

Students' Isolation Challenges in Blended EFL Learning During COVID-19: How Can Social Presence and Interaction Help Develop Sense of Community?

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Purpose: Due to COVID-19, many English as a foreign language (EFL) teachers chose to blend online and offline teaching. However, students in this modality face challenges in presence and feel isolated. Thus, the research investigated the relationship between social presence and sense of community in Chinese blended EFL learning during the pandemic and examined the role that interaction played in the relationship between social presence and sense of community.

Participants and Methods: Based on a purpose-sampling, 237 EFL students from three universities in the eastern part of China participated in this study using a set of self-rated questionnaires that assessed three variables: social presence, interaction, and sense of community. SPSS 23.0 and AMOS 24.0 were used to verify the hypotheses through structural equation modeling.

Results: This study found that ① the mean scores of social presence, interaction and sense of community varied from results of previous studies before the outbreak of COVID-19, and possible reasons were discussed; ② social presence had a significant impact on sense of community ($p < 0.05$) without interaction as the mediator, and interaction proved to be a full mediator in the relationship between social presence and sense of community [$\beta = 0.164$, $p = 0.001$, 95% CI (0.072, 0.311)].

Conclusion: In blended EFL learning during COVID-19 in China, social presence was positively related to sense of community, and interaction mediated this relationship fully. The present findings could help teachers better facilitate the virtuous interaction circle in online or blended EFL learning and, in turn, promote effective learning of learners.

Keywords: social presence, interaction, sense of community, blended language learning, structural equation modeling

Introduction

The 2021 EDUCAUSE Horizon Report described a growing demand for courses in blended learning modality during the post-pandemic period.¹ According to,² blended language learning has gained recognition in English as a foreign language (EFL) teaching. Owing to the outbreak of COVID-19, online or blended learning has been receiving growing popularity in higher education to sustain continuous learning in emergent situation, EFL education was no exception. During the process, teachers pointed out that this sudden change in remote teaching was different from well-planned online teaching.³ Both teachers and students met with various kinds of challenges, including over workload,⁴ insufficient knowledge about technology,⁵ and post-pandemic trauma (eg, isolation).⁶ In addition, the reopening of different levels of educational institutions would not be an easy assignment.

In China, there was a smooth transition from online emergency learning to normal offline education in 2021. With online emergency teaching experiences in 2020 and the support from both the government and the university, many EFL teachers, adopting blended learning after the social distancing policy,⁴ were encouraged to make attempts at various forms of blended learning using social network applications or learning management systems like DingTalk, WeChat, and QQ. The indefinite choice of blended language learning during COVID-19 was due to the flexibility of integrating online and offline advantages.⁷

Blended learning, defined as a combination of face-to-face and online learning,⁸ can provide a richer educational experience than traditional and online learning.⁹ Many studies in different fields across the world rate blended learning higher compared to traditional face-to-face learning or fully online learning,^{10–13} claiming that blended learning facilitates effective communication between learners and teachers,¹⁴ effective interaction between learners,¹¹ and effective interaction between learners and content.¹⁵ Language instructors tend to be more interested in blended learning due to its friendliness to social interaction, which is rather crucial in grasping the target language in EFL classes.¹⁶

However, maintaining social interaction continuously for meaningful learning was not an easy matter.¹⁷ Students have been reported to encounter many challenges in the online component of blended learning, including student isolation challenges.⁶ The downside of long-term distancing and online isolation may directly impact learner engagement and effectiveness in general,¹⁸ as evidenced in many places across the world.^{19–21} Students and teachers suffer from a sense of disconnectedness after the quarantine³ as the remote language teaching prompted by the COVID-19 crisis might meet with presence challenges. In this situation, the community could be crucial in integrating crisis-triggered remote language teaching with offline language teaching. According to,¹⁵ different interactions were vital in strengthening students' sense of community in an e-learning context, concluding that learner–instructor and learner–learner interaction could promote the e-learning sense of community, while learner–content interaction was the moderator. In particular,²² stresses the importance of social presence in engaging students within an online language learning community, and being involved in a learning community has a positive effect on student engagement and motivation.²³

According to,^{24,25} positive psychology aroused great attention in the field of second language acquisition.^{26,27} believed that positive emotions (emotional expression of social presence), arising from positive student–student, student–content, and student–teacher communications and interactions, are of great benefit to L2 learning. Conversely, limited social–affective interaction leads to a feeling of disconnectedness²⁵ or othering identities,²⁸ which results in low learning engagement or even academic dropout.²⁹ Given that social presence and interaction are important in the language learning process, and both online and offline classrooms are most likely to offer an overwhelming majority of the chances for students to practice the target language. Thus, I believe that it is significant to investigate the role of students' evaluative perceptions of social presence and interaction play in their sense of community in the L2 blended learning environment, which might influence students' purpose of meaning negotiation and their actual learning behaviors, and even the level of their actual academic achievement in the target language.

Given that social presence and interaction are environment-dependent and are likely to be influenced by different learning modes,³⁰ among many factors, the change of learning context may have altered student perception of social presence and interaction during COVID-19 (eg, crisis-prompted FL online learning, physical lockdown, and reopening after the distancing policy). However, how social presence and interaction influence students' sense of community jointly is under-researched in blended language learning settings during the pandemic. Therefore, this study is interested in students' socio-emotional perceptions of blended language learning during the pandemic. The degree to which a student perceives social presence and interaction to be valuable is prone to decide students' actual related behaviors in class. From the theoretical basis and the literature gap, this study intends to extend the current literature by examining the mechanism underlying the effect of social presence on sense of community and to explore the role of interaction in the mechanism in Chinese blended English learning settings during the pandemic.

Literature Review

According to³¹, language learning is a complex system and interaction can be viewed of great significance from two perspectives: social interaction from the micro perspective, and socio-cultural communication from the meso-level. The Community of Inquiry (CoI) model, emphasizing social interactions in online/blended learning environments,^{32–34} is a widely utilized framework both in online and blended learning settings, containing teaching presence, social presence and cognitive presence.³⁵ Social presence is understood as a projection of one's self in the form of a shared identity^{36,37} draws a parallel between social presence and student–student interaction, teaching presence and student–teacher interaction, and cognitive presence and student–content interaction, though the three presences all present psychological constructs arising from interaction.³⁸ According to¹⁷, the framing of social presence includes a dimension named interaction intensity, focusing on the level of interaction among learners.

It is widely acknowledged that interaction is of vital importance to language acquisition, which is supported by the well-known interaction view of language learning, the output hypothesis and sociocultural theory.¹⁶ Based on the sociocultural language teaching pedagogy, interaction is a necessity for knowledge negotiation and authentic language exercise in L2 classrooms.¹⁶ In the context of English as a foreign language (EFL), different types of interaction are more essential. Students usually do not accept the input of the target language (TL) outside the classroom,³⁹ and the language classroom is essentially based on social interaction practices.⁴⁰ As language learning is inherently social and interactive, students generally learn and use the knowledge of the target language through various forms of classroom exchange^{41,42} stressed the importance of positive emotional recognition of students, such as peer support, understanding from group members or teachers, and an enjoyable learning atmosphere that all contribute to the quality of L2 learning.⁴³ also called for more research on positive emotions in FL learning. In this regard, I predicted a high level of sense of community helped mitigate feelings of isolation and othering identities, and it is imperative to investigate the relationship between social presence and sense of community via interaction in blended language learning during the reopening period of COVID-19.

The cohesion of classroom community has been proven to be very important in higher education,^{25,44} as students in higher education are comparatively loosely connected (in contrast with senior high school) due to the different class schedule and routine arrangement in China. In the COVID-19 period, the boundary of class extends to both virtual and physical spaces. As mentioned above, the presence challenges in online or blended language learning and the isolation problems in the post-pandemic period⁴⁵ bring a sense of community into the research focus. According to the social exchange theory, sense of cohesion (community) can be viewed as mutual connectedness resulting from student commitment and contribution to the community, which is interaction-oriented and essentially social.^{15,44} For another, this cooperative climate and shared culture within a positive learning environment aligns with the philosophy of positive psychology's emphasis in second language acquisition, as evidenced by,²⁶ claiming that language teaching is an emotional profession.

Considering the complicated dynamic relationships among social presence, interaction and sense of community in blended language learning during COVID-19, the compelling evidence of social presence's influence on sense of community via interaction in a L2 contexts has to be explored in different instructional settings, which was the purpose of the current study.

Hypothesis Development

Social Presence and Sense of Community

On the basis of the existing literature, the connotation of social presence (SP) can be classified into three categories: nature of medium,⁴⁶ participants' interactive feelings or performance^{47,48} and a group construct.³⁶ The first category focuses on the inherent property of communication media; the second one on how people use them; the last on participants' ability of self-projecting in a community.⁴⁶ also pointed out that social presence is a multidimensional concept. Despite the lack of consensus in terms of the definition of social presence, it has received great attention.^{49,50} The Community of Inquiry (CoI) model is a widely adopted theoretic framework both in online and blended learning, including teaching presence, social presence and cognitive presence.⁵¹ It emphasizes the social interactions in online/blended learning contexts. According to the CoI model, social presence is considered to be a projection of one's self in the form of a shared identity, and includes the three dimensions of affection expression, open communication, and group cohesion.³⁶ As this study focuses on presence challenges and isolation issues of students in blended language learning during COVID-19, the three-dimensional construct of social presence is utilized.

The sense of community, firstly brought out by,⁵² and the four sub-dimensions of the Sense of Community Index was originally developed to measure the sense of community in their blocks.⁵³ extends sense of community to the context of classroom. As this study focuses on blended language learning classroom setting (both online and offline),⁵³ classification of sense of community was adopted. In this present study, sense of community is interpreted from two aspects: connectedness—the sense of connection among community members and the establishment of common learning goals, and learning—the promotion of learning and cognition as knowledge and meaning are co-constructed within the community. Connectedness indicates feelings of friendship, satisfaction, and belonging towards the community, which further could evolve into a sense of security and trust, encouraging community members to reveal learning gaps and to promote the learning process.

Literature shows that the three sub-dimensions of social presence—affective, interactive and cohesive—can help to identify possible obstacles and accelerating factors in developing a sense of community online^{25,54} also claimed that social presence contributed to the construction of a language teacher community, whereby sense of belonging depended

heavily on the extent of interaction.⁵⁵ Furthermore, social presence has been found to promote the establishment of a sense of community and sustain positive interpersonal relationships in online collaborative group works,⁵⁶ thus facilitating the cooperation process. Recently,²⁵ demonstrated that social presence plays a crucial role in influencing the cohesion of community in the undergraduate social media community. However, to my best knowledge, little research has been done in regard with the role of social presence in the development of sense of community via interaction in blended language learning context during the pandemic; thus, hypothesis 1 is established.

Hypothesis 1: Students' perception of social presence positively impacts their sense of community in blended language learning during COVID-19.

Social Presence and Interaction

The literature on social presence has been analyzed in the above section. Regarding the operational definition of interaction, this study adopted⁵⁷ classification of interaction: learner–content interaction, learner–instructor interaction, and learner–learner interaction, as his classical categorization could be the most cited in previous literature. According to,⁵⁷ learner–content interaction is a mutual interaction between learners and knowledge, and learner–instructor interaction appears in different forms of facilitation, discussion, negotiation with meaningful and productive gains, while learner–learner interaction means communications between learners both intellectually and emotionally. Previous studies suggested many antecedents of interaction in online/blended learning contexts: technological tools like different learning management systems,⁵⁸ pedagogical design such as interaction rules and regulations.^{59,60}

Coming down to the relationship between social presence and interaction, the three presences of the CoI framework are believed to be closely related with interaction,³⁸ and a positive association between social presence and interaction has been validated among preservice EFL teachers.⁹ Furthermore,¹⁷ found that the framing of social presence includes the dimension of interaction intensity, which reflects the level of interaction among learners. To a different extent, some researchers have also reported that there is a correlation between social presence and interaction in online/blended learning using both quantitative and qualitative methods.^{61–64} For example, group size has been found to influence learners' perceived social presence according to the extent of interaction,⁶¹ and more time and opportunities for interaction have been found to result in greater social presence and group cohesion.⁶⁵ However, other research showed a potential negative impact of interaction in the learning community.⁶⁶ Therefore, I am interested in the relationship between social presence and interaction in blended language learning during COVID-19, due to the transitional change from online learning to blended learning during the pandemic. In this way, hypothesis 2 was built.

Hypothesis 2: The perception of social presence has a positive influence on their perceived interaction in blended language learning during COVID-19.

Interaction and Sense of Community

During the pre-pandemic period, studies have shown that more opportunities to build social relationships promote a sense of community for online graduate learners.⁶⁷ Furthermore, learner–instructor and learner–learner interactions significantly increase students' sense of community with student–content as the moderator, which in turn increase student adherence to using e-learning platforms.¹⁵ In addition, Korean ELT teachers have been reported to attain a greater sense of belonging when they interact with each other more frequently and intensively.^{55,68} When facilitating the accumulation of knowledge, interaction also transforms learners' participation and promotes interactive collaboration, thus satisfying their educational needs in the community-building process. Other studies believe that positive student–teacher relationships in EFL classroom would help reduce student isolation,^{16,28} fostering shared learning goals and increasing FL acquisition.

After the several lockdown months in 2020, and even after the resumption of normal offline learning in the classroom in 2021, student perception of presence and interaction changed dramatically. Literature investigating the correlation between student perception of interaction and sense of community in a Chinese blended language setting, especially during the post-pandemic reopening period, was scarce. In this study, it is predicted that the change may have influenced sense of community as the concept of community extends to both online and offline contexts. Therefore, this research

adds to the existing literature and it is imperative to examine the association between student perception of social presence and sense of community, and how interaction relates to these two constructs in blended language learning.

Hypothesis 3: Students' perception of Interaction is positively correlated with their sense of community in blended language learning during COVID-19.

Hypothesis 4: The relationship between social presence and sense of community is mediated by interaction in blended language learning during COVID-19.

The Proposed Research Model

The present study establishes the research model (see Figure 1) based on the four hypotheses that explain the relationship existing between social presence (SP) and the other two variables: interaction (IN) and sense of community (SoC). Route c (SP→SoC) indicates that social presence is positively and significantly correlated with sense of community. Route a (SP→IN) shows that social presence and interaction are positively and significantly related. Route b (IN→SoC) indicates the positive and significant relation between interaction and sense of community. Finally, interaction is the mediator in the relation between social presence and sense of community (SP→IN→SoC).

Methodology

Participants

A total of 255 college students from three universities in the eastern part of China participated in this study in the fall semester of 2021. A valid sample of $N = 237$ students (53 men and 184 women; $M_{\text{age}} = 19.43$ years, $SD = 1.14$) was obtained after discarding missing data. These participants were chosen because they adopted blended learning in the College English course via different online platforms with 2/5 online and 3/5 offline, respectively. Students were first assigned to watch micro-videos related to the teaching content in face-to-face class, and then finished the pre-test to check their level of competency every week. Q and A were encouraged in the online discussion forum, and students could also make inquiries directly during the offline sessions.

Procedure

This study includes two major steps. At the beginning of the spring term 2021, seven volunteer teachers were firstly recruited from the three universities. The seven volunteer teachers were encouraged to practice the blended mode of 2/5 time allocated online while 3/5 offline in the spring semester. After the summer vacation (from 3 September to 17 September), the questionnaire of three constructs was sent to those seven teachers. Due to COVID-19, both online and offline surveys were distributed to students, and consent forms were collected. Teachers encouraged students' active participation, though students received no compensation. For the online part, the participants were first briefed by their teacher, and then the online questionnaire was sent to students via DingTalk or WeChat (two popular social media apps in China). For offline questionnaires, students were first informed about the research purpose in the classroom, and then received the scale in paper form to complete immediately. All

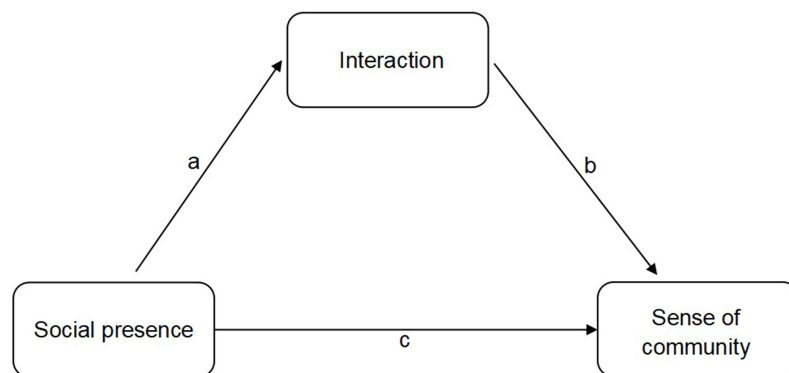


Figure 1 The proposed theoretical model.

data were collected anonymously and students understood that the questionnaire results would not influence their exam scores. Two teaching assistants helped transfer the offline data to the online Excel form.

Research Instruments

A 5-point Likert scale including three self-report constructs (social presence, interaction, sense of community) was adopted for participants to self-report the 31 items (1=strongly disagree, 2=disagree, 3=neutral, 3=agree, 4=strongly agree). In this study, a higher score of the item means a higher conception of the corresponding item among the respondents.

Social Presence Scale

The Social Presence scale has 9 items created by³⁶ with three dimensions: affective expression (three items, eg, item 1: Getting to know other students gave me a sense of belonging in the course), open communication (three items, item 6: I felt comfortable interacting with other students), and group cohesion (three items, item 8: I felt that my point of view was acknowledged by other students). Previous research has confirmed a high level of reliability and validity,^{69–71} using Chinese samples in particular.⁷²

Interaction Scale

The Interaction scale was developed and modified from the existing literature.^{15,63} In,⁶³ the interaction scale aims to examine the influence of different categories of interaction on learner satisfaction in a blended learning context.¹⁵ investigated the roles of three types of interaction (learner–instructor interaction, learner–content interaction and learner–learner interaction) on virtual sense of community. After consulting four language professors and five education experts in blended learning, this 12-item scale was validated with a group of Chinese undergraduate EFL students in this study, including learner–learner interaction (four items in total, eg, item 1: I get lots of online/offline feedback from my classmates) and learner–instructor interaction (four items altogether, eg, item 5: I ask the instructor questions via online/offline means) and learner–content interaction (four items in sum, eg, item 9: I can easily access the online course materials). Respondents were required to rate how they perceived the interaction in the EFL blended learning classroom. To validate the factor structure in a Chinese EFL learning environment, a CFA was run in terms of the data of this scale.

Sense of Community Scale

The Sense of Community Scale was refined from.⁵³ The original 20-item scale was validated with graduate students on an e-learning platform. It assesses students' perception and feelings of classroom community in online learning environment, including two sub-dimensions: connectedness and learning. The appropriateness and clarity of the questionnaire was confirmed via a two-way method: suggestions from four education professors and five experts from blended learning field, and a pilot study of 90 undergraduate EFL learners in blended learning. Considering all this, five items were removed from the sub-dimension connectedness and five other items from learning, leaving five items for connectedness (eg, item 1: I feel that students in this course care about each other;) and five for learning (eg, item 5: I feel that I can receive timely feedback). In addition, to ensure the fitness of the present scale in the Chinese EFL blended learning context, a CFA was carried out.

Data Analysis

In this study, SPSS 23.0 and Amos 24.0 were utilized for data analysis. First, a descriptive analysis was performed in terms of the three variables: social presence, interaction, and sense of community. Then, a confirmatory factor analysis (CFA) was performed to examine the validity of the interaction and the sense of community scales. Third, a Pearson's correlation analysis was run to explore the correlation among the three variables. Finally, the hypothesized mediation model was estimated using structural equation modeling.

Results

Descriptive Analysis

As shown in Table 1, the perception of social presence during the pandemic was not very high, and the total mean score was 3.80 (SD = 0.63), with a Cronbach's alpha coefficient 0.89. The student rate of interaction during COVID-19 was slightly higher (M = 3.91, SD = 0.64), and Cronbach's 0.91. The mean score of sense of community has been high (M = 4.01, SD = 0.61), and the reliability was 0.91 in this study.

Table 1 Mean Scores and Cronbach's Alpha Coefficients

	Mean	SD	Reliability
Social presence	3.80	0.63	0.89
Affective expression	3.79	0.75	0.87
Open communication	3.83	0.77	0.86
Group cohesion	3.78	0.77	0.83
Interaction	3.91	0.64	0.91
Learner–learner	3.92	0.77	0.88
Learner–instructor	3.92	0.73	0.88
Learner–content	3.89	0.82	0.91
Sense of community	4.02	0.61	0.91
Connectedness	4.05	0.70	0.90
Learning	3.99	0.67	0.90

CFA of the Interaction Scale and Sense of Community Scale

A confirmatory factor analysis of the interaction scale was run and the results were exhibited in Figure 2. This construct has three sub-scales: learner–learner interaction, learner–instructor interaction and learner–content instruction. The interrelationship among the three sub-factors was examined. The fitness of the model was checked by the goodness-of-fit indices (see Table 2). Loadings of learner–learner interaction are within the scope of 0.75 to 0.87, and loadings of

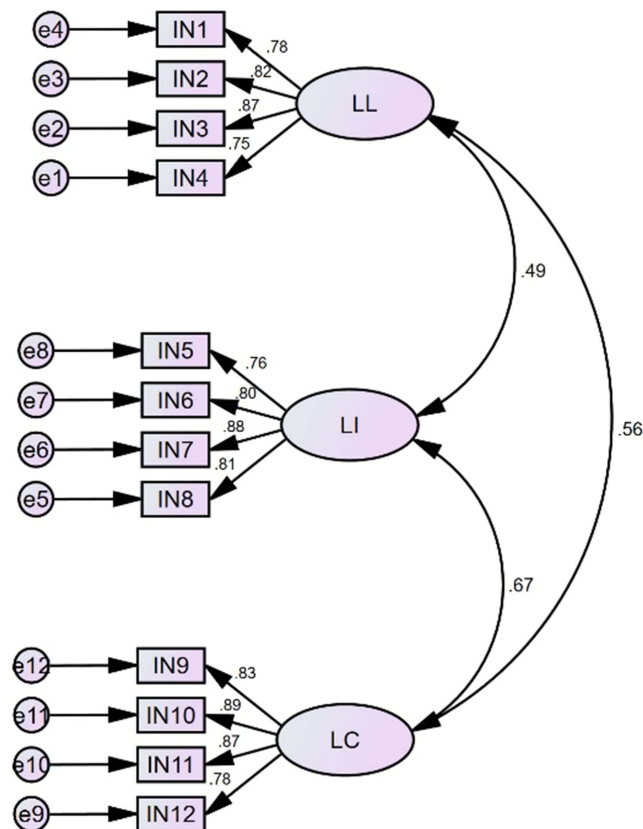
**Figure 2** Confirmatory factor analysis of the interaction scale.

Table 2 Fit Indices for the Interaction Scale

	χ^2/DF	RMSEA	CFI	IFI	TLI
Standard fit	<3	<0.08	>0.90	>0.90	>0.90
The interaction model	2.412	0.077	0.961	0.962	0.950

learner–instructor interaction are within the boundary of 0.76 to 0.88, and loadings of learner–content interaction are within the limit of 0.78 to 0.89. Table 2 shows that the expected three-factor construct had reasonable validity. The validity of the sense of community scale was assessed using a CFA analysis. This instrument includes two sub-dimensions: connectedness and learning. Loadings of the connectedness sub-factor were within the scope of 0.75 to 0.83, loadings of the learning sub-factor within the limit of 0.73 to 0.84. Accordingly, the model-to-data fit was assessed by the goodness-of-fit indices (see Figure 3 and Table 3).

Correlation Analysis

A Pearson multiple correlation analysis of the relationships among social presence, interaction, and sense of community (see Table 4) was carried out. The affective expression and group cohesion sub-scales were positively and significantly correlated with learner–learner interaction, learner–instructor interaction, and learner–content interaction, and open communication positively and significantly correlated with learner–learner interaction and learner–content interaction (ranging from $r = 0.170$ to 0.371), but not significantly with learner–instructor interaction ($p = 0.056 > 0.05$). These results indicate small effect sizes on the basis of,⁷³ accounting for 2.9% to 13.8%. For another, the social presence sub-factors of affective expression and open communication were positively and significantly related to connectedness and learning (ranging from $r = 0.192$ to 0.237), explaining 3.7% to 5.6%, while group cohesion associated with learning positively and significant, but not significantly with

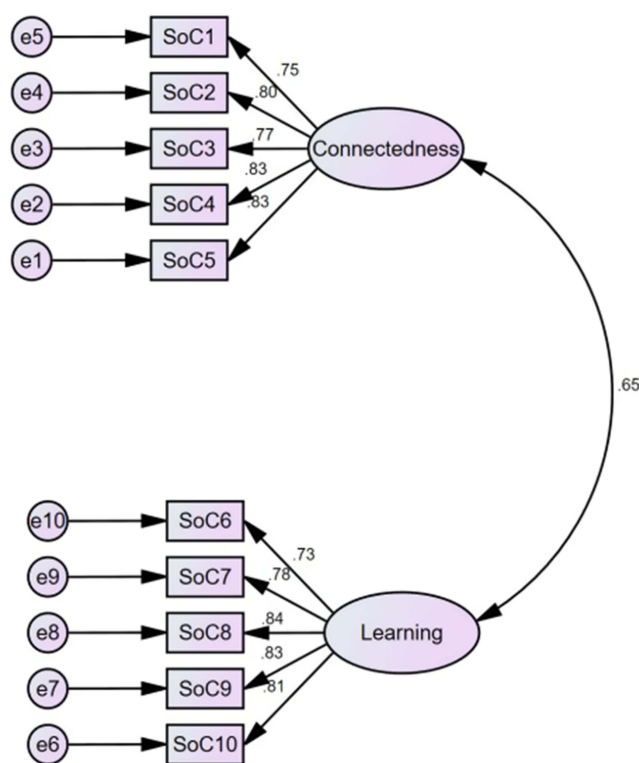
**Figure 3** Confirmatory factor analysis of the sense of community scale.

Table 3 Fit Indices for the Sense of Community Scale

	χ^2/DF	RMSEA	CFI	IFI	TLI
Standard fit	<3	<0.08	>0.90	>0.90	>0.90
The model	2.561	0.081	0.964	0.964	0.952

Table 4 Correlations of Social Presence, Interaction and Sense of Community

Subscale	AE	OC	GC	LL	LI	LC	C	L
Affective expression (AE)	1							
Open communication (OC)	0.585**	1						
Group cohesion (GC)	0.519**	0.448**	1					
Learner–learner (LL)	0.371**	0.239**	0.207**	1				
Learner–instructor (LI)	0.198**	0.124	0.215**	0.433**	1			
Learner–content (LC)	0.302**	0.170**	0.274**	0.517**	0.600**	1		
Connectedness (C)	0.195**	0.225**	0.111	0.324**	0.235**	0.300**	1	
Learning (L)	0.192**	0.216**	0.237**	0.207**	0.184**	0.258**	0.596**	1
Variables	SP	IN	SoC					
SP	(0.788)							
IN	0.449**	(0.767)						
SoC	0.360**	0.419**	(0.808)					

Notes: Diagonal in parentheses: square root of average variance. **p < 0.01.

Abbreviations: N, 237; SP, social presence; IN, interaction; SoC, sense of community.

connectedness ($p = 0.087 > 0.05$). Finally, the three sub-dimensions of interaction scale all positively and significantly correlated with those of the sense of community scale (ranging from $r = 0.184$ to 0.324), being responsible for 3.4% to 10.5%.

Structural Equation Modeling and Bootstrap Analysis

The fitness of the proposed model (see Table 5 and Figure 4) with the data of this investigation was examined using various fit indices:⁷⁴ fit indices of the root mean square error of approximation (RMSEA < 0.08), comparative fit index (CFI > 0.90), incremental fit index (IFI > 0.90), Tucker-Lewis index (TLI > 0.90) and Chi-square divided by degrees of freedom ($\chi^2/df < 3$).

As shown in Table 6 and Figure 4, the results show the standard estimates of the finalized SEM model of social presence as the predictor of sense of community via interaction. As shown in Table 6, SP→SoC has a p value of 0.001 (< 0.05) without interaction as the mediation variable, indicating that students' perceived social presence significantly and positively impact their sense of community, which fully supported Hypothesis 1. In addition, SP→IN was statistically significant with p value 0.001 (< 0.05), SE value = 0.094 (> 0), CR critical value = 4.634 (> 2), and zero was not included

Table 5 Fit Indices for the Present Model

	χ^2/DF	RMSEA	CFI	IFI	TLI
Standard fit	<3	<0.08	>0.90	>0.90	>0.90
The present model	1.999	0.065	0.969	0.969	0.949

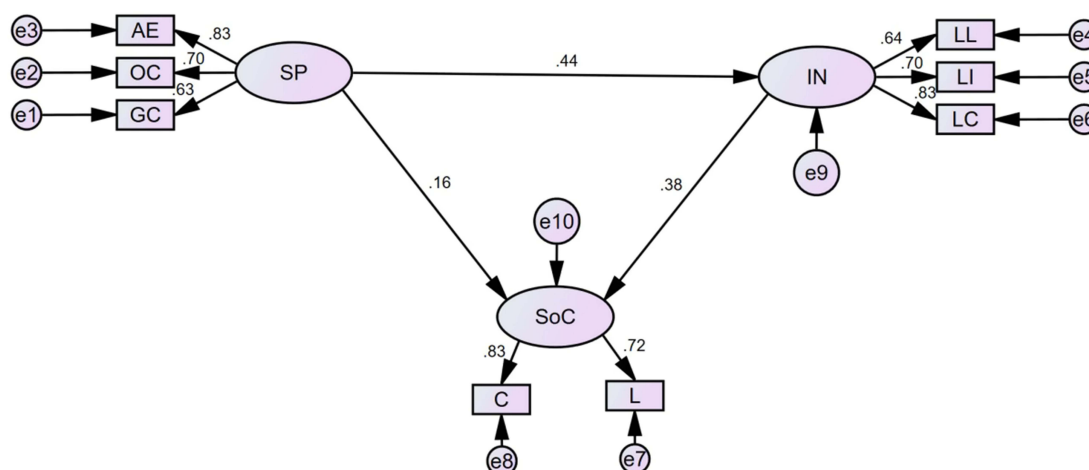


Figure 4 The SEM model (standardized).

in the bias-corrected confidence intervals CI (0.234, 0.618), validating Hypothesis 2. Moreover, $IN \rightarrow SoC$ was of statistical significance as well since the p value was 0.002 (< 0.05), with SE value = 0.104 (> 0), CR critical value = 3.556 (> 2), and zero not in CI (0.132, 0.544); thus, Hypothesis 3 was fully confirmed. Finally, social presence did not have a direct effect on sense of community as p value was 0.148 (> 0.05) in the mediation model after adding the mediator interaction, with CR critical value = 1.728 (< 2), and zero in CI [$\beta = 0.162$, 95% CI (−0.057, 0.384)]. However, interaction played a significant mediating role in the relationship between social presence and sense of community, the indirect effect was $\beta = 0.164$, [$p = 0.001$, 95% CI (0.072, 0.311)]; therefore, hypothesis 4 was supported, and interaction proved to be a full mediator in the relationship between social presence and sense of community.

Discussion

Social Presence, Interaction and Sense of Community

Compared to studies conducted before the outbreak of COVID-19, social presence (was 3.80, $SD = 0.63$) has lower scores, including different learning contexts, such as Twitter social media,³² blended writing courses with online part in Canvas (an online learning platform),⁶² and blended preservice teacher course using Moodle.⁷⁵ However, there are also studies with lower social presence mean scores in a fully online graduate educational technology program ($M = 3.33$),³³

Table 6 The Full Mediation Model

	Effect	p value	BootLLCI	BootULCI	Result
Total effect (without the mediation variable)					
H1: $SP \rightarrow SoC$	0.325	0.001	0.151	0.501	Significant
Direct effect					
$SP \rightarrow SoC$	0.162	0.148	−0.057	0.384	Not significant
H2: $SP \rightarrow IN$	0.436	0.001	0.234	0.618	Significant
H3: $IN \rightarrow SoC$	0.376	0.002	0.145	0.554	Significant
Indirect effect					
H4: $SP \rightarrow IN \rightarrow SoC$	0.164	0.001	0.072	0.311	Significant

Note: N=237.

Abbreviations: SP, social presence; IN, interaction; SoC, sense of community.

and university blended engineering courses ($M = 3.49\text{--}3.53$).⁷⁶ The prediction may help justify the results: different designs of blended learning lead to students' varying perceptions of social presence, though social presence is often characterized by being physically co-present,³⁴ but more face-to-face time does not guarantee a higher sense of social presence.⁶² As the pandemic burst so quickly, teachers may not be ready enough for online learning or are familiar with the blend modality.

Students' perceived interaction ($M = 3.91$, $SD = 0.64$) and three sub-dimensions of learner–learner interaction ($M = 3.92$, $SD = 0.77$), learner–instructor interaction ($M = 3.92$, $SD = 0.73$) and learner–content interaction ($M = 3.89$, $SD = 0.82$) were higher than in previous studies.^{63,77} The challenges of online learning reported in the literature, including the exclusion of physical touch, the absence of feelings of being present, and isolation, could be conducive to the justification of a lower interaction in earlier studies.⁶ Other reasons might be due to different disciplines, like a course of transportation technology⁶³ and graduate course of research methods. As interaction is course dependent in various learning environment, and EFL learning is interactional and emotional in essence,²⁶ it is logical that students' perception of interaction earns a higher rate in blended language learning during COVID-19 than in other courses pre-pandemic.

A relatively higher mean score was found for students' sense of community ($M = 4.02$, $SD = 0.61$) compared to previous studies before the pandemic, as reported less than 4.00 by.^{44,68} Even if there is controversy about student attitude and acceptance of computer-mediated or mobile-mediated learning, it is expected that students' sense of community in blended language learning during COVID-19 is equal or lower than before the pandemic. The expectation was rooted in the assumption that students and teachers may not be prepared enough during the pandemic on the one hand, and the shorter time of co-presence physically in the offline classroom would lessen social presence that is related to the sense of community,³⁴ which might not be true in this case, as investigated by.^{25,45} In fact, teachers have become more experienced with technology-mediated teaching and students have been more resilient in online or blended learning in 2021 with the emergency experiences in 2020.⁴⁵

The Effects of Social Presence and Interaction on Sense of Community

The results revealed that a greater perception of social presence was positively related with a greater sense of community (see Table 6), validating Hypothesis 1. The path without the mediator proved to be statistically significant ($\beta = 0.325$, $p < 0.001$), indicating that the association exists between social presence and sense of community, positive and significant. It is in congruence with pre-pandemic findings of the impact of social presence on the sense of community in online learning environment^{25,54,56} and further extends the exploration of how social presence indirectly influences sense of community by demonstrating the full mediating role of interaction in blended language learning during COVID-19.

Regarding Hypothesis 2, I assumed that the perceived social presence positively and significantly impacted student perception of interaction. The results supported Hypothesis 2 and authenticated the significant and positive association between social presence and interaction ($\beta = 0.436$, $p < 0.001$). On the contrary, other studies, completed before the pandemic, addressed other antecedents of interaction, such as collaborative online tools,⁵⁸ protocol,⁶⁰ and teaching design and facilitation,⁷⁸ implying that interaction is preceded by many factors. In this study, the perception of interaction is affected by their perceived social presence. The results are consistent with other studies,^{17,61,65} extending to this challenging period of COVID-19, in which the social, physical, and psychological learning and teaching environment have changed a lot. Since FL learning is an emotionally demanding task, students' perceived social presence is also a positive determinant of interaction, resulting in a higher interaction rate and a greater level of learning engagement.

Additionally, the results also corroborated Hypothesis 3 that students' perception of interaction in blended language learning during COVID-19 was positively and significantly related to their sense of community ($\beta = 0.376$, $p < 0.002$). In line with previous studies,^{15,55,67} interaction is important in sustaining a sense of group cohesion on e-learning platforms. When learners considered co-presence as an integral part of their blended language learning, they involved themselves more actively in interaction in the present study. Thus, the learning process was not only reliant on interaction, but also on a positive attitude towards sense of community generated by social presence, which is closely associated with the blended interactive learning designs, adding to the existing literature that elaborates on L2 classroom interaction and socio-emotional elements.

The Mediating Role of Interaction

In this research, the mediating role of interaction in the association between social presence and sense of community was examined. As the direct path from social presence to sense of community was not significant in the bootstrap analysis after including the mediator of interaction ($\beta = 0.162$, $p = 0.148$), and the indirect path from social presence to sense of community via interaction was significant ($\beta = 0.164$, $p = 0.001$), the variable interaction proves to be a full mediator. The results lend further credence to the importance of interaction in FL learning.¹⁶ The results are in line with previous literature that indicated social presence being associated with learners' sense of community in online context before the outbreak of COVID-19.⁶⁷ Furthermore, the present study generates new insights into this association by adding the mediator role of interaction using Chinese samples in blended language learning during COVID-19. These findings corroborate those of previous studies showing that social presence facilitates interaction⁹ and that interaction can help establish a sense of community.⁵⁵

Furthermore, the present study was a response to calls for more research on the influence of social presence.¹⁷ The interaction connotation has been integrated into the literature on social presence, which could deepen our understanding of social presence in blended language learning.^{62,79} Interaction has the potential to strengthen or weaken learners' perceptions of sense of community.²⁸ When an instructor intervenes too much, this can weaken the enthusiasm and learning autonomy, which hinders productive learning.⁶⁴ If group members compete with each other and do not view each other as collaborators, this could weaken community through a lack of trust in each other in terms of knowledge sharing and goal attainment.⁶⁶

Limitations and Implications

Despite the significant results, the study is not without limitations. First, the findings were based on self-reported questionnaire survey data; despite the relatively high reliability and validity of the scales used, this could have biased the results. Researchers could extend this research boundary by adding qualitative methods (like interviews and reflective journals) to cross-verify the results. Another limitation is that the cross-sectional research design in COVID-19 period, especially in the blended language learning. To overcome this, longitude data could be used to get a whole picture of the blended course of student perceived social presence, interaction and sense of community over time. Furthermore, the research context was blended English learning in a Chinese context. Students' behavior in other disciplines or from different cultural background should be investigated and compared in future researches to generalize the findings.

From a pedagogical point of view, we can make two recommendations for building up a learning community. First, due to the total mediation role of interaction in the relation between social presence and sense of community, practitioners and instructors could focus on various interaction types and their distinctive functioning mechanisms using qualitative research methods. Second, future studies could more fully consider the functions of teaching presence and cognitive presence in maintaining a sense of community.

Conclusion

The present findings provide new ideas and valuable first-hand empirical evidence to reveal the relationship between different socioemotional factors such as perceived social presence and sense of community by identifying a full mediation effect of interaction. During the post-pandemic period, educational institutions meet with the challenges of presence and isolation in the reopening process after the lockdown policy. This study aims to inform educators and teachers both in China and around the world to conduct more research on the perception of social presence and interaction by learners for their sense of community. In addition, future studies could focus on various socio-emotional factors, such as learners' resilience, agency, and attitude in blended language learning. At last, I believe that the main contribution of the current research is that social presence is crucial to increasing students' sense of community in blended language learning during COVID-19, especially when the classroom is highly interactive.

Ethical Statement and Informed Consent

This study was conducted in accordance with the Declaration of Helsinki. The Ethics Committee of College of Foreign Languages, Zhejiang Normal University approved the study. The participants interested in participating read the informed consent which contained the objectives, benefits, and risks of participation; those who agreed to participate in the study gave their informed consent, accepting to continue with the survey. The participants were informed that their responses to task would be anonymous and confidential, and the data collected would be used for academic research only.

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Disclosure

The author reports no conflicts of interest in this work.

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