Exploring Levels and Patterns of Social Presence in Asynchronous Online Discussion (AODs): A Longitudinal Study

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Abstract

The prevalence of shifting face-to-face classes to online learning under the pandemic suggests that social presence is crucial in overcoming inherently impersonal characteristics of online instruction. Observation techniques, social network mapping, and content analysis, using the Community of Inquiry framework (CoI), were conducted in a longitudinal study exploring patterns of social presence across two online courses over two semesters for a single cohort of graduate students. Patterns and suggestions for the instructional design are discussed.

Keywords: Asynchronous Online Discussions; Social Presence

Introduction

Education largely depends on social interaction and effective communication (Lowenthal & Dunlap, 2018). Interaction has been stated as one of the critical aspects of the online learning environment (Moore, 1989; Wagner, 1994) since it enables learners to gain other people's perspectives through interaction, and it is essential to create a learning community advocated by Garrison, and other learning theorists who emphasize the crucial role of community in learning (Garrison, Anderson & Archer, 2000). Social presence and interaction are closely related (Huang,

Gan, Wen & Li, 2017), that the concept of presence has been used to understand interactions in online learning environments (Saadatmand et al., 2017). Arbaugh et al. (2008) suggest that the CoI is a powerful and relevant theoretical framework to examine and explain online learning effectiveness and provides opportunities for researchers to evaluate learners' interaction and experiences in online learning environments. In Community of Inquiry framework (CoI), social presence is a popular construct used to describe and understand how people socially interact in online learning environments (Whiteside, Dikkers, & Swan, 2017). Garrison (2009) defined social presence as "the ability of participants to identify with the community (e.g., course of study), communicate purposefully in a trusting environment, and develop interpersonal relationships progressively by projecting their individual personalities."

An appropriate pedagogical design and proper exploitation of social technologies are crucial in fostering the processes of communication and interaction (Saadatmand et al., 2017). Asynchronous online discussions (AODs) are among the most widely used instructional techniques to support students' online learning (Koszalka, Pavlov & Wu, 2021; Gao, Zhang & Franklin, 2013). Participating in AODs through sharing thoughts, asking questions, and providing feedback, students are provided with ample possibilities that promote interaction and communication, thus building community in the online learning environment (Yang, Yeh & Wong, 2010).

Considerable effort has been devoted to studying social presence's establishment, notwithstanding, the nature and development of social presence in the online learning environment is still an ongoing issue (Lowenthal & Dunlap, 2018, 2020; Rourke & Kanuka, 2009; Swan & Shih, 2005). The majority of the social presence research sought to evaluate and measure students' perceptions of social presence by solely employing self-report surveys and interview instruments, which overlooked the importance of assessing and observing students' actual social presence behaviors with specific indicators. Empirical evidence also suggests that students' perceptions derived from self-reporting surveys do not accurately represent and truly match with their actual behaviors and participations in online courses (Picciano, 2002). Bernard et al. (2009) reported in their meta-analysis on interaction that research on interaction in distance education and online learning tends to focus more on interaction interventions (i.e., conditions or environments designed to elicit interaction) than on students' actual interactions (i.e., their behaviors). In addition, many of the previous social presence studies were conducted as short-term studies within the same context with different participants. Given the importance of social interaction in terms of developing social presence, it is necessary to further analyze how students interact online to establish social presence, thereby achieving an interactive and communicative online learning community that is meaningful to their learning experiences.

Beyond the self-report surveying generally used in this type of research, this longitudinal study explored the patterns and levels of the same cohort of graduate students' social presence in AODs across two online courses over two semesters. We sought to explore various patterns among students' social interactions and relationships in AODs. Observation techniques, document analysis, and social network mapping were employed to provide another point of analysis that faithfully characterizes the characteristics and the development of social interactions and social presence in the online environment.

Research Questions

Based on previous research limitations that justify the need for conducting the current study, the questions guiding this study focus on the nature and development of social presence. Typically, social presence is established and maintained in AODs through social interactions among the same cohort of students over the long term across two semesters. The specific research questions were:

1. What are the patterns of social presence within a single cohort of students in AODs across two online courses over two semesters?
2. What are the levels of social presence within a single cohort of students in AODs across two online courses over two semesters?

Method

Participants & Context

The study participants were the same cohort of twelve full-time graduate students who enrolled in two consecutive online courses over two semesters (Fall 2020 & Spring 2021) for an MS Instructional Design at a private northeastern university in the United States. The average age of the participants was 44 years old, and most of the participants were male (80%). The majority of the participants were active duty (80%), and the rest were veterans (20%). The average number of previous online courses have taken among participants was above four.

Data Collection & Analysis

Data collected from AOD scripts from two different consecutive online courses was under an IRB exempt status. The analysis comprises embedded case studies, 5 cases of AODs in Fall 2020 course, and 5 in Spring 2021. Transcripts of postings from two courses were retrieved from the Blackboard LMS, downloaded, cleaned, and saved in the qualitative data analysis software MAXQDA before coding. Transcript analysis was applied using the categorical indicators defined in the CoI framework, where social presence was analyzed in the transcripts by coding for affective responses, interactive responses, and cohesive responses (Swan, 2003; Hughes et al., 2007). The unit of analysis was sentence, whereby a single sentence could include multiple social presence indicators. Through an iterative coding practice process, two coders finalized the coding scheme with an inter-rater agreement of 0.75. Social network mapping analysis was conducted through Gephi 0.9.2 program to investigate and visualize the participation patterns and interaction levels manifested within and across the two courses over two semesters.

Results

Social Presence Category Pattern

The descriptive data for the Fall 2020 course revealed that cohesive responses were present the most and had the highest overall mean scores (M= 98.6), followed by interactive (M= 90.2) and affective responses (M= 37.6). Across all the AODs in the Fall term, there was a relatively minor mean score difference between interactive and cohesive responses ($M_{Interactive}$= 90.2; $M_{Cohesive}$= 98.6) than the mean score differences between these two categories and the affective responses category ($M_{Affective}$= 37.6) since it was the only category had a mean score below 50 across two courses. This suggested that throughout the AODs in the Fall term, students barely used words or

sentences that indicate their self-projection and acceptations of others into and within the learning community (Rourke et al., 1999).

Though the frequency and the mean score orders of social presence categories in the Spring 2021 course remained as the same pattern as the Fall 2020 course, the sharp decrease in the overall interactive responses and the moderate increase in the affective responses resulted in a larger difference between interactive and cohesive responses ($M_{Interactive}$= 76.0; $M_{Cohesive}$= 101.2) comparing to the one that the Fall term had. The overall increase in affective responses from the Fall term (M= 37.6) to the Spring term (M= 51.4) within the same cohort of students suggested that providing opportunities for longer interaction time and collaboration experiences might help facilitate student degree of comfort in recognizing each other in an online learning community.

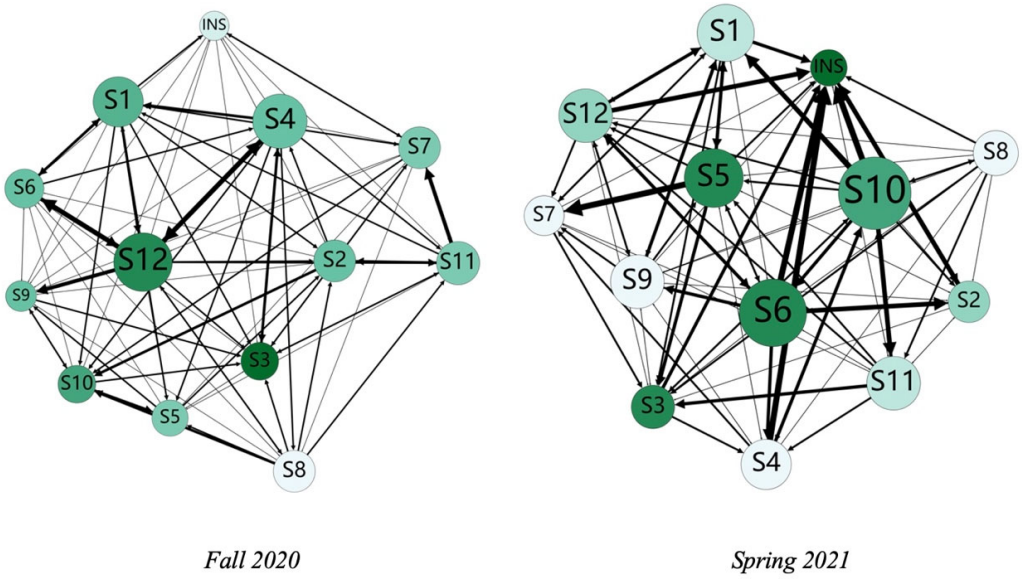
Social Presence Indicator Pattern

Filling the gap of the majority of previous social presence research studies in the literature that "did not report results at the indicator level" (Lowenthal et al., 2020), this study looked at and compared the occurrence and frequency of individual social presence indicators across two courses. As the findings suggested, vocatives (M_{Fall}= 46.8; M_{Spring}= 49.6) and group references (M_{Fall}= 42.8; M_{Spring}= 49) were two mostly used social presence indicators that had the highest mean scores across both courses, followed by complimenting, expressing appreciation (M_{Fall}= 34.8; M_{Spring}= 31), and acknowledgment (M_{Fall}= 25.8; M_{Spring}= 25.4). On the contrary, embracing the group (M_{Fall}= 3.6; M_{Spring}= 0) was the least frequently used indicator, followed by humor (M_{Fall}= 4; M_{Spring}= 4.2), and greetings and salutations (M_{Fall}= 5.4; M_{Spring}= 2.6).

Overall, across two courses, the increasing trend in the affective responses (e.g., self-disclosure, paralanguage & humor) and the decreasing trend in interactive responses (e.g., agreement/disagreement, invitation, complimenting, and expressing appreciation) suggested that students felt and became more comfortable in sharing personal experiences with their peers as they keep collaborating from the Fall term to the Spring term, but tended to less focusing on exchanging meaningful knowledge or ideas related to the course content.

Student Interaction and Relationship Patterns Across Two Courses

Social network analysis was conducted to map out the differences of the same cohort of students' interactive activities patterns and relationships between two courses as shown in **Figure 1**, where the Fall 2020 course is on the left, and the Spring 2021 course is on the right side. Each map includes 12 nodes representing a student and one node representing the instructor (INS). In the visualization, the node size indicates each student's level of activity in responding to others' posts in AODs. It was calculated by the total number of responses that the student sent out divided by the total number of participants. The node color indicates students' popularity and centrality within the AODs calculated by the total number of responses the student received divided by the total number of participants. The higher the number, the more popular the student is. The edge and its width connecting the nodes represent the frequencies of participant interactions, and the arrows point out the directions of interactions.



Fall 2020 *Spring 2021*

Figure 1. *Interaction Patterns and Relationships in Two Courses*

By comparing the social network maps between the two courses, there were more nodes in dark green in the Spring 2021 course than in the Fall 2020 course. This suggested that students replied as well as received more responses among each other in the Spring term than in the Fall term. Overall, the node sizes in the Spring 2021 course were relatively larger than those in the Fall 2020 course, which also demonstrated a higher student participation rate in replying to others' posts. There was an increasing number of thick edges among students in the Spring 2021 course than in the Fall 2020 course. Most of the thick edges among students in the Spring 2021 turned to be more stable and evenly distributed, which suggested that the Spring semester course had created a more trusting and sociable interactive learning community, where students had expanded their communications without a fixed social circle after experiencing previous AODs in the Fall semester. In addition, there was an increase in the number of students who had popular postings in the Spring course that aroused resonations and sympathies among peers. Though the sizes of instructor's nodes in both courses were almost the same, the Spring 2021's instructor had a much darker green node, which suggested the instructor's posts or comments had received more attentions among students as well as elicited more discussions with students.

Levels of Social Presence within Each AOD Across Two Courses

The percentage value for each of the social presence categories in each AOD case across two courses were calculated based on the number of coded sentences that contained one social presence category in one certain case divided by the sum of coded sentences that containing that particular category within all five cases in each course. The two courses shared the same highest level of affective responses and cohesive responses (28%) and the similar highest level of interactive responses (Fall = 25%; Spring = 26%). The majority of the thread sentences were coded as Cohesive Responses (44% in both Fall 2020 & Spring 2021), indicating a steady level of group cohesion within the same cohort of graduates over two courses.

Overall, both courses experienced similar observable fluctuation patterns of social presence level, which suggested that different time points throughout the course semester might influence

students' level of participation and engagement in interacting with each other. Besides, different types of discussion topics and questions might also influence the level of social presence.

Discussion

Instruction Stages

Spending time in the Fall 2020 semester to interact and learn through participating AODs activity, the same cohort of students established and developed social presence continuously and intensely in the Spring 2021 semester. This study showed that different stages of AODs activity throughout the semester had an essential impact on student social presence level. The same repeated patterns of social presence level across two courses suggested that during the late half of the semester, students might experience course fatigue, which will lead to a lack of interest and motivations in participating and engaging in AODs. Specifically, the observable fluctuations were in the affective and cohesive responses. Therefore, this informed online instructional designers and educators to carefully plan and arrange AOD activity based on different stages to effectively sustain student efforts and volitions in interacting with each other as well as to avoid having a sense of loneliness and lack of interest in participating in AODs due to the inherently impersonal characteristics of the online learning environment.

Instructor Involvement

Social presence, however, may not be increased over time without appropriate instructional design (Akyol et al., 2011; Shea, 2006). Students may not perceive a higher social presence in a long-term course if the instructor does not provide more interaction opportunities and proper instructional approaches (Lee et al., 2018). Research has reported that the level of instructor involvement has an impact on student social presence. Lowenthal et al. (2020) found low instructor involvement helps build social presence, and findings in An et al.'s (2009) study showed students tended to express thoughts and opinions more freely with many social presence cues when the instructor's intervention was minimal. In this study, both courses had a limited level of instructor involvement, as shown in **Figure 1**. Nonetheless, there was still a higher level of social presence categories in the Spring 2021 course that could be attributed to the instructor's role in AODs. As thus, while keeping a minimal level of instructor involvement to help establish a higher level of social presence, online instructors should also be attentive to other instructor role-related aspects that might influence student social presence, such as the time for instructor entering and posting messages, the quality of the discussion feedback given, and the tones and styles of asking prompt questions that might arouse further and deeper discussions.

In this study, the decrease in interactive responses in the Spring 2021 course indicated that the same cohort of students related and shared more about personal experiences as they were getting used to interact and communicate with each other as a group, but less course content learning-related behaviors were noticed. Thus, this suggested instructor should make sure to keep students are interacting with each other in a meaningful learning way. Establishing social presence means creating a climate that supports critical inquiry to achieve educational outcomes (Garrison & Akyol, 2013). According to the CoI framework, the teacher plays an important role in building social presence. The instructor establishes relationships and a sense of belonging by designing, facilitating, and directing cognitive and social presences. The teacher's personality, teaching styles, approaches, and beliefs influence the development of presence (Casey & Kroth, 2013). There is a lack of research focusing on the instructional effect on helping students build social presence in

the literature. Future research could examine whether there is a causal relationship between different instructional approaches and student social presence to investigate why students' interactive responses decreased over time, and which instructional strategies could effectively facilitate a higher level of social presence in online courses.

Previous relationships

Research has suggested that having a past relationship with class members is helpful when establishing social presence in online courses, where Lowenthal et al. (2018; 2020) found a positive group project experience helps increase students' perception of social presence and further helps maintain relationships with others. The results of this study confirmed their findings in a way that it is valuable that having "a cohort model enables students' multiple opportunities to build relationships with others across semesters" (Lowenthal, 2020) since the Spring 2021 social network map showed a more stable and expanded scope of student interactions with each other. Moreover, since all the participants in this study had a military background, even they did not have previous social relationship, their similar background set up a learning community that is easy for them to understand each other. Future studies could examine social presence within a cohort of students with different backgrounds, such as military versus on-campus students. In addition, it would also be helpful to study students individually based on their characteristics.

Conclusion

This longitudinal study investigated the social presence among the same cohort of students across two courses. Student discussion posts indicated that social presence, as analyzed through observation of behaviors, was an important part of AODs. Findings in this study help unpack the complexity and establishment of social relationships and provide insights into making AODs more productive. Thus, inform instructional designers and online educators on possible techniques to enhance and evoke student participation and engagement in AODs to gain a better and meaningful online learning experience. Hence, the analysis of these case studies provided further insights into the growth of social presence levels in AODs.

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