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Online Interaction and Learning Engagement of Senior High School Students in a Less-Developed Region in China

Jingyi WANG & Chunping ZHENG*
School of Humanities, Beijing University of Posts and Telecommunications, China
*zhengchunping@bupt.edu.cn

Abstract: This questionnaire-based survey research was conducted among 571 English language learners of a less-developed region China. Quantitative data was collected to explore the internal structure of high school students' online interaction and learning engagement and reveal the relationship of the two research constructs. Results showed that there are three factors of high school learners' online interaction including teacher-student interaction, student-student interaction and student-content interaction. There are four factors of learning engagement including cognitive engagement, behavioral engagement, emotional engagement and social engagement. Correlation analysis confirmed the positive correlation between learners' online interaction and learning engagement. The results of the stepwise regression analysis further proved that the interaction between learners and learning materials as well as the interaction among participants have the strongest prediction for learning engagement and can positively predict all variables of learning engagement. The research results provided pedagogical implications for high school online language education in minority areas, and provided inspirations for designing online courses in the future.

Keywords: Online interaction, learning engagement, English language learners

1. Introduction

English teaching in less-developed regions were usually carried out based on face-to-face classes, with little experience of technology-supported language teaching and practices (Zhou et al., 2021). However, since the outbreak of COVID-19 epidemic, the less-developed regions in China positively tried to implement online education in various forms, which facilitated researchers to analyze the online language learning of high school students in ethnic minority regions and provided convenience for online English teaching practices.

Online learning has many advantages. Compared with in-class courses, it transcends the limitations of time and space (Sun & Rueda, 2012) and equipped learners with more opportunities for self-learning. Online courses were also considered as a more convenient, flexible, and interesting form of teaching (Tuckman, 2007). This study focused on the online interaction and learning engagement of 571 high school English language learners from an Ethnic Senior High School in Changshun County, Qiannan Buyi and Miao Autonomous Prefecture in Guizhou Province in China. Combining the quantitative and qualitative datas, this study analyzed the status quo of online English learning among these high school students and explored the internal structure and the relations of their online interaction and learning engagement. This study also provided pedagogical suggestions for improving online English teaching in high schools in ethnic minority areas.

2. Literature Review

Interaction is important for students' learning effectiveness and the quality of online education (Sher, 2009). Moor (1993) divided the interaction in online learning into three dimensions, namely, learner-instructor interaction, learner-learner interaction, and learner-content interaction.

Student-teacher interaction was identified as teacher's guidance, encouragement, and evaluation, as well as students' willingness to communicate and give feedback. Student-student interaction included team work, in-class communication, and after-class discussion which are usually conducted without teachers' involvement. The interaction between students and learning materials referred to the process of students' acquiring information from multimedia platforms or taking advantage of online materials to conduct their language learning, which in this study is represented by students learning through recorded English lectures and various online platforms. Researchers have explored online interactive teaching models and its teaching efficiency based on the above models (e.g., Li, 2020; Li, Liang & Xue, 2018; Yang & Wang, 2019), but research on interaction in online language learning for high school learners in less-developed areas is still rare.

In the 1930s, Tyler pointed out that learning engagement referred to the time and effort that learners put in learning tasks (Merwin, 1969). Newman (1992) and his colleagues studied middle school students' learning engagement in the U.S. and proposed that learning engagement consisted of both psychological and behavioral aspects. Fredricks and his colleagues (2004) proposed that learning engagement is a multidimensional concept that included three main dimensions, namely, behavioral engagement, emotional engagement, and cognitive engagement. Behavioral engagement referred to students participating in positive classroom-based learning activities. This dimension could be evaluated through students' in-class attention, participation, and homework completion. Emotional engagement reflected students' attitude towards teachers, peers, and classroom activities, which also included their interest in learning (Finn & Voelkl, 1993). Cognitive engagement was the process where students conducted self-regulated learning using various learning strategies based on their self-awareness (Zimmerman, 1990). Fredricks et al. then added a social engagement dimension to the three-dimension model. Social engagement referred to the learner's social interaction with teachers and peers, and demonstrated learner's willingness to establish and maintain relationships with them in the learning process (Wang et al., 2016).

In this study, a questionaaire-based survey study was conducted to investigate 571 high school English learners' online interaction and learning engagement. Three research questions were identified as followed:

(1) What are the factorial structures of high school English language learners' online interaction and learning engagement in a less-developed region in China?

(2) What is the relationship between high school English language learners' online interaction and learning engagement in a less-developed region in China?

3. Research Design

3.1 Research Context and Participants

This study aimed to analyze high school student's online English language learning and to explore the internal structures of online interaction and learning engagement of high school students. The study was conducted at a public senior high school, Changshun Middle School of Nationalities in Changshun County, Qiannan Bouyei and Miao Autonomous Prefecture, Guizhou Province. Due to the economic constraints in the county, the school was equipped with only four multimedia classrooms, and students were not allowed to use electronic devices such as mobile phones in class. Students' had limited access to online learning resources.

3.2 Participants

During the COVID-19 epidemic, Changshun Middle School of Nationalities held English courses online. Through random sampling, the researcher selected 571 senior high school students as participants Among them, 321 were girls and 250 were boys, with an average age of 17 and nearly 75% of the participants ethnic minorities. They were invited to respond to a questionnaire after taking English courses online, and their personal information remained anonymous during the investigation.

Among all of our 571 participants, 504 students (88.3%) watched recorded online English courses through SkyQian. 304 students (53.2%) used E-net to study English online; 115 students

(20.1%) conducted their language learning and sought help through the online app Dingding and 101 students (17.7%) used Tecent Conference and QQ to participant in real-time interactive online English courses. They generally believed that online English courses could help with their language learning.

3.3 Instrument

In this study, a questionnaire consisting of three parts was adopted as the research instrument. The first two parts were two questionnaires of English language learners' online interaction and learning engagement, which were developed using a five-point Likert scale, from 1 "I do not agree at all" to 5 "I strongly agree". The third part of the questionnaire included eight open-ended questions, aiming to collect data and analyze the status quo of high school students' online English learning in ethnic minority regions. Since English is a foreign language for our participants, the whole questionnaire was translated into Chinese.

3.4 Data Collection and Analysis

In this study, data was collected using questionnaires and was analyzed through various methods. In order to answer the two research questions, data was analyzed in the following three steps. First, EFA and Cronbach's alpha test were conducted to explore the factorial structures of high school students' online interaction and learning engagement in online English courses in the less-developed region. Second, the correlation between the finalized online interaction and learning engagement factors was analyzed through Pearson correlation coefficient. Finally, stepwise regression analysis between the factors of the two questionnaires was conducted. The online interaction factors were considered as predictor variables, and the learning engagement factors were processed as outcome variables.

4. Research Results

4.1 Factorial Structures of High School Students' Online Interaction and Learning Engagement

The research investigated the factorial structures of high school students' online interaction and learning engagement when they learn English online in a less-developed region in China. EFA were conducted and the results indicated that high school students' online interaction in English language learning included three different dimensions while their learning engagement consisted of four factors. The results were consistent with previous studies on learners' online interaction and learning engagement (e.g., Wang, 2013; Fan, 2019; Zheng et al, 2021).

Table 1. *Rotated factor loadings and Cronbach's alpha values for students' online interaction*

Factors	Questions	Factor Loadings	Mean	S.D.	α
Student-Teacher Interaction (ST)	1. The teacher will regularly notify me of my study progress by posting notices through online platforms like WeChat groups.	0.75	3.66	0.65	0.76
	2. The teacher will regularly post assignments and marking rules through online platforms like WeChat groups.	0.82			
	3. The teacher will regularly show us outstanding assignment cases through online platforms like WeChat groups.	0.81			
Student-Student Interaction (SS)	4. I can share my ideas with my classmates in online English courses.	0.83	3.39	0.68	0.84
	5. I can communicate with my classmates in online English courses.	0.86			

	6. Enhancing interactions with my classmates will help me with learning English online.	0.70			
Student-Content Interaction (SC)	7. Online learning materials (e.g. class handouts) can help me with learning English online.	0.72	3.48	0.61	0.88
	8. Participating in online learning tasks or group activities can help me with learning English online.	0.75			
	9. Preparing for online learning tasks or group activities can help me with learning English online.	0.78			
	10. Online English courses improved my ability to solve problems and facilitated my language learning.	0.79			
	11. Online English courses trained my ability of critical thinking and facilitated my language learning.	0.79			

Note. Overall alpha=0.74, total variance explained=70.23%, N=571.

Table 1 and Table 2 showed the EFA results for the questionnaires of online interaction and learning engagement. Researchers used the principal component analysis as the extraction method, and the Varimax with Kaiser Normalization as the rotation method (Kaiser, 1958). As indicated in Table 1, three factors were identified in high school students' online interaction, namely, student-teacher interaction (ST), ($\alpha = 0.76$, Mean = 3.66, S.D. = 0.65), student-student interaction (SS), ($\alpha = 0.84$, Mean = 3.39, S.D. = 0.68), and student-content interaction (SC), ($\alpha = 0.88$, Mean = 3.48, S.D. = 0.61). The total variance explained was 70.23%. The overall alpha of this research was 0.74, and the alpha coefficient of this study was over 0.70 for each factor.

As shown in Table 2, high school students' learning engagement consisted of four factors, namely, cognitive engagement (CE), ($\alpha = 0.79$, Mean = 3.34, S.D. = 0.64), behavioral engagement (BE), ($\alpha = 0.85$, Mean = 3.48, S.D. = 0.58), emotional engagement (EE), ($\alpha = 0.89$, Mean = 3.41, S.D. = 0.65), and social engagement (SE), ($\alpha = 0.89$, Mean = 3.42, S.D. = 0.61). The total variance explained was 67.42%. The overall alpha of this research was 0.90, and the alpha coefficient of this study was around 0.80 for each factor. The results of both tables clearly indicated that the internal consistency of all factors was sufficient for statistical analysis.

Table 2. *Rotated factor loadings and Cronbach's alpha values for students' learning engagement*

Factors	**Questions**	**Factor Loadings**	**Mean**	**S.D.**	**α**
Cognitive Engagement (CE)	1. I will think about different methods to finish learning tasks.	0.76	3.34	0.64	0.79
	2. I try to think hard when learning English online.	0.61			
	3. I will think positively and try to challenge the problems I encountered.	0.75			
Behavioral Engagement (BE)	4. I am not learning English online to satisfy teachers	0.69			
	5. I will finish the learning tasks within stipulated time.	0.52	3.48	0.58	0.85
	6. I would love to participate in online courses.	0.72			
	7. I will not give up when I meet with difficulties.	0.63			
	8. I will stick to online learning even I have difficulties.	0.66			
Emotional Engagement	9. I'm looking forward to participating in online courses.	0.68	3.41	0.65	0.89

(EE)	10. I love to experience and learn new technologies through online courses.	0.74			
	11. I hope to learn more knowledge online.	0.67			
	12. I feel happy when doing learning tasks.	0.72			
	13. I find this learning form (online) very interesting.	0.75			
Social Engagement (SE)	14. I refer to the prompts or experiences given by other students in online learning tasks.	0.66	3.42	0.61	0.89
	15. I will try to do the tasks with classmates who can help me.	0.62			
	16. I will try to help the students who meet with difficulties when learning online.	0.70			
	17. I am very concerned about the ideas and suggestions of my classmates or teachers.	0.62			
	18. I like to share achievements and ideas when learning online.	0.74			
	19. I like to work with others when doing learning tasks.	0.73			

Note. Overall alpha=0.90, total variance explained=67.42%, N=571.

4.2 The Relationship between High School Students' Online Interaction and Learning Engagement

In this study, Pearson correlation analysis was conducted among all the online interaction and learning engagement factors to further explore the relationships among these dimensions of both questionnaires. As shown in Table 3, all factors were significantly correlated with each other ($p < 0.001$), with the correlation coefficient floating from 0.37 to 0.74.

Table 3. *Correlation analysis among the factors of high school students' online interaction and learning engagement*

	Mean	**S.D.**	**ST**	**SS**	**SC**	**CE**	**BE**	**EE**	**SE**
ST	3.66	0.65	1						
SS	3.39	0.68	0.41**	1					
SC	3.48	0.61	0.45**	0.63**	1				
CE	3.34	0.64	0.37**	0.54**	0.67**	1			
BE	3.48	0.58	0.47**	0.54**	0.66**	0.70**	1		
EE	3.41	0.65	0.38**	0.56**	0.63**	0.63**	0.72**	1	
SE	3.42	0.61	0.39**	0.60**	0.65**	0.67**	0.73**	0.74**	1

Note. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

This study also conducted stepwise regression analysis by using learners' online interaction to predict their learning engagement. The online interaction factors were identified as predicators, while the learning engagement factors were considered outcome variables. As indicated in Table 4, the stepwise regression analysis results showed that these two factors, "student-content interaction" and "student-student interaction" made the two most significant predictions for all learning engagement factors. As a result, these two factors played an important role in learners' learning engagement in online English language learning environments and could effectively predict most of the aspects of high school English language learners' learning engagement. SC positively predicted English language learners' cognitive engagement ($\beta = 0.54$, $T = 13.74$, $p < 0.001$), behavioral engagement ($\beta = 0.47$, $T = 11.58$, $p < 0.001$), emotional engagement ($\beta = 0.44$, $T = 10.41$, $p < 0.001$), and social engagement ($\beta = 0.43$, $T = 10.62$, $p < 0.001$). Besides, SS ($p < 0.001$) and ST could also positively predict all four variables of online learning for high school English learners from ethnic minority regions. While ST's

predictive power was weaker than SC and SS for explaining high school English language learners' emotional engagement ($p < 0.05$) and social engagement ($p < 0.05$).

Table 4. *Stepwise regression model for predicting students' online interaction and learning engagement*

Outcome Variables	Predicators	B	S.E.	β	T	R^2
Cognitive Engagement (CE)	Student-Student Interaction (SS)	0.19	0.04	0.20	5.04***	
	Student-Content Interaction (SC)	0.57	0.04	0.54	13.74***	0.469
	Constant	0.71	0.12		5.95***	
Behavioral Engagement (BE)	Student-Teacher Interaction (ST)	0.17	0.03	0.20	5.75***	
	Student-Student Interaction (SS)	0.14	0.03	0.16	4.05***	
	Student-Content Interaction (SC)	0.45	0.04	0.47	11.58***	0.484
	Constant	0.83	0.12		6.97***	
Emotional Engagement (EE)	Student-Teacher Interaction (ST)	0.09	0.04	0.09	2.56*	
	Student-Student Interaction (SS)	0.27	0.04	0.25	6.01***	
	Student-Content Interaction (SC)	0.47	0.05	0.44	10.41***	0.447
	Constant	0.65	0.14		4.61***	
Social Engagement (SE)	Student-Teacher Interaction (ST)	0.07	0.03	0.08	2.25*	
	Student-Student Interaction (SS)	0.27	0.04	0.30	7.62***	
	Student-Content Interaction (SC)	0.43	0.04	0.43	10.62***	0.488
	Constant	0.77	0.13		6.15***	

Note. N=571, *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

5. Conclusion

Based on the theoretical framework of online interaction and learning engagement, this study explored the factorial structures of high school English language learners' online interaction and learning engagement in a less-developed region in China. It further explored the relationship between these online interaction factors and learning engagement factors. This study verified the importance of high school English learners' online interaction in predicting their learning engagement.

Besides, two pedagogical implications were identified in order to further facilitate online language teaching practices in less-developed regions in China. On one hand, teachers should pay more attention to students' difficulties during online learning and provide timely assistance though during or beyond online language courses. Supplementary multimedia resources could be provided in addition to the recorded online courses. Students' instant interaction with teachers and classmates may be further enhanced in live-stream English courses, synchronous online teaching or could be conducted to improve teacher-student interaction. More technical support and learning strategies training should be provided for high school language learners to help learners develop more positive learning attitudes and learning experiences in online learning environments.

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