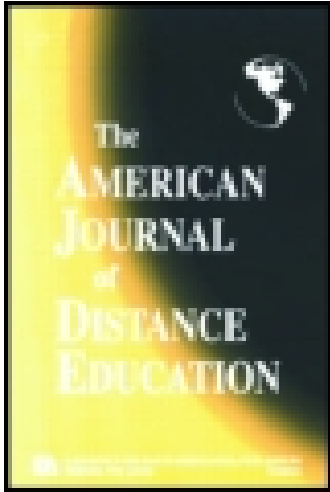


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The Relationship of Social Presence and Interaction in Online Classes

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The purpose of this research was to study social presence in the on-line learning environment. Dimensions of social presence were examined using quantitative and qualitative methods. Three dimensions of social presence—social context, online communication, and interactivity—emerged as important elements in establishing a sense of community among online learners. The privacy factor was also an important element in the level of comfort for students online. An increase in the level of online interaction occurs with an improved level of social presence. This can be fostered by considering characteristics of the learners, by selecting the appropriate computer-mediated communication medium, and by applying appropriate instructional elements to course design.

Social presence is a measure of the feeling of community that a learner experiences in an online environment. To examine social presence in online classes, the relationship between media and the sociocultural construction of knowledge should be explored (McIsaac and Gunawardena 1996). Short, Williams, and Christie (1976) regarded social presence as the most important perception that occurs in an environment and stated that it is fundamental to person-to-person communication. Therefore the area of social presence, particularly in the online environment, invites further inquiry.

Because of the lack of traditional communication cues in the electronic classroom, researchers are interested in examining ways to enhance the two

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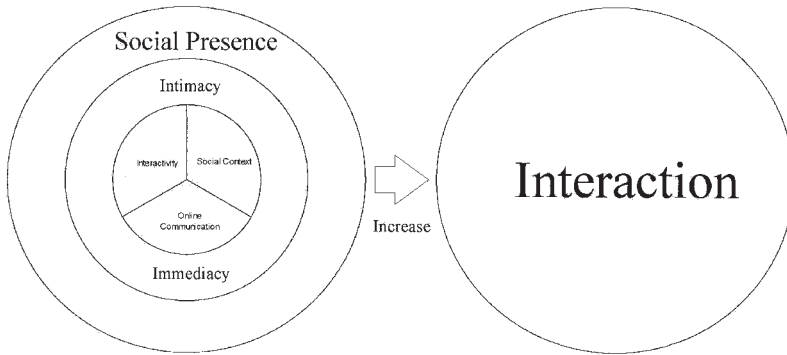


Figure 1. Social Presence and Interaction

components of social presence: intimacy and immediacy (Argyle and Dean 1965; Wiener and Mehrabian 1968). These components can be further broken down into dimensions that can then be expanded individually in the online environment (see Figure 1). It is hypothesized that using strategies to improve social context, online communication, and interactivity will increase interaction of online students and instructors in online classes. These three dimensions of social presence will be explored in this study.

The phenomenon of social presence was described initially in face-to-face (FTF), audio, and closed-circuit television encounters. However, the computer-mediated communication (CMC) environment presents very different characteristics from the FTF classroom. How does social presence theory apply to CMC systems? How can social presence affect online learning? Answers to these inquiries may assist instructional designers to develop more interactive and successful distance education courses.

There is not a clear definition of social presence for CMC in the literature (Rafaelli 1988; Walther and Burgoon 1992; Svenning and Ruchinskas 1984; Walther 1995, 1996, 1997). This research proposes to define social presence for online settings, develop guidelines for improving online social learning environments through interaction, and promote sound instructional design in distance education.

The research questions were as follows:

1. Is there a relationship between social presence and online interaction?
2. How do social relationships affect online interaction?
3. How does online communication impact interaction on CMC?

4. How does interactivity impact online interaction?
5. Do issues of privacy influence online social interaction?
6. Does the use of CMC intensify social interaction among online learners?

Literature Review

Definition of Social Presence

Social presence has been defined as the degree of awareness of another person in an interaction and the consequent appreciation of an interpersonal relationship (Short, Williams, and Christie 1976; Rice 1993; Walther 1992; Walther and Burgoon 1992). Biocca (1997) stated, "The minimum level of social presence occurs when users feel that a form, behavior, or sensory experience indicates the presence of another intelligence." Factors that contribute to the degree of social presence in an FTF encounter are facial expression, direction of gaze, posture, dress, nonverbal cues, and vocal cues. Perception of social presence, initially seen as an attribute of the medium (Short, Williams, and Christie 1976), varied among users (Gunawardena 1995; Perse et al. 1992; Young 1999) and should be viewed as a subjective quality, depending on the objective quality of the medium (Walther 1992).

Degree of Social Presence

The degree of social presence is based on the characteristics of the medium and the user's perception. Normally, users are asked to assess the degree of social presence in a particular situation (Perse et al. 1992; Walther 1992). Short, Williams, and Christie (1976) measured social presence through the semantic differential technique and used a series of bipolar scales: sociable/unsociable, personal/impersonal, sensitive/insensitive, and warm/cold. Tu (2002) argued that current social presence instruments (Short, Williams, and Christie 1976; Gunawardena and Zittle 1997) were unable to capture a thorough perception of social presence because several important variables were not considered (e.g., privacy, recipients, topics).

Two Concepts of Social Presence

Intimacy (Argyle and Dean 1965) is a function of such things as eye contact, physical proximity, and topic of conversation. Communication with

maintained eye contact, proximity, body leaning forward, and smiling conveys intimacy (Burgoon et al. 1984). When an uncomfortable degree of intimacy is encountered, the participants will attempt to alter their behavior to maintain an optimal comfort level, called equilibrium (Short, Williams, and Christie 1976).

Immediacy (Wiener and Mehrabian 1968) is the psychological distance between a communicator and the recipient of the communication. Immediacy is conveyed through speech and associated verbal and nonverbal cues (Walther 1992). Therefore, the user may alter immediacy.

Three Dimensions of Social Presence

Three dimensions of social presence were proposed from previous studies: social context, online communication, and interactivity (Tu 2000, 2001).

Social context. Social contexts, such as task orientation (Steinfeld 1986), privacy (Champness 1972; Steinfeld 1986), topics (Argyle and Dean 1965; Walther 1992), recipients/social relationships (Walther 1992; Williams and Rice 1983), and social process (Walther 1992) contribute to the degree of social presence. When the conversation is task oriented and more public, the degree of social presence will degrade. Walther (1992) proposed that different social processes, settings, and purposes are components of social context and affect social presence.

Task types influence the degree of social presence and communication processes. Steinfeld (1986) found that task complexity, task interdependence, environmental uncertainty, and the need for communication across distant locations were positively associated with increasing task orientation in CMC messaging. Hollingshead and McGrath (1995) identified four different task types associated with CMC—to generate, choose, negotiate, and execute.

Walther (1992) argued that social relationships could stimulate changes in interactions. CMC users tend initially to have less relational communication. However, as time passes, CMC users are driven to develop social relationships by forming impressions of others through the text-based information conveyed. Participants became more social toward the latter part of a CMC conference than during the initial stages and exchanged more personal messages at that time (Gunawardena and Zittle 1997). Haslam's (1995) four social relationships—communal sharing, equality matching,

authority ranking, and market pricing—can be applied to online learning environments and redefined as Love, Information, Status, and Services.

Privacy affects the degree of social presence. A less private setting results in a decreased perception of social presence by users. Champness (1972) reported that users felt more public in a videoconference and perceived less social presence. A camera in operation may be seen as intrusive, electronic eavesdropping and produce negative reactions (Ryan 1976). Steinfield (1986) reported that users were reluctant to employ e-mail for confidential matters, so privacy may not have affected their use of e-mail.

Online communication. Online communication is concerned with the attributes of the language used online and the applications of online language. The text-based format requires CMC users to possess some level of computer communication literacy such as typing, reading, and writing. People without these skills develop communication anxiety (Gunawardena 1991) when text-based communication is required. Therefore, text-based communications should be initiated with some light or casual topics or introductions. Training students to use the medium comfortably is crucial to the success of collaborative learning. Garramone, Harris, and Anderson (1986) concluded that the degree of social presence on computer bulletin boards was perceived as higher for users who were more interactive than for those who were not. Perse et al. (1992) found a positive relationship between social presence and a student's perception of his/her own computer expertise.

Interactivity. Interactivity includes the activities in which CMC users engage and the communication styles they use. The potential for feedback contributes to the degree of salience of the other person in the interaction. Immediacy is a component of interactivity. Because responses in asynchronous CMC are delayed, and not immediate, a feeling of low interactivity can diminish social presence. Communication styles may impact social presence. Norton (1986) identified eleven communication styles (impression-leaving, contentious, open, dramatic, dominant, precise, relaxed, friendly, attentive, animated, and communicator image) that may be associated with online communication. Gunawardena (1995) differentiates interactivity and social presence, arguing that social presence requires users to add one more step to awareness of interactivity; in short, when users notice it, there is social presence.

Research on the Impact of Social Presence

Immediacy relates positively to a number of instructional processes. Christophel (1990) reported that instructors with higher social presence were viewed as more positive and effective, leading to an increase in affect toward the instructor and the course. Kelley and Gorham (1988) found a positive relationship between immediacy and cognitive learning at the level of short-term recall. Gorham (1988) concluded that teacher verbal immediacy behavior correlated with affective learning and cognitive learning. Lack of immediacy results in a lack of social presence, resulting in frustration, a critical attitude toward the instructor's effectiveness, and lower affective learning (Rifkind 1992).

Sallinen-Kuparinen (1992) suggested that using stylistic behavior could contribute to the perception of teacher effectiveness. Gunawardena (1995) felt that instructors should develop interaction skills that create teacher immediacy and a sense of social presence as well as offer encouragement to participants (Gunawardena and Zittle 1997).

Methodology

Both quantitative and qualitative methods were used to understand the students' perception of social presence. Fifty-one students enrolled in a graduate level course were the participants.

Quantitative Method

The CMC Questionnaire (Tu 2002), evaluating e-mail, bulletin board, and real-time chat, was used to measure online social presence and privacy. The questionnaire contains seventeen social-presence items and thirteen privacy items, each with a five-point Likert scale, and twelve demographic identities. Bartlett's test of sphericity (Bartlett 1950) was applied to increase the validity because of the small number of participants. This tested whether the correlation was statistically different from zero by comparing the correlation matrix (R) and identity matrix (I). If $R \neq I$, the correlation was significant and then factor analysis could follow. The power of the Bartlett's test of sphericity is that it is sensitive to sample size (Knapp and Swoyer 1967). Therefore, if the zero correlation is rejected by a small sample, there is greater validity.

Exploratory factor analysis was utilized. Humphrey-Ilggen Parallel Analysis was applied; two data matrices are analyzed simultaneously and their

eigenvalues were plotted. Additionally, Cattell's Scree test and Kaiser's Criterion were used to determine the number of factors to extract. Pearson correlation was computed to explain the relationship of the numbers of messages sent/received and the social presence.

Qualitative Method

Participant observation method with a dramaturgy perspective was used to understand social presence in CMC from the student's point of view. Dramaturgy is a theatrical metaphor used to understand social interaction. Goffman (1959) contended that humans construct their self-presentations/impression management and carry them off in front of others. It is an intentional motive behind the planning and execution of human performances that are accomplished with an eye toward presenting the best impression of themselves in the view of others. In other words, people construct some images intentionally and provide others inadvertently. A dramaturgical perspective sees actors engaging in manipulative behavior designed to manage impressions. Therefore, the researcher should take a manipulative role (Mead 1934). Tu (2001) argued that participant observation is best suited to the dramaturgical perspective because it enables the researcher to capture a wide range of acts.

FirstClass, a computer conferencing system providing e-mail, bulletin board, and real-time chat functions, was used for class communication. The data were collected through casual conversation, an in-depth interview, direct observation, and document analysis. The casual conversation was conducted between the researcher and students in different settings, the researcher's office, the classroom, online real-time chat, and any convenient location. Observations were conducted in the classroom, the computer laboratory, the graduate assistant's office, and through online asynchronous and synchronous class discussions. The researcher applied a dramaturgical approach by using different communication styles, formal/informal communication styles, paralanguage, emoticons, and so on, with students to observe their responses. Eight semistructured in-depth interviews were conducted with students to explore particular concepts in social presence, such as "How do you feel when you communicate with someone who dominated the conversations?" and "What are your relationships with online participants?" Document analysis included all messages delivered on FirstClass and on e-mail. In-depth analysis began after acquisition of some preliminary data, giving the researcher a better idea of where to focus further data collection. Three dimensions from the quantitative

data results and specific studies, Haslam's (1995) four social relationships, Hollingshead and McGrath's (1995) four task types, and Norton's (1986) eleven stylistic communication styles provided a foundation for qualitative data analysis.

Triangulation methods were utilized to achieve a better understanding about the students' perceptions of social presence, not as a validation process. Data triangulation consisted of time, space, and person triangulation. Method triangulation consisted of class observation, lab observation, on-line discussion observation, interview, and questionnaires.

Results

Demographics

Forty-three of 51 participants responded to the online questionnaire. More than half of the participants (28, or 65.12%) were female, and 15 (34.88%) were male. Multiple age groups were represented with a spread of 18 years to 45-plus years. The ethnic mix was 31 Caucasians (72.09%), 4 Latinos (9.30%), 4 African-Americans (9.30%), and 4 Asian and Pacific Islanders (9.30%).

Quantitative Results

An exploratory factor analysis was performed on thirty questionnaire items. Five factors (social context, online communication, interactivity, system privacy, and feeling of privacy) were retained. These five factors accounted for 76.74% of the variance and were extracted using varimax rotation. Cronbach's coefficient alpha for these five factors ranged from .82 to .71. The factor analysis was conducted for each of three CMC systems—e-mail, bulletin board, and real-time discussion. The coefficients and factor structures are similar in all three CMC systems. The main discernable difference is that the order of extraction differs for the individual samples.

The perceived social presence ($M = 3.32$, $SD = .39$) and privacy ($M = 3.08$, $SD = .52$) on CMC was high. However, correlation between social presence and privacy was insignificant with $r = 0.286$.

One-way repeated-measures, analysis of variance (ANOVA), were computed for three CMC systems and five factors. It indicated a significant difference in the level of five factors and CMC systems (see Table 1).

Table 1. Multivariate Tests: Five Factors

Effect	Wilks's λ	Value	F	$d.f.$	Error $d.f.$	Sig.	η^2
CMC	Social context	.58	14.84	2	41	.00*	.42
	Online communication	.66	10.38	2	41	.00*	.34
	Interactivity	.42	27.97	2	41	.00*	.58
	System privacy	.83	4.21	2	41	.02*	.17
	Feeling of privacy	.71	8.39	2	41	.00*	.29

Note: Sig. = statistical significance of the F value; CMC = computer-mediated communication.

* $p < .05$, two-tailed.

One-way repeated-measures, ANOVA, were computed for the level of privacy of three CMC systems and indicated a significant difference in the level of privacy among the three systems: $F(2, 41) = 10.32, p < .05$. E-mail received the highest rate ($M = 3.15, SD = .58$), followed by the real-time discussion ($M = 3.13, SD = .49$) and bulletin board ($M = 2.97, SD = .48$).

Because the ANOVA overall test yielded a significant result, three pairwise comparisons among three CMC systems were conducted to assess which means differed from the others. Two of the three pairwise comparisons were significant, controlling for familywise error rate across the three tests at the .05 level, using the Holm's sequential Bonferroni procedure to minimize the chances of making a Type I error. The smallest p value was for the comparison of e-mail-bulletin board and bulletin board-real time discussion, and its value of 0.001 was less than the p value of $0.05 / 3 = 0.0167$ and, therefore, the differences between the means for these two systems was significant. The last comparison, between e-mail and real-time discussion, was not significant ($p = 0.44$).

One-way repeated-measures, ANOVA, were computed for three CMC systems and five factors emerged from the previous factor analysis. The results indicated a significant difference in the level of all five factors among these three CMC systems ($p < .05$).

A Pearson correlation between mean social presence rating and frequency of messages produced a correlation of $r = -.004$, and this correlation was not significant at ($\alpha = .05, r(41) = -.04, p > .05$). The frequency of CMC does not vary with the level of social presence.

Qualitative Results

The data analysis began with three dimensions and privacy factor as derived from the quantitative results and the literature. The three basic dimensions and the privacy factor remained unchanged. However, the qualitative

data analysis indicated that there were more variables that contribute to social presence. Social presence theory is more complicated than previous studies indicated (Gunawardena 1995; Gunawardena and Zittle 1997; Tu 2002; see Table 2).

Discussion

Social presence positively influences online interaction; however, frequency of participation does not represent high social presence. Three dimensions of social presence—social context, online communication, and interactivity—clearly emerged quantitatively and qualitatively. These three dimensions positively impact social presence. Social context was constructed from the CMC characteristics and their perception of the CMC environment. Online communication consisted of the attributes of the language used online and the applications of that online language. Interactivity includes the activities in which CMC users engage and the communication styles they use. Therefore, social presence is the degree of feeling, perception, and reaction of being connected by CMC to another intellectual entity through a text-based encounter. Participants felt a high level of privacy on CMC; however, the correlation to social presence was insignificant.

Three Dimensions

Social context. Social context is constructed from the CMC users' characteristics and their perception of the CMC environment. Analysis of the qualitative data reveals that this dimension appears more complicated than suggested by the quantitative results. The degree of familiarity with participants appears to be critical in qualitative data that did not load on social context in the quantitative data analysis. The following items may have positive influences on social presence:

- familiarity with recipients,
- informal relationships,
- better trust relationships,
- personally informative relationships,
- positive psychological attitude toward to technology, and
- more-private locations.

Table 2. Variables Identified in Qualitative Data

Variables	Dimensions			
	I. Social Context	II. Online Communication	III. Interactivity	IV. Privacy
1	Familiarity with recipients	Keyboarding and accuracy skills	Timely response	Formats of CMC
2	Assertive/acquiescent	Use of emoticons and paralanguage	Communication styles	Access and location
3	Informal/formal relationship	Characteristics of real-time discussion	Length of messages	Patterns of CMC
4	Trust relationships	Characteristics of discussion boards	Formal/informal	
5	Social relationships (love and information)	Language skills (reading, writing)	Type of tasks (planning, creativity, social tasks)	
6	Psychological attitude toward technology		Size of groups	
7	Access and location		Communication strategies	
8	User's characteristics			

Note: CMC = computer-mediated communication.

When the senders are familiar with the recipients, they tend to be more informal and are more willing to share personal information, thereby achieving greater interaction—although this issue did not load on factor analysis. Therefore, it is recommended that a dedicated time for introductions be integrated into the course design at the beginning of the semester.

The more-assertive students may not be aware that their communication styles create a negative impact on other students' ability and willingness to communicate, resulting in unequal participation in real-time discussions. In this case, instructors can use a casual communication style to encourage more-reluctant students.

Inherently, students perceive that the relationship between teachers and themselves is more formal. Clearly, when students communicated with their peers, the conversation tended to be more casual because students felt that they are "at the same level."

Trust issues played a very critical role in online interaction among students. In the CMC environment, it requires more time for students to become acquainted and to develop a trusting relationship. Therefore, students must develop a method of gaining trust before attaining a higher level of social presence.

The qualitative data reveals that social presence is impacted by the students' social relationships. Four major social relationships emerged from this study: demonstrating caring, exchanging information, providing services, and maintaining existing status, in that order. Caring and information exchanges in social relationships were found to impact online interactions positively, while status and service relationships resulted in negative formal communications.

Students' perceptions of CMC technology were based primarily on their cultural backgrounds, their particular situations, their previous experiences, or their psychological attitudes. Individual students perceived that the same CMC system can have different attributes at different times, at different places, in different situations, and in different contexts.

The location from which students could access computers is a critical element. Students accessing CMC at home had the conveniences of privacy, a more relaxed atmosphere, a strong familiarity with their own computers, and the ability to exert greater control and flexibility over their schedules. These advantages permit a greater willingness and a higher motivation to engage in CMC activities. Students whose only computer access is in a computer laboratory may be less willing to confront the difficulties imposed by CMC access. Inconveniences include waiting in line, lack of pri-

vacy, and the likelihood of losing the computer workstation during a rest room break.

Online communication. Online communication refers to the attributes, application, and perception of the language used online. This was supported by five variables in the quantitative data analysis: CMC (1) is stimulating; (2) is expressive; (3) conveys feelings and emotions; (4) is meaningful; and (5) is easily understood, as confirmed by qualitative data such as keyboarding skills, expressiveness, characteristics of discussion, and language skills.

Keyboarding skills clearly influenced the students' efficiency in synchronous communication because immediate responses were required; but the impact was less noticeable in asynchronous communications. The instructor should examine students' keyboarding skills and utilize the appropriate CMC systems, either synchronous or asynchronous. When students have fewer keyboarding skills, asynchronous communication, e-mail, and bulletin board are more appropriate. Accuracy was another area of concern. Typographical errors occurred frequently and may have interfered with understanding or caused misunderstandings.

In the CMC environment, the delivery channel is lean. Therefore, plain text may not be capable of delivering the desired level of stimulation, and one may find it more difficult to express intended meaning. "Misunderstanding" was a major concern for many students. Therefore, increasing the familiarity among students was important.

The process of conveying feelings and emotions is necessary in human communication. CMC users are constantly searching for expressive ways to generate and deliver their feelings and emotions. Students used emoticons and paralanguage to compensate for the lack of social context cues in the online communication environment. Most students expressed positive responses to the use of emoticons and paralanguage.

Many students reported that they felt lost in the multithreaded discussion environment. They became confused and frustrated, having difficulty determining "who" was talking to "whom" about "what." The large number of messages and the ever-increasing number of topics made it impossible to maintain the discussion speed, regardless of typing skills. Generally, students were motivated to "withdraw" or "just observe." These reactions would create a negative impact on online communications, such as creating "discontinued" feelings and interfered with the student's ability to think and reflect on the messages. Two strategies were proposed (Winiiecki and Chyung 1998): using strategic snipping to simulate conversational over-

laps and using formulations and indexical repairs to emulate conversational practice.

Interactivity. Interactivity consisted of those cooperative activities and communication styles used by CMC users. The quantitative data consisted of four variables: CMC (1) is pleasant, (2) is immediate, (3) promotes responsiveness, and (4) allows the student to be comfortable with familiar topics. The qualitative data included issues that involved CMC response time, communication styles/skills, and the size of discussion groups. Issues that have positive influence are as follows:

- timely response to CMC messages,
- use of stylistic communication styles,
- casual conversations, communication strategies,
- appropriate message length,
- planning, creativity, intellectual, decision-making, and social tasks, and
- appropriate communication group size.

The response time was an issue that was critical to the online interaction, particularly in asynchronous communication. If the person did not respond within the time frame expected by the sender or did not respond at all, the sender perceived less social presence. Three irregularities resulting in a delayed or absent response to a message were pure technology delays, personal technology use difficulty, and the sender's perception regarding late/no response.

Stylistic communication styles were found to have a very positive impact on students' feelings toward others and influencing learning. Nine of Norton's (1986) 11 stylistic communication styles (attentive, impression-leaving, relaxed, acquiescent, friendly, open, animated, dramatic, and personal) were identified to be useful in increasing interactive communication.

The level of formality influenced the students' willingness to respond. When the message was perceived as more formal, immediacy was sacrificed because the psychological distance between the correspondents was increased. Informality decreased the psychological distance and people felt closer to each other. The use of formal and informal styles depended on the situation. One female participant expressed her feeling about a formal message: "Fancy paper makes you feel like changing your clothes before you read it.... It comes across as cold when it's really just formal."

The findings from interviews suggested that instructors use several social communication strategies to enhance interactive communications: initiation of conversation, greeting, praise, inviting tones, and so forth. Initiating communication showed the recipient that the correspondent was willing to build a friendship as well as share concerns. This made people feel friendlier, more personable, and warmer.

Message length exerted influence on students' interactions based on interviews. Real-time discussion is more like oral conversation, and is therefore shorter. E-mail is more like a "causal written conversation." The bulletin board was perceived as more formal writing, so it tended to be longer, the writing style more formal, and the word choice less oral. Sentence structure and grammar should be more rigid since the message was permanent and in public.

Several task types that influenced the online interaction were identified: planning, creativity, intellectual, decision making, cognitive conflict, and social tasks. Four tasks were identified as more desirable in the area of cognitive learning. Social tasks contributing to social learning formed the foundation for all of the different tasks. Ideally, in a learning environment, "generate" and "choose" will provide a better environment for interaction.

Being familiar with the topic of the discussion exerted a great impact on a student's interaction. When the students were more familiar with the discussion topics, they felt more comfortable participating in the discussions; otherwise, they felt intimidated and were reluctant to join the conversation. Therefore, it was recommended that, if applicable, one should allow students to exercise some control over the selection of the discussion topics.

The size of the discussion group exerted a major impact on students' interaction, particularly in real-time discussions. It is recommended that the real-time discussion group or chat be limited to two or three participants, if possible. If a larger group is necessary, a strategy that provides equal turn-taking must be applied.

Privacy

System privacy and a perception of privacy emerged as major variables. Quantitative data analysis provided what was associated with the privacy factors, whereas qualitative data analysis addressed how students perceived online privacy issues. Among three CMC systems, it appeared that e-mail was ranked as the most private, followed by one-to-one real-time discussion, then many-to-many real-time discussion; bulletin board was considered the least private. It was concluded that one-to-one discussion

was a more personal form of communication, such as e-mail; therefore, it was more private. Many-to-many discussions have a more public access and are perceived as less private.

The location from which students accessed CMC had major influences on their feelings of privacy. When the location was more public, as in some computer laboratories, the students perceived less privacy.

The correlation between social presence and privacy was insignificant. Students responded that it was “risky” to share personal information on CMC in the interviews. However, students perceived CMC systems to have high levels of social presence in the questionnaire. This reaction can be explained as “risk-taking” behavior (Witmer 1997). Students know that it is risky to share personal information online, but they feel that it will not affect them negatively.

Recommendations

The results of this study revealed that social presence is much more complicated than previously imagined. The current CMC instrument (Tu 2002) must be revised to include additional variables identified in the qualitative data. The format of CMC systems, e-mail, and real-time discussion should be examined in different formats: one-to-one e-mail, one-to-many e-mail, one-to-one real-time discussion, and many-to-many real-time discussion.

Social learning requires cognitive and environmental determinants. Social presence is necessary to enhance and foster online social interaction. Therefore, the relationships between social presence theory and social learning theory require further examination. The correlation between privacy and social presence was insignificant although both were highly perceived. It deserves further examination.

Conclusions

Social presence was redefined as the degree of feeling, perception, and reaction to another intellectual entity in the CMC environment. It is clear that social presence is a vital element influencing online interaction. This study examined the issues in social interactions and provided a foundation for future CMC studies.

CMC is unlikely to replace FTF communication in the learning environment despite its acceptance as an educational tool. CMC applications should be seen as an opportunity to select communication channels that op-

timize the learner's self-image and enhance his/her interaction. The definition of social presence in an online environment, together with positive results along the three dimensions of social presence, gives instructional designers practical guidelines for online course design. By incorporating concepts such as building trust online, providing "hand-holding" technical support, and promoting informal relationships, instructors can help provide greater interactivity within the online community of learners.

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