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Social presence and online discussions: a mixed method investigation

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ABSTRACT

Researchers have been investigating social presence in online learning for decades. However, despite this continued research, questions remain about the nature and development of social presence. The purpose of this mixed method exploratory case study was to investigate how social presence is established in online discussion forums in an asynchronous online course. The results suggest that social presence is more complicated than previously thought. In particular, situational variable such as group size, instructional task, and previous relationships influence how social presence is established and maintained in online courses. In the following paper, we report the results of our inquiry and the implications for further research and practice.

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Social presence is a key construct in online learning environments (Whiteside et al., 2017). Social presence theory recognizes the critical role of social learning and relationship-building on student engagement and inclusion in online learning. It addresses concerns associated with the transactional distance experienced by students and faculty in online courses, where, for example, some students and faculty find it challenging to feel like a recognized individual (as opposed to an anonymous member of a group). Social learning strategies help build relationships with others in online courses, especially courses that rely on asynchronous interaction, communication, and collaboration tools such as asynchronous online discussions (Liu et al., 2007; Phirangee, 2016). In fact, isolation and loneliness are regularly cited as reasons why students do not persist or dropout of online courses (Ali & Leeds, 2010; Whiteside et al., 2017). However, research has suggested that social presence can help address students' feelings of isolation and loneliness and improve retention in online courses and programs (Boston et al., 2009; Reio & Crim, 2013; Rovai, 2002).

Thus, it is not surprising to find hundreds of studies focused on social presence and online learning. Researchers have shown—to varying degrees—a relationship between social presence and student satisfaction (Borup et al., 2012; Gunawardena & Zittle, 1997; Hostetter & Busch, 2006; Richardson et al., 2017; Richardson & Swan, 2003; So & Brush, 2008), social presence and the development of a community of learners (Delmas, 2017; Garrison, 2016; Pollard et al., 2014), and social presence and perceived learning (Caspi &

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Blau, 2008; Cobb, 2011; Richardson et al., 2017) to name a few. Despite these findings, questions remain about the nature and development of social presence in online courses (Lowenthal & Dunlap, 2014, 2018; Rourke & Kanuka, 2009; Swan & Shih, 2005). Further, the majority of research on social presence (e.g., Akyol & Garrison, 2008; Garrison et al., 2010; Gunawardena, 1995; Mathieson & Leafman, 2014; Picciano, 2002; Richardson et al., 2016; Russo & Campbell, 2004; Tu, 2002; Wheeler, 2005) has focused on perceptions of social presence rather than on observable indicators of social presence in online discussions. To address this gap, we conducted a mixed methods exploratory case study to investigate observable indicators of social presence in an online course that relied on asynchronous discussions for student interaction, communication, and collaboration.

Literature review

Social presence theory dates back to the work of Short et al. (1976). They defined social presence as the quality or state of being between two communicators using a communication medium. Although Short et al. originally conceptualized social presence primarily as a quality of a communication medium, later researchers (e.g., Gunawardena, 1995; Rourke et al., 1999) began to reconceptualize social presence by focusing more on the way people used and adapted to a communication medium than solely on the qualities of the medium itself. In the late 1990s, Garrison et al. (2000) developed the community of inquiry (CoI) framework, which posited that a deep and meaningful educational experience consists of three types of presence—teaching presence, social presence, and cognitive presence. More specifically, Garrison and his colleagues argued that educators can use teaching presence (e.g., instructional design, discourse facilitation, and direct instruction) to develop social presence and ultimately cognitive presence (Anderson et al., 2001; Garrison et al., 2000). In the CoI framework, the three presences are seen as interconnected and in service to each other in order to create meaningful educational experiences. However, despite this interconnectedness, most early research focused on each of the presences separately (Anderson et al., 2001; Garrison et al., 2000; Rourke et al., 1999); among the three types of presences, researchers have studied social presence the most (see Richardson et al., 2017; Rourke & Anderson, 2002a, 2002b; Whiteside et al., 2017).

Garrison et al. (2000) developed subcategories for each of the three presences. For instance, they conceptualized social presence as consisting of emotional expression, open communication, and group cohesion. They then identified indicators of each of these categories for each of the presences in order to study them in online discussions (see Anderson et al., 2001; Garrison et al., 2000; Rourke et al., 1999). For instance, they argued that indicators of emotional expression (later renamed affective responses or affective expression) were things such as expressing emotion, using humor, and self-disclosing (Rourke et al., 1999). Swan (2003) expanded and adapted the indicators, and then Hughes et al. (2007) (though possibly unaware of Swan's work) made further changes to the original list of indicators (see Table 1).

Despite the renaming of the categories and some minor changes to the social presence indicators, Garrison et al.'s (2000) original categories and list of indicators of social presence have, for the most part, remained unchanged over the years. However, most researchers over the years have not used these indicators to analyze how students

Table 1. Evolution of categories and indicators of social presence.

Rourke et al. (1999)	Swan (2003)	Hughes et al. (2007)
Affective responses		
Expression of emotions	Paralanguage	Expression of emotion
Use of humor	Emotion	Use of humor
Self-disclosure	Value	Self-disclosure
	Humor	
	Self-disclosure	
Interactive responses		
Continuing a thread	Acknowledgment	Referring to others' messages
Quoting from other messages	Disagreement	Asking questions
Referring explicitly to other messages	Approval	Complimenting, expressing appreciation
Asking questions	Invitation	
Complimenting, expressing appreciation	Personal advice	Expressing agreement
Expressing agreement		
Cohesive responses		
Vocatives	Greetings & salutations	Vocatives
Addresses or refers to the group using inclusive pronouns	Vocatives	Expresses group inclusivity
Phatics or salutations	Group reference	Phatics or salutations
	Social sharing	Embracing the group
	Self-reflection	

establish and develop social presence in text-based online discussions, instead opting to survey students on their perceptions of social presence (see Garrison et al., 2010; Richardson et al., 2017). This is likely in part due to the work involved in analyzing online discussions as well as a shift to focus more on all three of the presences as a whole rather than just social presence. However, as online learning grows and people become more adept at interacting, communicating, and collaborating online, it is important for online educators to better understand how social presence is established and developed online.

Research question

Our goal was to understand how students establish and develop social presence in online courses. The following research question guided our inquiry: How does social presence manifest in an asynchronous, online graduate-education course?

Research method

A single, completely online graduate-level course in educational policy was purposefully sampled for this study. To answer the research question, we examined all of the discussions in the learning management system across the 15-week semester, as opposed to analyzing only a few weeks of discussions—a limitation of past research. The data for this study came from a course of 19 graduate students completing coursework for an educational specialist degree or a PhD in educational leadership at an institution located in a western state in the United States of America. The course had a few different types of discussions (see Table 2 for an overview), mainly discussions that were open and available to the entire class (e.g., office hours, discussions on adult learning, or plus delta discussions to give course feedback) and small-group discussions (e.g., reading groups, pairs, and project groups) that were available only to students in a certain group and the instructor, and therefore were a type of closed

Table 2. Threaded discussions raw data.

Discussion name	Participants	Posts	Words
Virtual Office Hours	7	44	2560
General—Syllabus	14	48	3294
General—Groups	6	14	639
General—Independent Work	3	3	155
General—Individual Work	2	2	84
Adult Learning Discussion—Your Learning	7	12	456
Adult Learning Discussion—Questionnaire #1	3	3	221
A: Reading Group A	4	125	7828
B: Reading Group B	5	132	11677
C: Reading Group C	4	95	8452
D: Reading Group D	4	109	12562
E: Reading Group E	5	40	5235
F: Reading Group F	4	106	10916
G: Reading Group G	5	103	8116
Pair 1	3	32	2028
Pair 2	3	40	6222
Pair 3	3	45	3000
Pair 4	4	6	248
Pair 5	3	30	2232
Pair 6	3	28	1453
Pair 7	3	26	2687
Pair 8	3	21	3658
Pair 9	3	15	2909
Pair 10	2	22	2129
Plus Delta Week 2	8	13	866
Plus Delta Week 3	8	22	2375
Plus Delta Week 4	2	2	299
Plus Delta Week 5	2	2	109
Plus Delta Week 6	3	3	234
Project Group 1	5	109	12673
Project Group 2	5	180	15322
Project Group 3	5	138	8404
Project Group 4	5	113	6791
Project Group 5	4	126	12380
Reading Log 1	5	12	1364
Reading Log 3	1	1	513
Total	156	1822	160,091

Note. If a discussion did not have any posts (e.g., Reading Log 2), it was not listed.

discussion. The main discussions in the course were the reading groups (where small groups of students discussed the readings and then had to write a series of reading logs as a group), pairs (where typically two students and the instructor discussed important individual personal and professional goals, which then resulted in each student writing a paper summarizing their partner's goals and plans), and project groups (where small groups of students analyzed and discussed a policy and then collaboratively wrote a critical analysis of the policy).

Data analysis

We used a mixed methods exploratory case study approach (Miles & Huberman, 1994; Onwuegbuzie & Leech, 2005)—using word count, content analysis, and constant comparison analysis—to explore what students and their instructor actually did during the course to establish and maintain social presence. More specifically, we conducted the following types of data analysis:

- Word count analysis: The first author used word count of each discussion to identify which discussion had a higher frequency of words and posts, as well as which discussion had a higher number of social presence indicators (i.e., types of words).
- Content analysis: The content of each discussion was examined to look for social presence indicators, as defined by a modified version of the social presence indicators developed by Garrison et al. (2000) and later modified by Swan (2003) and Hughes et al. (2007) (see the Appendix). The first author and another researcher coded the discussions using content analysis and calculated an overall percentage agreement of 78% using Holsti's (1969) coefficient of reliability.
- Constant comparison analysis: Based on the content analysis, the first author analyzed two discussions—one with a high number of social presence indicators and one with a low number of social presence indicators—in more depth with a constant comparison analysis technique.

The creditability and trustworthiness of the results were improved by basing the analysis in the literature, checking the reliability of the content analysis, taking multiple passes with the data, sharing the results with the instructor (i.e., member checking), and peer debriefing the analysis with colleagues.

Results

Word count

We began by analyzing whether certain types of words appeared more frequently than others across all of the discussions, as well as within certain types of discussions. After reviewing the top 50 words, we determined that focusing on the top 20 words would be sufficient. The word "I" was used most frequently (4858 times, which represents 4.13% of all the words used) followed next by the word "you" (2186 times; 1.86% of all the words used). "We" was used 1367 times (or 1.16% of all words used) and ranked fourth overall in all words used; this is noteworthy because "we" is often used as a sign of group reference, which is an indicator of social presence. "Your," which is an example of acknowledgment (i.e., another indicator of social presence), was used 810 times or eighth overall. And finally, the word "policy"—which is the focus of the course—was used 600 times (or 10th overall) whereas the professor's pseudonym, "Bob," was used 566 times (or 14th overall).

After looking at the frequency of the top 20 words across all discussions, a word count report was generated for each of the main discussions—project groups, pairs, and reading groups. While "I" and "you" were still the first and second most used words in these discussions, "we" and "your" (i.e., two possible social presence indicators) were in the top 20 across all three of these discussions and "our" (which is also a possible social presence indicator) was the top word in the project groups and the pairs discussions. Each of these are words that Rourke et al. (1999) identified as possible indicators of social presence (i.e., specifically, indicators of group reference and acknowledgment). Word count, though, does not take into account the context in which a word is used; for instance, "we" could be referring to part of a society (e.g., "we Americans") or "we the class." However, it was interesting that the words "we" and "our," (i.e., group reference) showed up more in specific types of small-group discussions where the purpose of the discussion was on collaborating on a class project

together as compared to reading groups (which were also small-group discussions but with a different purpose and goal). This suggests that the purpose and goal of a discussion might influence the degree to which participants employ certain behavior.

Content analysis

After conducting the word count analysis, we used an amended version of the social presence indicators developed by Rourke et al. (1999) for the content analysis (see the Appendix). We were interested in the occurrence and the frequency of the social presence indicators across all of the discussions, as well as their occurrence and frequency within specific discussions, and finally their relationship to each student (i.e., how often each student used specific social presence indicators). Figure 1 illustrates the three stages of the content analysis.

Stage 1: social presence categories and indicators across all discussions

The content analysis revealed that interactive indicators were present the most (2581 times), cohesive indicators the second most (2454 times), and affective indicators the least (1373 times; see Table 3). The differences between interactive and cohesive indicators across all of the discussions were minor. But there was an observable difference between these two categories and the affective category. In other words, in this sample, students used affective indicators of social presence the least. This is interesting in part because while Hughes et al. (2007) found a similar result in their sample, Swan (2003) found that affective indicators were actually used the most in her sample.

In terms of individual indicators used across all of the discussions, the top three were acknowledgment (i.e., recognizing and openly acknowledging a previous post by a person), which was used the most (1137 times), followed next by invitation (e.g., asking a question; 747 times), and then vocatives (i.e., addressing someone directly by the first name) (748 times). It is difficult, though, to compare these results to other research

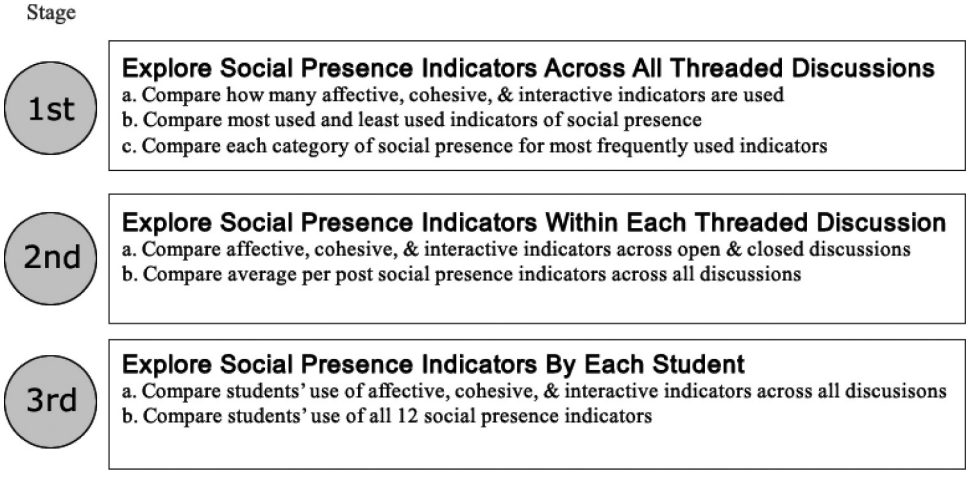

Figure 1. Stages of content analysis used to explore social presence indicators.

Table 3. Social presence frequency across all forums.

Category & Indicator	Frequency
Total affective responses	1373
Paralanguage (PL)	270
Emotion (EM)	526
Humor (H)	53
Self-disclosure (SD)	524
Total interactive responses	2581
Acknowledgment (AK)	1137
Agreement or Disagreement (AG)	192
Invitation (I)	747
Expressing appreciation (EA)	505
Total cohesive responses	2454
Greetings & salutations or phatics (GS)	714
Vocatives (V)	748
Group reference or inclusivity (GR)	638
Embracing the group (EG)	354
Total	6408

because the majority who have analyzed social presence in online discussions did not report results at the indicator level. Swan (2003) is one exception, but she reported her findings at the indicator level through a series of bar graphs only; while they lacked the exact numerical values, the reader can compare the frequency of each indicator. Acknowledgment was the only top-three indicator shared with our sample and Swan's sample; paralanguage (i.e., text used to express emotions, like emoticons or exaggerated spelling), which was used infrequently in this sample, was actually the most frequently used indicator in Swan's study. The least frequently used indicators were humor (53 times, which was also the least used indicator in Swan's sample), followed next by agreement/disagreement (192 times), and then paralanguage (270 times; see Table 3).

Although it is useful to compare how individual social presence indicators manifest across all categories of social presence, it is also helpful to see how they compare to other indicators within their same category. It is possible that within a given category certain indicators are used more frequently than others. For instance, in the affective category, emotion and self-disclosure were used most frequently and almost at the same frequency (see Figure 2). In the interactive category, however, signs of acknowledgment were the most frequently used. Finally, in the cohesive category, greetings, salutations, phatics, vocatives, and group reference were all used at about the same frequency, and embracing the group was used the least.

Stage 2: social presence categories and indicators by discussion forum

As helpful as it is to look at the frequency of social presence indicators across all of the discussions and treating all of the discussions essentially as one case, it is perhaps more insightful and helpful to drill down and look at the occurrence of social presence indicators across and within types of discussions. At this stage, we first analyzed the occurrence of social presence indicators across specific types of discussions. For the ease of reporting, we separated full-class discussions (i.e., discussions that are open to the

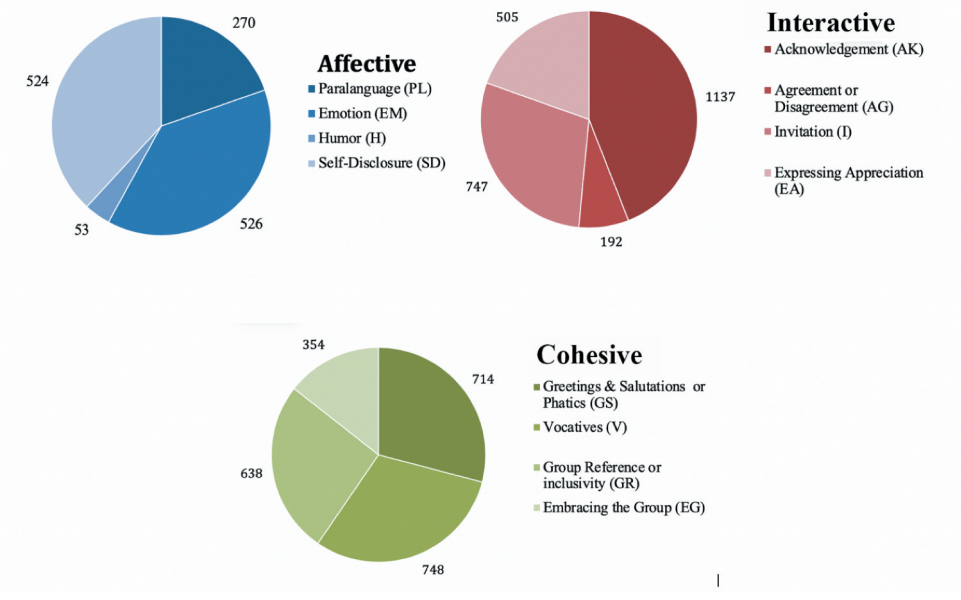

Figure 2. Social presence indicators separated by category.

entire class) from small-group discussions (i.e., discussions that are closed to a small select group of students assigned with a specific collaborative task). But because each discussion differed in total number of posts and words, we needed to calculate the social presence density of each discussion. Following the lead of Rourke et al. (1999), we calculated the social presence density for each indicator in each discussion. But because the unit of analysis for this study was the entire post, we calculated the social presence density by taking the average social presence indicator per post (as opposed to per word like Rourke et al., 1999) to facilitate comparison across open and closed discussions.

We found that a higher density of social presence indicators occurred in closed discussions than in open discussions (see Table 4). For instance, the average affective indicator per post was 0.78 in closed discussions compared to 0.56 for open discussions; the average cohesive indicator was 1.37 in closed discussions as compared to 1.17 in open discussions; and the average interactive indicators was 1.45 in closed discussions versus 1.09 in open discussions.

We explored the differences between the closed discussions, because all three of the closed discussions had a distinct purpose and goal, which could have influenced how students posted in each discussion. When comparing the three closed

Table 4. Average social presence indicators per post across open and closed discussions.

	Open discussions		Closed discussions	
	Total	Average	Total	Average
Affective	101	0.56	1272	0.78
Cohesive	211	1.17	2243	1.37
Interactive	197	1.09	2382	1.45
Total	509	2.81	5897	3.59

Table 5. Average social presence indicators across closed threaded discussions.

	Reading Groups		Pairs		Project Groups	
	Total	Average	Total	Average	Total	Average
Affective	549	0.77	253	0.95	470	0.71
Cohesive	776	1.09	467	1.76	1000	1.50
Interactive	956	1.35	394	1.49	1032	1.55
Total	2281	3.21	1114	4.20	2502	3.76

discussions (see Table 5), Pairs had the highest total social presence average per post with 4.20 indicators per post. Project Groups was next with an average of 3.76 indicators per post. And then Reading Groups had the lowest average with 3.21 indicators per post. These differences could likely be due to a combination of the group size and the purpose and goal of each of these threaded discussions. For instance, the Pairs and the Project Groups had very specific tasks that required interaction, cohesion, and collaboration, whereas the Reading Groups (while also a small group) had less prescriptive tasks.

When we began to compare each category and later each indicator, the results began to change. For instance, the Pairs threaded discussions had the highest average of all of the social presence indicators per post across all of the categories and indicators. But when we disaggregated these results, we found that the Pairs discussions did not have the highest social presence density across all three categories of social presence. For the interactive category of indicators, the Pairs group actually had a lower per post average than the Project Groups. At the same time, while the Reading Groups had the lowest total social presence average per post overall, these discussions actually had a higher average of affective indicators than Project Groups (see Table 6). This could suggest that certain types of tasks in certain group sizes elicit more social presence behaviors per participant than others. At the same time, the differences are minor, and more research would likely need to be conducted to support this theory.

Each of the closed discussions consisted of different students, and even though the tasks might be the same, it is possible that individual students and their natural or learned communication skills, as well as personality, and even personal life circumstances, influenced the frequency and overall social presence density in a given discussion (which is in part why we looked at each student's social presence behaviors during Stage 3 of the

Table 6. Ranking of average social presence indicators across closed discussions.

Social presence category & closed discussions	Average per post
Affective indicators	
Pairs	0.95
Reading Groups	0.77
Project Groups	0.71
Cohesive indicators	
Pairs	1.76
Project Groups	1.50
Reading Groups	1.09
Interactive indicators	
Project Groups	1.55
Pairs	1.49
Reading Groups	1.35

Table 7. Average social presence indicator per discussion.

Discussion forum	Total posts	Affective (avg per post)	Cohesive (avg per post)	Interactive (avg per post)	Total social presence (avg per post)
Open discussions					
Virtual Office	44	16 (0.36)	59 (1.34)	44 (1.00)	119 (2.7)
General—Syllabus	48	12 (0.25)	44 (0.92)	34 (0.71)	90 (1.88)
General—Groups	14	8 (0.57)	12 (0.86)	16 (1.14)	36 (2.57)
General—Independent Work	3	3 (1.00)	5 (1.67)	3 (1.00)	11 (3.67)
General—Individual Work	2	0 (0.00)	3 (1.50)	2 (1.00)	5 (2.5)
Adult Learning Discussion	12	4 (0.33)	13 (1.08)	12 (1.00)	29 (2.42)
Adult Learning Discussion	3	4 (1.33)	2 (0.67)	5 (1.67)	11 (3.67)
Plus Delta Week2	13	15 (1.15)	24 (1.85)	15 (1.15)	54 (4.15)
Plus Delta Week 3	22	19 (0.86)	30 (1.36)	36 (1.64)	85 (3.86)
Plus Delta Week 4	2	3 (1.50)	0 (0.00)	3 (1.50)	6 (3.00)
Plus Delta Week 5	2	3 (1.50)	5 (2.50)	2 (1.00)	10 (5.00)
Plus Delta Week 6	3	7 (2.33)	4 (1.33)	4 (1.33)	15 (5.00)
Reading Log 1	12	7 (0.58)	10 (0.83)	20 (1.67)	37 (3.08)
Reading Log 3	1	0 (0.00)	0 (0.00)	1 (1.00)	1 (1.00)
Closed discussions					
Reading Group A	125	110 (0.88)	128 (1.02)	192 (1.54)	430 (3.44)
Reading Group B	132	88 (0.67)	124 (0.94)	203 (1.54)	415 (3.14)
Reading Group C	95	104 (1.09)	129 (1.36)	95 (1.00)	328 (3.45)
Reading Group D	109	120 (1.10)	153 (1.40)	186 (1.71)	459 (4.21)
Reading Group E	40	23 (0.58)	29 (0.73)	41 (1.03)	93 (2.33)
Reading Group F	106	59 (0.56)	84 (0.79)	126 (1.19)	269 (2.54)
Reading Group G	103	45 (0.44)	129 (1.25)	113 (1.10)	287 (2.79)
Pair 1	32	18 (0.56)	46 (1.44)	51 (1.59)	115 (3.59)
Pair 2	40	41 (1.03)	71 (1.78)	59 (1.48)	171 (4.28)
Pair 3	45	41 (0.91)	84 (1.87)	78 (1.73)	203 (4.51)
Pair 4	6	5 (0.83)	5 (0.83)	5 (0.83)	15 (2.50)
Pair 5	30	38 (1.27)	65 (2.17)	38 (1.27)	141 (4.70)
Pair 6	28	14 (0.50)	38 (1.36)	30 (1.07)	82 (2.93)
Pair 7	26	23 (0.88)	41 (1.58)	40 (1.54)	104 (4.00)
Pair 8	21	33 (1.57)	48 (2.29)	33 (1.57)	114 (5.43)
Pair 9	15	25 (1.67)	38 (2.53)	30 (2.00)	93 (6.20)
Pair 10	22	15 (0.68)	31 (1.41)	30 (1.36)	76 (3.45)
Project Group 1	109	72 (0.66)	160 (1.47)	167 (1.53)	399 (3.66)
Project Group 2	180	96 (0.53)	276 (1.53)	292 (1.62)	664 (3.69)
Project Group 3	138	111 (0.80)	168 (1.22)	189 (1.37)	468 (3.39)
Project Group 4	113	79 (0.70)	136 (1.20)	141 (1.25)	356 (3.15)
Project Group 5	126	112 (0.89)	260 (2.06)	243 (1.93)	615 (4.88)

content analysis). Therefore, we compared the social presence density across all closed threaded discussions (see Table 7).

One of the Pairs discussions—specifically Pair 9—had the highest overall average of social presence indicators per post per discussion, as well as the highest per post average of each of the three categories of social presence indicators. Reading Group E and Reading Group G ended up with the lowest social presence per post average per individual discussions. These results follow the general trend identified earlier with the Pairs discussions having the overall highest density of social presence per post and the Reading Groups discussions having the lowest overall density of social presence per post. This could suggest that the overall size and purpose of a specific discussion highly influences the amount of social presence indicators used by students. For instance, the Pairs discussions consisted of two students taking part in personal discussions versus the Reading

Groups, which involved small groups of 4 or 5 students talking about the weekly readings in the course. As one might imagine, two students discussing personal matters might engender more affective, cohesive, and interactive indicators than a larger group discussing course readings.

Stage 3: social presence categories and indicators by students

While conducting the content analysis, we noticed certain students used certain social presence indicators (e.g., paralanguage and vocatives) more than others. Therefore, we investigated the frequency at which each student used social presence indicators. We reasoned that, even though a certain discussion (which consisted of a group of students) might have a high social presence density, it could be the result of one group member who was extremely active and proficient with employing affective, interactive, and cohesive means of communication.

We first looked at each participant's use of all three categories of social presence as a whole; however, we excluded five students who failed to post more than 10 times throughout the semester. Of those who posted more than ten times, Cathy (which is a pseudonym) had the highest average with 5.43 instances of social presence per post, followed next by Diana with 4.87 per post, and Mary with 4.64 per post. The frequency of instances of social presence per post becomes more striking when these results are compared to participants with the lowest use of social presence indicators per post. The three participants with the lowest number of social presence indicators per post were Instructor Bob, who had the lowest average at 2.24 instances per post, followed by Sam with 2.42 per post, and then Monica at 2.89 per post.

But when we dug a little deeper, we found that a high or low social presence rating (i.e., the average social presence indicators used per post) did not necessarily mean that the

Table 8. Instructor and students' use of social presence categories.

Student	Total posts	Social presence total posts (avg per post)	Affective total posts (avg per post)	Cohesive total posts (avg per posts)	Interactive total posts (avg per posts)
Adam	76	254 (3.34)	56 (0.22)	109 (0.43)	89 (0.35)
Cathy	77	418 (5.43)	122 (0.29)	175 (0.42)	121 (0.29)
Christine	107	362 (3.38)	86 (0.24)	115 (0.32)	161 (0.44)
Daphne	73	253 (3.47)	42 (0.17)	112 (0.44)	99 (0.39)
Dawn	121	360 (2.98)	69 (0.19)	123 (0.34)	168 (0.47)
Denise	103	393 (3.82)	61 (0.16)	178 (0.45)	154 (0.39)
Diana	94	458 (4.87)	156 (0.34)	151 (0.33)	151 (0.33)
Erica	66	221 (3.35)	53 (0.24)	101 (0.46)	67 (0.30)
Gabriela	55	173 (3.15)	34 (0.20)	66 (0.38)	73 (0.42)
Instructor Bob	328	736 (2.24)	115 (0.16)	204 (0.28)	417 (0.57)
Kate	99	354 (3.58)	52 (0.15)	157 (0.44)	145 (0.41)
Kyleigh	85	274 (3.22)	75 (0.27)	99 (0.36)	100 (0.36)
Laura	39	172 (4.41)	44 (0.26)	73 (0.42)	55 (0.32)
Mary	117	543 (4.64)	91 (0.17)	231 (0.43)	221 (0.41)
Micky	93	423 (4.55)	96 (0.23)	174 (0.41)	153 (0.36)
Monica	53	153 (2.89)	32 (0.21)	61(0.40)	60 (0.39)
Richard	31	130 (4.19)	23 (0.18)	61 (0.47)	46 (0.35)
Sam	78	189 (2.42)	50 (0.26)	55 (0.29)	84 (0.44)
Sara	50	229 (4.58)	54 (0.24)	88 (0.38)	87 (0.38)
Vicky	64	234 (3.66)	47 (0.20)	82 (0.35)	105 (0.45)

participant in question scored the same on all three categories of indicators or even on a given set of indicators within a category. For instance, while Cathy had a high overall social presence average per post (when taking into consideration all three categories of social presence), she had one of the three lowest interactive averages per post. In other words, while her use of affective and cohesive indicators was high compared to her peers, her use of interactive indicators was low compared to her peers. Similarly, while Instructor Bob's total social presence score was low compared to others; he in fact had the highest interactive score (see Table 8), thus suggesting that he may be more proficient at interactive types of communication than cohesive or affective.

We also decided to take a look at the students with the highest overall social presence average per post (see Figure 3). While Cathy had the highest social presence per post average at 5.43 instances per post, Cathy's (like Mary's) strength was greetings and salutations. Diana on the other hand used paralanguage more frequently than greetings and salutations. Diana though was one of the students in the Pair 9 discussion, which had the highest per post average of social presence indicators; it is important to note that she was paired with Sara who was fourth on the overall list with the highest average of social presence indicators.

These results suggest two things. First, just because someone may be proficient at employing a certain type or category of social presence behaviors (i.e., affective, interactive, and/or cohesive) does not mean that this same person is proficient at or comfortable with each indicator related to the category of social presence communication. In other words, while someone might use a lot of affective types of communication, he or she might never use paralanguage and vocatives, opting instead for the use of greetings and salutations, acknowledgment of others, and the use of emotion. Second, these findings might point to the fact that people—especially in small groups—may begin to mirror the communication behaviors of their peers. For example, if a peer (in a small group) has strong social presence

Cathy		Diana		Mary	
Greetings & salutations	0.84	Paralanguage	0.64	Greetings & salutations	0.85
Emotion	0.6	Acknowledgment	0.63	Acknowledgment	0.79
Acknowledgment	0.6	Group reference	0.62	Invitation	0.5
Vocatives	0.56	Invitation	0.59	Group reference	0.5
Paralanguage	0.52	Emotion	0.5	Vocatives	0.44
Group reference	0.51	Self-disclosure	0.49	Expressing appreciation	0.44
Invitation	0.45	Greetings & salutations	0.43	Emotion	0.37
Expressing appreciation	0.42	Vocatives	0.31	Self-disclosure	0.31
Embracing the group	0.36	Expressing appreciation	0.31	Embracing the group	0.18
Self-disclosure	0.35	Embracing the group	0.26	Agreement	0.17
Humor	0.12	Agreement	0.09	Paralanguage	0.1
Agreement	0.1	Humor	0.03	Humor	0

Figure 3. Ranking of social presence indicators used by the three students with the highest overall social presence per post average.

behaviors and heavily uses paralanguage, other students in the group might begin to use paralanguage more frequently than before simply because of their peer's influence.

Constant comparison analysis

After conducting content analysis, we identified the Pair 9 discussion as having the highest social presence density at 6.20 per post and the Reading Group E as having the lowest social presence density at 2.33 per post. We then used constant comparison analysis to analyze these two discussions to see what themes might emerge that could tell a similar or different story than the content analysis results.

Due to the different nature of each discussion, we conducted constant comparison analysis on each discussion separately. We first analyzed Reading Group E. The Reading Group discussions consisted of small groups of 4 or 5 students who were tasked with discussing the course readings and then collaboratively as a group writing nine reading logs about the course readings. The readings logs were supposed to not only summarize the readings but also bring up any questions the group members had about the readings so that the instructor could respond. Students had two incentives to take part in the Reading Group discussions: First, students were graded on each of the nine reading logs, which consisted of 15.25% of the course grade; second, students were graded for their online interactivity and quality of work, which consisted of 16.95% of the course grade.

Two themes emerged from the data from Reading Group E. However, we focus only on the following theme that related to social presence: Students began the threaded discussion (which spanned 2 months) with chitchatting and telling personal stories but quickly changed their focus to the required task of discussing public policy in general and the readings in particular; over time, the focus of the discussion was solely on the reading and public policy—by this point, the discussion largely consisted of students posting questions and the instructor answering the questions.

After analyzing the Reading Group E discussion, we analyzed the Pair 9 discussion. The Pair 9 discussion had a different purpose than the reading group. According to the course syllabus, the Pairs group is a place where group members work on a personal and professional development activity that required each student to take a bit of risk and develop some trust with each other while discussing individual personal and professional goals. Similar to the Reading Group discussions, students had two incentives to take part in the Pairs threaded discussions: First, students were graded on the paper of 3–5 pages that resulted from their work in their Pairs group, which consisted of 12.7% of the course grade. Second, students were graded for their online interactivity and quality of work, which consisted of 16.95% of the course grade.

Likely due in part to the different purpose, the Pairs discussions had a higher social presence density than other discussions, but specifically, the Pairs 9 group had the highest among all of the Pairs and all of the threaded discussions in general. Three themes emerged from this data as well. We put any text that came straight from the discussions in quotation marks:

- Students who have a past relationship and spend time with each other either professionally (e.g., we "are fortunate enough to work together") or personally outside of class can have an easier time collaborating with each other because of their

past relationship, shared experiences, and geographic closeness which others might not have. These benefits can help them "NOT to be alone," give them opportunities "to chat a lot," provide a strong and safe foundation to openly share how they are struggling personally and professionally, and to regularly meet face-to-face.
- Instructors can only react to what they see in a threaded discussion. It is difficult to assess and to support students when they collaborate offline.
- When asked to take a risk, trust a peer, and self-disclose personal details, it helps when two people already know each other, have some trust already built, have shared experiences, and finally have the ability to talk and meet offline.

While the results of the constant comparison analysis did not necessarily contradict any of the findings from the word count or content analysis, they did begin to fill in some details regarding what students were talking about in each discussion and how the type and purpose of a discussion could influence how people communicate with one another.

Discussion

According to the CoI framework, a deep and meaningful experience in online learning contexts involves teaching presence, social presence, and cognitive presence (Garrison et al., 2000). The CoI framework posits that social presence is developed as the result of teaching presence. The CoI framework (as well as the CoI literature as a whole), though, does not provide much guidance on how to design courses, facilitate discourse, and provide direct instruction to facilitate the development of social presence (Dunlap & Lowenthal, 2014; Martin et al., 2018). For instance, how many discussions should there be in a course? Should the discussions be full-class discussions or small groups? Should they have specific instructional tasks? Educators can make some inferences from the indicators of teaching presence developed by Anderson et al. (2001), but even the indicators lack sufficient detail. Some of the results presented in this study might begin filling this void. That is, the results provide a few possible guidelines for how educators can design and develop online courses to increase social presence. However, as an exploratory study using a small sample and not taking into consideration discussions that might take place outside of the learning management system (e.g., via email or face-to-face), the findings from this study should not be generalized to all populations. With this in mind, we will discuss some key findings below.

Group size

The results showed that the indicators of social presence differed across types of discussions, specifically open versus closed discussions. In other words, a higher social presence density existed for small-group closed discussions than for large-group open discussions. This suggests that students projected themselves as real and there in the discussions through specific social presence behaviors (e.g., self-disclosing information, addressing people by first name, using emoticons) more frequently in small discussions than in large discussions.

Although very little research has been conducted on group size and social presence, Tu and McIsaac (2002) claimed that "appropriate communication group size" can influence social interaction and thus social presence. They concluded that "the size of the discussion group exerted a major impact on students' interaction, particularly in real-time discussions" (p. 145).

And although they recommended that two or three participants are an ideal group size for real-time discussions, they unfortunately did not offer any suggestions for asynchronous discussions. Rourke and Anderson (2002a) conducted a study on using peer teams to lead discussions. They found that students preferred small-group peer-led threaded discussions more than full-class instructor-led discussions. They concluded this was possibly because the small-group discussions consisted of four students and were led by their peers rather than the instructor. Thus, preference for small-group discussions could have been due to a combination of the group size, the instructional task, and the instructor's reduced role rather than because the discussions were peer led. In fact, other researchers have found that students participated more or seemed to value instructor-led discussions more (Phirangee et al., 2016; Richardson & Lowenthal, 2017). Our findings about large- and small-group discussions, however, do not suggest that social presence cannot develop in large-group discussions. In fact, Nagel and Kotzé (2010) found high levels of social presence in a supersized course of 100+ students.

The results in this current study might simply confirm what Kreijns et al. (2003) argued about group size—namely, that anonymity and nonparticipation increases as groups get larger; as the group size increases, it is more likely that some students will feel lost in the volume of posts and be unable to fully contribute to the conversation in relevant and meaningful ways. Lurking is not necessarily a bad thing (see Dennen, 2008). However, students need to actually interact with their peers in order to project themselves as real and there in online discussions. And this type of interaction might simply be easier for students in smaller groups—especially those who might feel lost in large discussions. Thus, small-group discussions might work better at the beginning of a course to help students establish their social presence. Small groups likely place an additional amount of peer pressure, and in turn accountability, on individual. More research, though, is needed across other samples on group size and social presence.

Instructional task

In this study, though, group size alone did not guarantee a high level of social presence. For instance, Project Groups and Pairs had a higher social presence density than Reading Groups even though Reading Groups were also small groups. This difference could be due to the instructional task of each discussion. Students' participation in both of these discussions were graded, and both discussions were tied to specific graded assignments. However, the Reading Groups involved identifying questions that resulted from the course readings and then having the instructor answer the questions. As a result, the dynamic of the discussions appeared to be less goal specific (or at least less clearly defined) than the other two types of small discussions. Reading Groups had less peer accountability at least in comparison to the Pairs threaded discussion. Also, more student-to-instructor and instructor-to-student rather than student-to-student interaction occurred in these discussions. In fact, when looking at the number of posts and the number of words in each post in these discussions, the instructor's role in the Reading Groups was more prominent than in the Pairs or Project Groups. This does not mean that instructors should say less or avoid direct instruction. In fact, the CoI framework argued for the use of direct instruction as one way to establish social presence (Anderson et al., 2001). Rather, it might simply suggest that the purpose of a discussion likely influences how and what

a student posts—and therefore the amount of social presence behaviors used by both instructors and students.

The Pairs discussion groups had the highest overall density of social presence. Although this is likely due in part to the fact that the Pairs groups consisted of only two students, it is perhaps equally influenced by the fact that the Pairs groups were tasked with sharing personal information with one another. In fact, the Pairs had the highest frequency of affective indicators per post, which is likely largely due to the instructional task. To date though, we are not aware of research that specifically examines how instructional tasks in online discussions affect social-presence behaviors used in the discussions.

Researchers for years have questioned how best to structure online discussions (Gilbert & Dabbagh, 2005). And they have shown that the structure of a discussion as well as how an instructor posts—thus modeling and setting the tone—can influence how students post (see Dennen, 2005). Although Lowenthal and Dunlap (2018) investigated students' perceptions of how specific instructional tasks influence students' perceptions of social presence, to date there is a lack of research on how small working groups (working on specific assignments—whether group assignments or not) can help build social presence.

The reason the Pairs group had a higher social presence density, though, could also be due in part to the instructor's role in these discussions. An et al. (2009) found that "when the instructor's intervention was minimal, students tended to more freely express their thoughts and opinions, with a large number of cues for social presence" (p. 749). These results suggest that it could be a combination of small-group size, instructional tasks that engender interpersonal dialogue, and low instructor involvement that helps build social presence. But additional variables such as one's personal communication style, how discussions are graded, and the relevance of the instructional tasks to name a few, need to be investigated to see how they too influence the manifestation of social presence. Further research needs to be conducted to verify how instructional tasks (including not only what students are asked to do but how they are graded, as well as the personal and professional relevance of the assignments), group size, and instructor involvement can impact the development of social presence.

Past relationships

Constant comparison analysis revealed that the students involved in the Pairs group with the highest social presence density worked together and even carpooled together. Online educators have recommended for online courses—whenever possible—to start with face-to-face meetings to establish social presence (Palloff & Pratt, 2013). This finding, though, might suggest something more. It could suggest that people who have a strong relationship outside of class might have an easier time with interactive, cohesive, and affective types of communication than people who do not. This finding is supported by other research we conducted (Lowenthal & Dunlap, 2018), where we found that having a positive group project experience helps increase a student's perceptions of social presence and helps them maintain future relationships with one another—even in the absence of ever meeting face-to-face.

Our findings, coupled with these studies, suggest that having a past relationship with class members is helpful when establishing social presence in online courses. It could be that a cohort model that enables students' multiple opportunities to build relationships

with others across semesters is more valuable (at least when it comes to building social presence) than beginning a course or a program with face-to-face meetings. Walther (1994) argued years ago that the possibility of future interaction can influence the degree to which people socially interact online, thus giving further support for cohort models or other types of models that enable students to take multiple courses with the same students and/or with the same instructor. Further research is needed to confirm this, because while the students' past relationship emerged in the data in this one group (Pairs), it was difficult to ascertain whether or not other students had past relationships with their peers and if so to what degree.

One size doesn't fit all

A major finding from a design perspective is that one size does not fit all. The results show that while there are trends (e.g., that closed discussions had a higher social presence density than open discussions), there is not always a clear reason as to why some students use specific social presence behaviors (e.g., paralanguage) and others do not. Although some students might use (or some discussions might elicit) high levels of social presence overall, each of the indicators or at least the categories (i.e., types of social presence) differed across students and types of discussions.

This finding supports Lowenthal and Dunlap's (2018) research (also see Dunlap & Lowenthal, 2014), where they found that each student appeared to have their own need and therefore threshold for social presence. In other words, different people have different social presence needs. What works for one student might not work for another, and what is comfortable or ideal for one student might not be comfortable or ideal for another. It is possible that each person—perhaps based in part on their own social presence needs—has developed their own level of proficiency at utilizing social presence behaviors in online discussions; that is, each person has developed different levels of literacy at electronically mediated discourse.

Further, a stylistic element appears to affect how people communicate in online learning environments as well. For instance, some students appear to almost habitually use emoticons (e.g., Diana), whereas others do not appear to use them at all (e.g., Kate, Denise, Dawn, or Laura). Just as people have different communication styles face-to-face, they also have different communication styles online. Additional research is needed to better understand people's different communication behaviors.

Implications for researching social presence

Situational variables of electronically mediated discourse (EMD)

Early research on social presence focused more on one-to-one communication (Short et al., 1976). While instances of one-to-one EMD occur in online courses (e.g., one-on-one emails), more often than not EMD in online courses involves three or more communicators, and therefore is a one-to-many model—thus changing the dynamic and making it more like public speaking. Or when it is one-to-one, it is like talking to another person on the phone but while on speakerphone (where others are listening). These changes in the social context in which one communicates—more than any limitations of the technology

—likely changes how people communicate and establish themselves as there and real. This becomes important when one starts to think about the indicators of social presence developed by Rourke et al. (1999). Many things have changed since the indicators were created: the technology of online discussion forums has improved, bandwidth has increased, students are more familiar with EMD, and online pedagogies have matured. Therefore, the study of online discussions needs to change to reflect these advances. Many of these indicators of social presence may no longer be relevant, may lack enough specificity, or simply may be based too much on old assumptions of proper or effective ways to communicate online.

Further, very little research has focused on how one's role or status can influence how and what one communicates, and how one is perceived as being there or being real (see Richardson & Lowenthal, 2017). While the CoI framework has an element called teaching presence, as mentioned earlier, it focuses on how instructors design and organize a course, facilitate discourse, and provide direct instruction (Anderson et al., 2001). Teaching presence does not specifically address how an instructor establishes their own social presence, especially given the added task of directing instruction and facilitating discourse (Lowenthal, 2016; Richardson & Lowenthal, 2017).

The CoI framework does not differentiate or really even acknowledge how an instructor might establish their social presence differently than students (Richardson & Lowenthal, 2017). Instructors often talk differently than students. Further, each instructor has their own style and level of comfort in the classroom. Although some instructors share parts of their personality and will engage in affective types of communication, others will not. Further, although instructors might build opportunities to establish social presence in their own online courses—they often will not engage in these activities with students. The bottom line is that when instructors talk (i.e., post), students tend to listen (i.e., read). This is not always the case when other students talk. Students are not always as interested in what their peers share. We posit that the way instructors establish their own social presence, and the little things they do (because of their status), can carry even more weight than if a student did the exact same thing. Further, and because of the difference in roles and status, students tend to talk to an instructor differently than they do to their peers (i.e., code switch; see White & Lowenthal, 2011). But these dynamics are rarely considered when researchers study social presence.

Online discussions are more complicated than Short et al. (1976), and possibly even Rourke et al. (1999), originally experienced or perhaps even imagined. For instance, online discussions today often involve a many-to-many model, students with past relationships (e.g., from past courses) and likely future relationships (e.g., future courses), and consist of individuals who are often paying tuition to take part in the discussions (and therefore have some extra motivation to participate) while managing competing priorities and various demands on their time. Situational variables such as these need to be considered when studying social presence. For instance, although content analysis is a useful technique to study online discussions, quantitative measures or counts of social presence behaviors might have limited value—especially when they do not take into consideration the context in which social behaviors are used.

Unit of analysis

Among other things, the unit of analysis used when conducting content analysis influences the frequency of social presence indicators. For instance, following past researchers' lead (e.g., Rourke et al., 1999; Swan, 2003), we used the entire discussion post as the unit of analysis. But the unit of analysis can largely determine what one sees and what one does not see.

When researchers approach analyzing online discussions from a purely quantitative content-analysis perspective—frequency counts are everything. If researchers only count a specific indicator of social presence (e.g., use of emotion) once in a post because the post is the unit of analysis, the researcher is likely to miss details. For instance, you can imagine how many times students might use the word "we" as a group reference within a single post in small-group discussions focused on a group project. But if the unit of analysis is simply the entire post, the high frequency of the use of the word "we" may be lost in the totality of the words. The frequency of this group reference—the word "we"—could be captured more accurately if the unit of analysis is smaller than the entire post (e.g., each meaningful unit). For example, if a discussion post has the group reference "we" five times in the post, this indicator would be counted once only if the unit of analysis is the entire post, but might be counted up to five times if the unit of analysis is a meaningful unit (which is not always but often the sentence level) or if it is counted for each occurrence in a post.

Researchers have written much about the ideal unit of analysis when using content analysis to code online discussions (De Wever et al., 2006; Rourke & Anderson, 2004; Rourke et al., 2001). Unfortunately, very little consensus exists on the best approach, because although one might gain granularity using a smaller unit of analysis, interrater reliability decreases and workload increases. Future research must investigate how the unit of analysis influences content analysis results of discussions.

Problems with treating social presence indicators equally

Researchers need to get a better idea of what specific behaviors elicit perceptions of closeness and realness in others. The indicators of social presence are a great start, but they have limitations. For instance, one indicator combines greetings and salutations. Although they are similar, one could argue that someone who continually uses a salutation more than a greeting is focusing more on themselves than on acknowledging others in a given discussion. Further, a greeting with a vocative (e.g., "Hi John") is arguably better at developing a sense of social presence and projecting oneself as real and there than either "Hi" or ending a post with one's first name. Another problem is researchers' tendency to treat all three categories and subsequent indicators of social presence equally. Some researchers tend to define social presence as not only presenting oneself as real and there but also establishing a positive emotional connection with others (see Lowenthal, 2010; Lowenthal & Snelson, 2017). In this case, it makes sense that while interactive and cohesive types of communication are important and possibly necessary building blocks for affective communication, affective communication is likely the best way to build an emotional connection with others. In other words, simply ending a discussion posting with a salutation is not nearly as powerful as disclosing personal information. Further research is needed to test this theory.

Concluding remarks

The theory of social presence remains a central concept in online learning. However, despite its importance, many questions remain about what exactly it is and how best to develop it. This study focused on analyzing how an instructor and students use social presence indicators to establish and maintain social presence in asynchronous text-based discussions. The results, although not generalizable to all people and contexts, suggest that social presence is more complicated than previously imagined. Moreover, situational variables such as group size, instructional task, and previous relationships might influence how social presence is established and maintained in online courses. Additional research is needed to better understand how people's behaviors in asynchronous text-based environments influence others' perceptions of social presence.

Disclosure statement

No potential conflict of interest was declared by the authors.

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Appendix

Coding sheet used for content analysis

Category & Indicator	Definition (Swan, 2003)	Criteria	Examples
Affective responses			
Paralanguage (PL)	Features of text outside formal syntax used to convey emotion (i.e., emoticons, exaggerated punctuation or spelling)		Someday … … ; How awful for you ☹; Mathcad is definitely NOT stand along software; Absolutely!!!!!
Emotion (EM)	Use of descriptive words that indicate feelings (i.e., love, sad, hate, silly); conventional or unconventional expression of emotions.	Refers directly to an emotion or an emoticon. Use of capitalization only if obviously intended	When I make a spelling mistake, I look and feel stupid; I get chills when I think of … I am scared; This is fun; Sorry this is such a lame e-mail; Hope you are OK; I am pleased that
Humor (H)	Use of humor—joking, teasing, cajoling, irony, sarcasm, understatement	Only code if a clear indication that this is meant to be funny, e.g., extra punctuation or an emoticon	God forbid leaving your house to go to the library I'm useless at computers but will this make me a bad nurse? Ha Ha; LOL
Self-disclosure (SD)	Sharing personal information, expressing vulnerability or feelings	An expression that may indicate an emotional state but does not directly refer to it. Uncertainty, non-comprehension	I sound like an old lady; I am a closet writer; We had a similar problem. I'm not quite sure how to … ; This is strange; I don't understand how; I don't' know what that means; As usual I am uncertain; It's all too much … ; Website? Help!!!!
Interactive responses			
Acknowledgment (AK)	Referring directly to the contents of others' messages; quoting from others' messages in agreement; Reference to others' posts	Explicit or implicit recognition that another message has been the motivation for this message	Those "old machines" sure were something; we won by a landslide – "landslide" (next response). So what you're saying is … ; I thought that too … For me the question meant … ;
Agreement or Disagreement (AG)	Expressing agreement or disagreement with other's messages	Expressing agreement with each other or contents of messages	I'm with you on that; I agree; I think what you are saying is right. I think that would be a good plan; I think your suggestion is good
Invitation (I)	Asking questions or otherwise inviting response. Students ask questions of each other or moderator		Any suggestions?; Would you describe that for me, I am unfamiliar with the term. Does anybody know … ?
Expressing appreciation (EA)	Showing appreciation of each other	Showing appreciation or approval of each other or contents of messages or complimenting	You make a good point; Right on; Good luck as you continue to learn I like your briefing paper … ; It was really good;
Cohesive responses			
Greetings, salutations or phatics (GS)	Greetings, closures. Communication that serves a purely social function		Hi Mary; That's it for now, Tom Hi; Hey; Bye for now;
Vocatives (V)	Addressing or referring to classmates by name		You know, Tamara, … ; I totally agree with you. Katherine Sally said that …

(*Continued*)

(Continued).

Category & Indicator	Definition (Swan, 2003)	Criteria	Examples
Group reference/ inclusivity (GR)	Referring to the group as "we", "us", "our". Addresses the group as a possessed or as a whole	Any reference to the group with a possessive pronoun	We need to be educated; Our use of the Internet may not be free. We need some ground rules; The task asks us to …
Embracing the group (EG)	Revealing life outside the group that is not emotional or expressing vulnerability or feelings. Also that isn't related to the course	Any expression that lets the group know about the circumstance of the author	The kids are asleep now; I'm a physiotherapist; It's raining again; It's 4am—I'm off to bed;