When the learners are involved and interested in meaningful tasks, they learn more effectively, and are more likely to retain and transfer the information to other contexts (Kearsley & Schneiderman, 1998). In the context of online learning, student engagement is an

integrated learning process guided by a set of motivational beliefs, behaviors, and metacognitive tasks that are planned and adapted to support the pursuit of personal goals (Wang, 2017).

The multifaceted nature of engagement (Liu, Wang, & Tai, 2016; O'Brien & Toms, 2008; Trevino & Webster, 1992) is typically described as having three or four components (Ding, Kim, & Orey, 2017). The most prevalent conceptualization in the literature suggests that engagement consists of three distinct, yet interconnected elements: behavioral, emotional, and cognitive engagement (Fredricks, Blumenfeld, & Paris, 2004). In the current research, the four-component model proposed by Fredricks et al. (2016) is adopted to represent online learning engagement, including cognitive engagement, behavioral engagement, emotional engagement, and social engagement.

Based on the definition given by the previous researchers (e.g. Fredricks et al., 2004; Meece, Blumenfeld, & Hoyle, 1988; Finn, 1989; Finn and Zimmer, 2012), a summary of these four dimensions is provided as follows. Behavioral engagement refers to the participation, effort, attention, persistence, positive conduct, and the absence of disruptive behavior. Cognitive engagement focuses on the student's level of investment in learning, including being thoughtful, strategic, and willing to exert the necessary effort for comprehension of complex ideas or mastery of difficult skills. Emotional engagement represents students' psychological reactions to academic environments, such as boredom or enjoyment. Social engagement concerns students' prosocial behavior in classrooms and the quality of interactions with peers around instructional content.

Considering the dramatic differences between conventional classroom-based and online learning environment, subject-specific measures of engagement need to be developed for assessing learners' engagement within different academic domains in online settings. Following Fredricks et al. (2016) theoretical model, the current research aimed at examining English language learners' engagement in an online learning environment. To achieve the research purpose, this study seeks to adapt and validate the math and science engagement scale of Fredricks et al. (2016) with the participation of Chinese EFL learners.

### **3. Method**

#### *3.1 Participants*

This present study was undertaken in a compulsory and credit-bearing EFL language course at a comprehensive university in the northeast of China. In this study, a convenience sampling strategy was used with a total of 454 freshmen (338 males and 116 females; average age: 19.3 years) who took this online class during the pandemic lockdown period were involved in this study. All the participants voluntarily responded to the questionnaire anonymously in one setting. It took about 5-10 minutes for the participants to complete the questionnaires.

#### *3.2 Instrument*

The questionnaire was adapted from the previous instrument of Fredricks et al. (2016). The original survey was reported to have high overall internal consistency reliability (Wang et al., 2016). The following is a brief description of the questionnaire. First, the four factors in the original questionnaire for measuring Math and Science Engagement (Fredricks et al., 2016), namely, "Cognitive engagement," "Behavioral engagement," "emotional engagement," and "Social engagement" were maintained in the OLLE scale, but the questionnaire items were changed slightly by replacing "learning math and science" with "learning English online." For instance, we changed the item 'I try to connect what I am learning to things I have learned before.' to 'I try to connect what I am learning in this online English class to things I have learned before.' After modifying the previous questionnaire, three experts in English language education were invited to examine the content of all the questionnaire items, providing expert validity for the survey. Eight university students were invited to think aloud when completing the survey, and made further minor revisions of the wording of certain items based on their comments. All the questionnaire items were presented in students' native language, Chinese, on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The sample items of the four subscales are presented below:

- Cognitive engagement (6 items): I try to connect what I am learning online to things I have learned before.
- Behavioral engagement (5 items): I stay focused in the process of learning English online.
- Emotional engagement (4 items): I look forward to learning English online.
- Social engagement (4 items): I build on others' ideas while studying English online.

### 3.3 Research procedure

Both exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were conducted to address the construct validity of the OLLE scale. The Statistical Package for the Social Sciences (SPSS 22.0) and the Analysis of Moment Structures (AMOS 24.0) were utilized to fulfil the purpose of this study. The procedure of data analysis included the following phases. First of all, the quantitative data obtained from the 454 participants were randomly divided into equal halves with 227 students respectively. Second, exploratory factor analysis (EFA) was used to test the construct validity of the OLLE questionnaire among the first set of participants (227 students, including 163 male and 64 female students). Then, confirmatory factor analysis (CFA) was performed to provide the constructive validity of the scale among the second set of participants (227 students with another 175 male and 52 female students).

## 4. Results

### 4.1 Exploratory factor analyses

The scale for evaluating students' online language learning engagement in this research was adapted from the Math and Science Engagement Scale developed by Fredricks et al. (2016). Therefore, a re-examination of the factor structure and reliability of the factors for this survey was performed with the method of principal component factoring and Varimax rotation. Following the principle stated by Stevens (2012), items with loadings weighted greater than 0.40 on the relevant factor and less than 0.40 on all the other factors were kept in the finalized OLLE.

Table 1 shows the results of the exploratory factor analysis for the OLLE instrument. As a result, a total of 19 items were retained and grouped into four factors. The four factors were "cognitive engagement" ( $\alpha=0.90$ , Mean =3.20, SD = 0.98), "behavioral engagement" ( $\alpha=0.87$ , Mean =3.48, SD = 0.87), "emotional engagement" ( $\alpha=0.88$ , Mean =2.90, SD = 0.98), and "social engagement" ( $\alpha=0.90$ , Mean =3.33, SD = 0.92). The factor loadings for all the items were all greater than 0.60, ranging from 0.68 to 0.86. The total variance explained for the scale was 69.24%. The Cronbach's alpha value for each factor ranged from 0.87 to 0.90, indicating satisfactory internal reliability and validity for conducting further confirmatory factor analysis.

Table 1. *The EFA analysis of the OLLE scale (N = 227)*

	Factor 1	Factor 2	Factor 3	Factor 4
	Cognitive	Behavioral	Emotional	Social
<b>Cognitive Engagement (CE) (M=3.20 , SD=0.98, <math>\alpha=0.90</math>)</b>				
Cognitive 1	0.76			
Cognitive 2	0.72			
Cognitive 3	0.78			
Cognitive 4	0.75			
Cognitive 5	0.74			
Cognitive 6	0.71			
<b>Behavioral Engagement (BE) (M=3.48 , SD=0.87, <math>\alpha=0.87</math>)</b>				
Behavioral 1		0.80		
Behavioral 2		0.81		
Behavioral 3		0.79		
Behavioral 4		0.68		

Behavioral 5	0.70	
<b>Emotional Engagement (EE) (M=2.90 , SD=0.98, <math>\alpha</math>=0.88)</b>		
Emotional 1	0.84	
Emotional 2	0.85	
Emotional 3	0.80	
Emotional 4	0.77	
<b>Social Engagement (SE) (M=3.33 , SD=0.92, <math>\alpha</math>=0.90)</b>		
Social 1		0.83
Social 2		0.86
Social 3		0.85
Social 4		0.78

Overall alpha: 0.91; total variance explained: 69.24%.

#### 4.2 Confirmatory factor analysis

In order to verify the construct of the OLLE scale, confirmatory factors analysis was conducted. As shown in table 2, all Average Variance Extracted values (AVE) of components of online learning engagement had exceeded the cut-off value of 0.50, the Composite Reliability values (CR) ranged from 0.88 to 0.91, all alpha values were above 0.87 and the overall Cronbach's value was 0.93. Therefore, the reliability of the questionnaire was established. Moreover,  $\chi^2/df = 2.138$ , RMSEA=0.072, IFI=0.93, CFI=0.93, NFI=0.88, GFI=0.85. According to Hair et al. (2006), a reasonable value of the ratio of chi-square to the degree of freedom ( $\chi^2/df$ ) is under 3.0. A reasonable fit of Root Mean Square Error of Approximation (RMSEA) and Standardized Root Mean Square Residual (SRMR) are acceptable if below 0.08. As suggested by Hair et al. (2006) and Gefen, Straub, and Boudreau (2000), the Incremental Fit Index (IFI), the Comparative Fit Index (CFI), the Normed-Fit Index (NFI), and the Goodness of Fit Index (GFI), are best if above 0.90 and demonstrate marginal acceptance if above 0.80. Hence, statistics all indicated that OLLE scale demonstrates good reliability and structural validity.

Table 2. *The CFA analysis of the OLLE scale (N = 227)*

Factor and item	Factor loading	t-value	CR	AVE	Alpha value	Mean	S.D.
<b>Cognitive Engagement</b>	–	–	0.91	0.64	0.91	3.11	1.04
Cognitive 1	0.80	–				3.05	1.34
Cognitive 2	0.83	14.04*				3.02	1.26
Cognitive 3	0.86	15.59*				3.30	1.18
Cognitive 4	0.81	14.23*				3.08	1.23
Cognitive 5	0.80	14.10*				3.16	1.25
Cognitive 6	0.69	11.28*				3.08	1.19
<b>Behavioral Engagement</b>	–	–	0.88	0.59	0.87	3.44	0.88
Behavioral 1	0.85	–				3.45	1.06
Behavioral 2	0.80	13.86*				3.45	1.04
Behavioral 3	0.81	14.03*				3.40	1.05
Behavioral 4	0.73	12.00*				3.63	1.10
Behavioral 5	0.64	10.23*				3.27	1.15
<b>Emotional Engagement</b>	–	–	0.90	0.70	0.90	2.84	1.02
Emotional 1	0.83	–				2.83	1.10
Emotional 2	0.85	14.69*				2.95	1.20
Emotional 3	0.88	15.30*				2.80	1.21
Emotional 4	0.79	13.20*				2.81	1.12

<b>Social Engagement</b>	–	–	0.91	0.63	0.91	3.26	0.95
Social 1	0.72	–				3.43	1.06
Social 2	0.83	11.83*				3.13	1.23
Social 3	0.84	11.99*				3.30	1.16
Social 4	0.86	12.26*				3.09	1.18

Total alpha: 0.93

Notes: CFA: Confirmatory Factor Analysis; CR; Composite Reliability; AVE: Average Variance Extracted; SD: Standard deviation.

## 5. Discussion

First and foremost, this paper reports on the development and validation analyses for the scale of students' online language learning engagement conducted in an EFL online learning context in China. Through both exploratory and confirmatory factor analyses, the findings indicated that learners' online language learning engagement include four factors, named as cognitive engagement, behavioral engagement, emotional engagement, and social engagement, revealing similar results as those of Fredricks et al.'s (2016) study. However, different from the previous studies conducted among primary school students, this research focused on the EFL learners in tertiary education. The findings presents the significance to duplicate the validation processes within different educational levels and subject matters to confirm valid clarification of the survey results.

The results of this study also revealed that EFL learners demonstrated the highest level of behavioral engagement followed by social engagement and cognitive engagement, while they had the lowest scores in emotional engagement. This finding implied that EFL learners believed that although they actively involved in task-based online activities of English language learning, they still displayed inadequate interest or positive emotional reactions to the online learning context. This finding is in conjunction with Xie, Debacker, and Ferguson's (2006) finding in which students' perceived enjoyment in online learning activities descended steadily throughout the semester. One of the possible reasons for this might result from lacking opportunities to interact, collaborate and receive feedback and social support in distance education (Tuckman, 2007). Similar results were also obtained in a study conducted in a K-12 online learning setting by Kim, Park and Cozart (2014). In their study, they found that lack of interpersonal interactions and the chance of receiving social support from peers may give rise to students' anger that impeded their pace and actions of studying.

This study has several limitations and consequently implications for future research. First, it should be cautioned that the current study only employed quantitative measures. Future study could also combine other data collection methods, such as interview, performance-based method, in order to examine students' OLLE thoroughly. Second, the diversity of research sample needs to be enriched. The use of more ethnically and socioeconomically diverse samples is important for understanding whether some dimensions of engagement are more important than others for enhancing online language learning engagement among minority youths and students from low-income families (Wang, Fredricks, Ye, Hofkens, & Linn, 2016). Finally, as students' engagement in online learning activities may change over time (Liu, Chen, Lin, & Huang, 2017), the OLLE instrument needs to be refined and updated, which would be critical for understanding student engagement in different contexts, and designing pedagogical interventions aimed at increasing student engagement in a long-term online learning experience.

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