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Social Presence Theory and Implications for Interaction and Collaborative Learning in Computer Conferences

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This paper examines research on social presence theory and the implications for analyzing interaction, communication, collaborative learning, and the social context of computer-mediated communication (CMC). Two studies that examined whether social presence is largely an attribute of the communication medium or users' perception of the medium are discussed. It can be concluded from the results that even though CMC is considered to be a medium that is low in social context cues, it can be perceived as interactive, active, interesting, and stimulating by conference participants. However, it is the kind of interactions that take place between the participants, and the sense of community that is created during the conference, that will impact participants' perceptions of CMC as a "social" medium. Therefore, the impetus falls upon the moderators of computer conferences to create a sense of online community in order to promote interaction and collaborative learning.

INTRODUCTION

The explosive growth of the Internet and Computer-Mediated Communication (CMC) signifies the importance of understanding the social context of this medium, especially the new types and formations of com-

munity facilitated by computer conferencing. Communications technologies that mediate the communication process in distance education and training create social climates which are very different from the traditional classroom. Even two-way interactive video and audio systems that permit the transmission of facial expressions, gestures, and tone of voice, create interaction patterns different from the face-to-face context. In traditional face-to-face interaction, besides what is actually verbalized, people exchange a range of nonverbal cues such as facial expression, direction of gaze, posture, dress and physical presence. Birdwhistel (1970) notes that these nonverbal cues perform two distinct functions. The first concerns itself directly with the passage of information from one individual to another; the second is the "integrational aspects" of the communication process. Integrational aspects include all the physical manifestations of information exchange that keep the conversation going, regulate the interaction process, cross-reference particular messages to semantic meaning, and relate a particular context to larger contexts. In CMC, the integrational activity is the dialogue that occurs between participants and the instructors/moderators/facilitators, and among participants.

The importance of examining social factors that impact communication and learning in CMC has been emphasized in recent studies conducted by Feenberg (1989), Harasim (1993), Jones (1995), Rheingold (1993), and Walther (1992). In computer conferences, the social interactions tend to be unusually complex because of the necessity to mediate group activity in a text based environment. Failures tend to occur at the social level far more than they do at the technical level. Jones (1995) discussing the "social construction of reality" on computer networks, observes that reality is not constituted *by* the networks CMC users use; but is constituted *in* the networks and that it would be far easier to understand the physical, or hardwired connections than to understand the symbolic connections that emerge from interaction. As discussed in Gunawardena (1994) three attributes of computer-mediated communication (CMC): The asynchronous or time-independent feature, text-based communication and computer-mediated interaction create a unique social climate that impact interactions and group dynamics online. One of the theories that has been used in communication research and educational psychology to explain the social context of telecommunications-based interaction is the theory of social presence.

THE PURPOSE OF THE STUDY

The purpose of this paper is to examine research on social presence theory and the implications of this research for analyzing interaction, communication, collaborative learning, and the social context of CMC. The paper will: (a) review literature related to social presence theory, examining research conducted in both traditional and distance education settings; (b) review literature that examines social presence in online communities, and (c) discuss two studies that examine whether social presence is largely an attribute of the communication medium or users' perception of the medium. The two studies were conducted in Spring 1992, and in Fall 1993 with students who participated in the Globaled computer conferences who provided their reactions to the medium of CMC after they had participated in the conferences. The studies assessed students' subjective perceptions of media characteristics and not their performance in using these characteristics. Although the question discussed in this study addressed the medium of CMC from a user perception perspective, qualitative research data that examines CMC from a relational perspective is also presented.

METHODS

The review literature examines the development of the concept of social presence from the seminal work of Short, Williams, and Christie (1976) to its examination by communication researchers in the traditional face-to-face classroom and distance education settings. The review of literature further examines recent research that questions the applicability of this theory to analyze the social context of online communities.

The two studies reported in this paper, are one small component of an ongoing study that was undertaken to research and evaluate the Globaled conferences that were conducted in Spring 1992 and Fall 1993. Globaled linked graduate students in several universities to discuss issues related to distance education, engage in collaborative learning and research related to distance education, and experience distance education by using a medium that is increasingly being used to deliver distance education. Detailed findings of this project are reported in Gunawardena (1992), Gunawardena, et al. (1993), Gunawardena et al. (1994), and Rezabek et al. (1994).

The studies reported here focus on one question in the questionnaire that was administered to Globaled participants that solicited their reactions to CMC. In this question, seventeen, five-point bipolar scales solicited stu-

dent reactions on a range of feelings toward the medium of CMC. The questionnaire was administered after the students completed the Globaled computer conferences. The question asked students to indicate their "current feelings" about CMC. Therefore, the responses to this question indicated students' experience with the medium as a result of the conference and any prior experience with CMC.

The 17 bipolar scales included: Stimulating-dull, personal-impersonal, sociable-unsociable, sensitive-insensitive, warm-cold, colorful-colorless, interesting-boring, appealing-not appealing, interactive-non-interactive, active-passive, reliable-unreliable, humanizing-dehumanizing, immediate-non-immediate, easy-difficult, efficient-inefficient, unthreatening-threatening, and helpful-hindering. Students were asked to respond to each of the five point scales according to their current feelings about the medium. For each scale, "5" indicated a negative reaction to the medium, for example, in the scale, stimulating- dull, "5" indicated "very dull," and "1" indicated a very positive reaction: "very stimulating." If they were undecided or neutral or thought that the medium was equally likely to be stimulating or dull, they indicated so by circling "3," the midpoint of the scale.

In one study, the questionnaire was administered to a group of graduate students from four universities, Texas A&M university, the University of New Mexico, the University of Wisconsin-Madison, and the University of Wyoming, who participated in the Fall 1993 Globaled computer conference.

In the second study a comparison is made between two student groups at the University of New Mexico who participated in two separate Globaled computer conferences: (a) the Spring 1992 Globaled conference that linked graduate students from four universities: Florida State, the Universities of New Mexico, Oklahoma, Wyoming, U.S.A., and Anadolu University in Turkey and several outside participants who engaged in collaborative learning and online discussions related to distance education, and (b) the Fall 1993 Globaled conference which linked students in seven universities: San Diego State University, Texas A&M University, and the Universities of Oklahoma, New Mexico, Wisconsin-Madison, Wyoming, U.S.A., and Wollongong, Australia, who participated in a collaborative learning exercise that involved conducting research on a selected topic at each institution and sharing the results with the Globaled community. The 1992 Globaled conference had 70 participants and the 1993 conference had 90 participants.

The Globaled conferences were conducted using a "listserv" which is a large electronic distribution list. Students subscribed electronically to the list maintained at the University of New Mexico. In a listserv each stu-

dent's contribution is distributed to the group as a private e-mail message. When compared to conferencing systems designed on the principles of groupware, a listserv is not as conducive to conducting a group discussion online. However, the listserv has the unique advantage of linking anyone with access to an electronic mail account anywhere in the world.

REVIEW OF LITERATURE

The Concept of Social Presence

The issue of social presence may be explored by examining a variety of constructs which may contribute to the social climate of the classroom. Short et al., (1976) define social presence as the "degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationships..." (p. 65). This means the degree to which a person is perceived as a "real person" in mediated communication. They define social presence as a quality of the medium itself and hypothesize that communications media vary in their degree of social presence, and that these variations are important in determining the way individuals interact. The capacity of the medium to transmit information about facial expression, direction of looking, posture, dress and nonverbal cues, all contribute to the degree of social presence of a communications medium.

Two concepts associated with social presence are: Argyle and Dean's 1965 concept of "intimacy;" and Wiener and Mehrabian's 1968 concept of "immediacy" (Short et al., 1976.) Short et al., suggest that the social presence of the communications medium contributes to the level of intimacy which depends on factors such as physical distance, eye contact, smiling, and personal topics of conversation. They observe that the use of television rather than audio-only communication makes for greater intimacy, other things being equal. Immediacy is a measure of the psychological distance which a communicator puts between himself or herself and the object of his/her communication. A person can convey immediacy or non-immediacy nonverbally (physical proximity, formality of dress, and facial expression) as well as verbally. A person making a telephone call may choose to speak in such a manner as to give an impression of aloofness and "distance" (non-immediacy) or he or she may choose to adopt an attitude of informality and comradeship (immediacy). Immediacy enhances social presence. Therefore, according to this argument, social presence is a factor of the medium, as well as that of the communicators and their presence in a sequence of interaction.

Walther (1992) observes that Argyle and Dean's 1965 equilibrium theory posits that communicators adopt levels of gaze, physical proximity, and other behaviors indicative of intimacy and that these levels are derived partly from cultural norms as well as from a need for affiliation. Short et al., (1976) were aware of equilibrium theory and research although they did not embrace it, and speculated that language may substitute or even "overcompensate" for missing nonverbal information. Examining teleconference research, Short et al., observed that because of the reduced-cue situation, a participant will modify his or her behavior. Thus head-nods indicating agreement may be replaced by verbal phrases such as "I agree." Equilibrium theory supports the principle of cue substitutability, in that a communicator is likely to adopt other symbol systems to convey affective messages that are unavailable nonverbally. Therefore, Walther (1992) notes that those who communicate with each other using only a text-based medium such as CMC, will try to achieve desired levels of immediacy through the manipulation of verbal immediacy in the textual environment.

Examining the concepts of "social presence" and "interactivity" Rafaeli (1990, 1988) observes that social presence is a subjective measure of the presence of others as Short et al., defined it in 1976, while "interactivity" is the actual quality of a communication sequence or context. Interactivity is a quality (potential) that may be realized by some, or remain and unfulfilled option. When it is realized, and when participants notice it, there is "social presence."

The Impact of Social Presence on Learning and Attitudes

A large number of studies in communication research focus on examining factors related to social presence in the traditional face-to-face classroom. A study by Kearney et al., (1985) examined immediacy as a potential indicator of student affective learning across varied course content. The results showed that immediacy was a good predictor of student learning, and that both people-type and task-type students were sensitive to teacher immediacy behaviors.

Having examined instructor social presence as a potential predictor of instructional effectiveness, Christophel (1990) concludes that perceptions of immediacy are highly correlated with favorable learner outcomes. Instructors with a high degree of social presence were viewed by learners as being more positive and effective, which, in turn, led to increased affect toward the instructor and the course itself.

   Powell and Harville (1990) examined how a teacher's verbal and non-verbal immediacy behaviors relate to clarity when the students are ethnically diverse. The results showed differences in the affect of immediacy on clarity for certain ethnic groups, with Asian and Latino students showing the greatest demand for teacher immediacy behaviors. Based on the assumption that relational messages are multidimensional and are frequently communicated by nonverbal cues, Burgoon et al., (1984) examined relational messages associated with nonverbal behaviors. It was found that high eye contact, close proximity, forward body lean, and smiling all conveyed greater intimacy, attraction, and trust, while low eye contact, a distal position, backward body lean, and the absence of smiling and touch communicated greater detachment.

   In a study that examined the relationship between verbal teacher immediacy behaviors and student learning in a group of forty seven advanced undergraduate students enrolled in upper-division communication classes, Gorham (1988) found a substantial relationship between immediacy and learning. Both the total verbal and nonverbal immediacy scores and the overwhelming majority of the individual immediacy items were significantly correlated with both affective learning and perceptions of cognitive learning. Thus verbal and nonverbal behaviors function together to generate immediacy.

   Kelly and Gorham (1988) observe that while the link between teacher immediacy and affective learning is empirically supported, the link between immediacy and cognitive learning is less straightforward. They conducted a study to investigate the effects of immediacy on cognitive learning in an experimental situation which removed the effects of affect—that of teacher (experimenter) toward students or that of students toward subject or teacher, from the measurement of cognitive learning. The results showed that immediacy produced positive results on short term recall. They observe that a teacher's use of immediacy behaviors is likely to be as directly related to cognitive learning as it is to affective learning.

   In the distance education context, Hackman and Walker's (1990) study provides evidence that "teacher immediacy" contributes to student satisfaction and learning in an interactive television class. They argue that there are differences between telecommunications delivered instruction and traditional face-to face instruction, specifically in terms of the climate of "social presence" created. Teacher immediacy behaviors include both verbal and nonverbal actions such as gesturing, smiling, using humor, vocal variety, personalizing examples, addressing students by name, questioning, praising, initiating discussion, encouraging feedback and avoiding tense body positions.

Social Presence and CMC

Walther (1992) conducted a comprehensive study of interpersonal effects in computer-mediated interaction, and observed that several theories and experimental research on relational tone in CMC points to the lack of nonverbal cues in this channel as a cause of impersonal and task-oriented messages. However, field research in CMC often reports more positive relational behavior and has indicated the development of "online communities" and warm friendships. He observes that research has suggested that communicators develop individuating impressions of others through accumulated CMC messages and based upon these impressions, users may develop relationships and express multidimensional relational messages through verbal or textual cues.

Walther observes that social presence theory has been used to account for interpersonal effects in CMC research. CMC with its lack of nonverbal communication cues is said to be extremely low in social presence in comparison to face-to-face communication. However, he observes that it is not clear from the original theory of social presence (that electronic media differ in their capacity to transmit information about facial expression, direction of looking, and nonverbal cues), whether the actual characteristics of the media are the causal determinants of communication differences or whether users' perceptions of media alter their behavior.

A significant number of research studies that have explored the effects of CMC has failed to account for differences between CMC contexts and purposes. Walther observes that the degree of social presence, social context, or the relational qualities associated with CMC may be affected by the different social processes, settings, and purposes within CMC use as well. He cites research that reported that experienced computer users rated several text-based media including e-mail and computer conferencing, "as rich" or "richer" than telephone conversations, television, and face-to-face conversations. Walther notes that the relational qualities such as task or social orientation, and impersonality may be affected by other factors than the medium alone. If the nonverbal as well as verbal messages of face-to-face groups were coded, then the overall ratio of socioemotional expressions to total messages may be no different in face-to-face than in CMC groups. It appears that the conclusion that CMC is less socioemotional or personal than face-to-face communication is based on incomplete measurement of the latter form.

Even when CMC participants have no other sources of information about each other than their CMC interactions, some relational develop-

ment may be expected to occur. Hiltz (1994) notes that the paucity of non-verbal cues in CMC may limit information that serves to improve perception of communication partners, to regulate social interaction, and to provide a social context for communication. On the other hand, CMC participants may explicitly increase overt social-emotional expressions such as greetings, and paralinguistic cues in order to compensate for the missing communication channels.

Johansen, Vallee, & Spangler 1988, (cited in Walther, 1992) suggest that social presence can "be cultured" among teleconference participants, a position different from Short and other's 1976 position that social presence is largely an attribute of the communication medium. Research has indicated that CMC users develop an ability to express missing nonverbal cues in written form. One way of expressing emotion through this text-based medium is the use of "relational icons" or "emoticons" the contrived sideways faces that can be made by combinations of punctuation marks. These marks contextualize the message within the relationship. Parenthetical metalinguistic cues such as "hmmm" or "yuk" in a message adds emotion to a text-based message. Such cues and emoticons add affective information and indicate informality. Walther observes that studying CMC from a relational communication perspective offers an approach to the process that differs from a channel-effects view alone. A relational perspective suggests that functional and social factors should be examined.

Discussing the emergence of community in CMC, Baym (1995) like Walther feels that CMC needs to be studied from a relational perspective, rather than from a "cues filtered out" approach. According to her, a "cues-filtered out" approach assumes that the computer itself is the sole influence on communicative outcomes. In such a view the computer is assumed to have low social presence because of the need to conduct interaction in a textual environment and therefore, deprive participants of salient social cues. The presumed lack of social context cues and feedback is seen as promoting greater anonymity and social equality among participants. Baym critiques this perspective and observes that while participant equality may be seen as a benefit of CMC, the view that CMC is socially impaired leads to an overwhelmingly negative characterization of the CMC social climate. She notes that in her study of a Usenet newsgroup that is devoted to the recreational discussion of daytime soap operas, participants have created a dynamic and rich community filled with social nuance and emotion. She emphasizes that it is a mistake to view patterns in CMC as direct effects of the medium. There are at least five different sources of impact on CMC: External contexts, temporal structure, system infrastructure, group purposes,

and participant characteristics. These forces affect one another as well as the emergent social dimensions of the groups. The emergence of pattern in a computer-mediated group is a complex and dynamic process and its study requires more naturalistic, ethnographic, and microanalytic research.

Examining the issue of community formation in a postmodern world, Jones (1995) observes that with CMC we are embarking on an adventure in creating new communities and new forms of community. In CMC, what allows for the reproduction of social space is the malleability with which identity can be created and negotiated. One can have multiple identities in "cyberspace" and one can shift identities rather easily, taking on characteristics of others' identities. Although text-based CMC is described as an equalizing medium because of it inability to portray social context cues, it is evident that CMC can just as easily create boundaries and hierarchies.

He points out that one must question the potential of CMC for production of social space. "Could it perhaps reproduce 'real' social relations in a 'virtual' medium?" (p. 14). He notes the many contradictions and problems embodied in CMC. On the one hand it appears to foster community, or at least the sense of community among its users. On the other hand, it embodies the impersonal communication of the computer and of the written word.

Discussing synchronous or (real-time) interaction that takes place in Multi-User Domains or Multi-User Dimensions (MUDs), Reid (1995) notes that MUD users share not only a common virtual environment but also a common language and a common textuality. Interaction on most MUDs is carried out through the use of four commands known as: Say, emote, whisper, and page, and these become the tools with which social presence is formed on MUDs and through which social interaction is made possible. She notes that MUD users have devised systems of symbolism and textual significance that enable them to achieve understanding despite the absence of conventional social context cues. With these tools MUD users are able to read between the lines of text that make up their virtual world. Reid remarks that these shared abilities and strategies allow her to think of the users of a MUD as sharing a common culture, and this common culture allows MUD users to engage in activities that serve to bind them together as a community.

Research on social presence and CMC has indicated that despite the low social bandwidth of the medium, users of computer networks are able to project their identities whether "real" or "pseudo," feel the presence of others online, and create communities with commonly agreed on conventions and norms that bind them together to explore issues of common interest.

RESULTS AND DISCUSSION

Student Reactions to CMC

The first study discussed here, examines student perceptions of CMC after the conclusion of the Fall 1993 Globaled conference. Students rated CMC using a seventeen point bipolar scale. The second study compares two groups of students from the University of New Mexico who participated in two different Globaled computer conferences in 1992 and 1993, in terms of their perceptions of the medium of CMC. These findings are followed by a qualitative analysis of UNM student reactions to social presence and the sense of community created by the 1993 Globaled conference.

Table 1
Personal Reactions to CMC Globaled F'93
Average of All Universities

	Globaled F'93 Mean N=60	SD
Stimulating	2.22	1.08
Personal	2.80	1.18
Sociable	2.18	0.96
Sensitive	3.17	0.99
Warm	2.95	0.97
Colorful	2.68	1.12
Interesting	2.07	0.98
Appealing	2.42	1.13
Interactive	2.00	1.11
Active	2.07	1.08
Reliable	2.67	0.99
Humanizing	2.87	0.92
Immediate	2.70	1.22
Easy	2.67	1.23
Efficient	2.78	1.27
Unthreatening	2.27	1.16
Helpful	2.36	1.00

1 = positive rating, 5 = negative rating.

Table 1 indicates average ratings of students' personal reactions to the medium of CMC from five universities: San Diego State, Texas A&M, and the Universities of New Mexico, Wisconsin-Madison, and Wyoming, that participated in the 1993 Globaled conference. As can be seen from Table 1, CMC as a whole received a very positive rating. CMC was rated fairly highly as an "interactive" medium (Mean= 2.0), followed by "active" (mean=2.07) "interesting" (mean=2.07), and a "sociable" medium (mean=2.18). Although CMC is considered to be low in its ability to convey social presence, participants in this conference rated CMC highly as an interactive, active, and social medium. This is partly due to the social cohesion that was created by this conference. The conference was organized so that the first three weeks would be spent on introductions before the scheduled activities began. In order to create the sense of an online community and promote social cohesiveness, participants were asked to introduce themselves and talk about their professional interests and experiences. The second and third week of the initial introductory period was devoted to discussing respective classes, syllabuses, and class projects so that the participants got a sense of the online community and the work their peers were involved in at participating universities. Participants soon connected with those who had similar professional interests. At the end of every week, during the first three weeks, all introductions were acknowledged by the moderators so that students who introduced themselves felt welcome and a part of the Globaled community.

Table 2, Table 3, and column two of Table 4, indicate how individual universities reacted to the medium of CMC. While the majority of institutions that participated in the Globaled conference integrated it into a traditional face-to-face graduate class on distance education, two of the institutions that participated in the Globaled conference: The University of Wisconsin-Madison and Texas A&M University integrated Globaled into a class taught by distance education technologies. At the University of Wisconsin-Madison, the entire class was taught using CMC, and Texas A&M University taught the class via a compressed video system. A closer examination of Texas A&M's rating of CMC indicates that the medium received a positive rating as "interactive," "interesting," "sociable" and "stimulating." The University of Wisconsin rated the medium positively as "interactive," "interesting," "stimulating," "active," "helpful," "sociable," and "appealing." In both these contexts, distance learners gave a positive rating to the medium of CMC.

Table 2
Personal Reactions to CMC Globaled F'93, San Diego State
University and University of Wyoming

	San Diego State Mean N=18	SD	Wyoming Mean N=10	SD
Stimulating	2.94	1.18	1.80	0.75
Personal	3.28	1.19	2.50	1.12
Sociable	2.39	1.06	2.20	1.25
Sensitive	3.33	0.94	2.90	0.94
Warm	3.33	0.88	2.60	1.02
Colorful	3.33	0.94	2.50	1.02
Interesting	2.56	0.96	1.90	1.22
Appealing	2.94	1.18	2.10	0.83
Interactive	2.61	1.16	2.20	1.47
Active	2.33	1.11	1.70	1.00
Reliable	2.78	0.79	2.50	1.28
Humanizing	3.33	0.82	2.70	0.90
Immediate	2.89	1.24	2.70	1.62
Easy	2.44	0.90	2.40	1.43
Efficient	3.17	1.12	2.80	1.47
Unthreatening	2.05	1.03	2.29	1.42
Helpful	3.95	0.85	2.00	1.00

1 = positive rating, 5 = negative rating.

Students who participated in Globaled as a distance education experience integrated into a traditional face-to-face classroom also rated the medium of CMC positively. As can be seen from Table 2 and column two of Table 3, students at San Diego State University and the Universities of New Mexico and Wyoming rated CMC positively as an "interactive," "active," "interesting," "stimulating" and "sociable" medium. One institution rated it highly as "unthreatening" and another as "helpful."

Table 3
Personal Reactions to CMC Globaled F'93, Texas A&M, and
University of Wisconsin-Madison

	Texas A&M Mean N=12	SD	Wisconsin Mean N=7	SD
Stimulating	1.83	1.07	1.43	0.49
Personal	2.67	1.37	2.29	1.16
Sociable	1.83	0.69	2.14	0.99
Sensitive	2.75	0.92	3.71	0.70
Warm	2.58	1.04	3.00	0.53
Colorful	2.08	1.11	2.43	1.05
Interesting	1.67	0.75	1.43	0.49
Appealing	2.00	1.29	2.14	0.83
Interactive	1.67	0.94	1.29	0.45
Active	2.42	1.38	1.57	0.73
Reliable	3.08	1.19	2.29	0.88
Humanizing	2.58	0.86	2.43	0.49
Immediate	2.33	0.94	2.43	1.05
Easy	2.92	1.44	3.29	1.39
Efficient	2.50	1.26	2.29	1.03
Unthreatening	1.91	1.26	3.00	0.93
Helpful	1.91	1.19	2.00	0.53

1 = positive rating, 5 = negative rating.

Table 4 compares personal reactions to CMC by two different groups of students from the University of New Mexico who participated in two different Globaled computer conferences. In this comparison it is interesting to note that both groups of students rated CMC the same on fifteen out of the seventeen bipolar scales, with slight differences seen for "interesting" and "easy." The medium was rated highly as "interactive" and "active," followed by "sociable," "interesting," and "stimulating." It can be argued that since CMC received a similar rating in two separate conferences, the results indicate social presence from a channel-effects view. However, it is possible that if this same question was administered to other CMC groups, the results may be different depending on the participants' experience of each conference.

Table 4
Personal Reactions to CMC
University of New Mexico Students

	Globaled Sp'92 Mean N=24	SD	Globaled F'93 Mean N=13	SD
Stimulating	2.31	0.75	2.31	0.72
Personal	2.77	0.73	2.77	0.70
Sociable	2.23	0.60	2.23	0.58
Sensitive	3.23	1.09	3.23	1.05
Warm	3.00	1.00	3.00	0.96
Colorful	2.62	1.04	2.62	1.00
Interesting	2.07	1.00	2.23	0.80
Appealing	2.46	0.97	2.46	0.93
Interactive	1.69	0.48	1.69	0.46
Active	1.92	0.64	1.92	0.62
Reliable	2.46	0.66	2.46	0.63
Humanizing	2.85	1.07	2.85	1.03
Immediate	2.92	1.04	2.92	1.00
Easy	2.57	1.02	2.62	1.00
Efficient	2.77	1.30	2.77	1.25
Unthreatening	2.53	0.88	2.53	0.84
Helpful	2.30	0.63	2.30	0.61

1 = positive rating, 5 = negative rating.

Although the two Globaled conferences linked students in several universities who had never seen or met each other, the participants soon connected with online participants as a result of initial introductions, and the social presence created by the participants helped to move the task oriented conference to a more social conference toward the middle of the semester. The collaborative learning projects in the two conferences were organized a little differently. In the 1992 conference, after the initial introductory period, each university was responsible for moderating a question related to distance education that they had selected. In 1993, in order to facilitate collaborative learning and discussion, the faculty decided that the Globaled project would include both research and discussion components. The research project was designed as a collaborative learning project which each class conducted as a group at their own site. The discussion component involved a discussion of findings from each group project with the online community.

Interaction analysis of Globaled conferences indicate that both conferences started as very task oriented ones, but moved to more social conferences toward the middle and end of the semester. This was more so in the 1993 conference. Since the students at each university conducted similar research projects, the discussion of the findings online became tedious. As the task became boring the social aspect of the conference became more interesting and the conference evolved into a social conference with a closely knit, socially cohesive group.

Tables 1, 2, 3, and 4 indicate that there were no negative ratings for CMC. It can be concluded that even though CMC is a text-based medium, it can be perceived as interactive, active, interesting, and stimulating. However, it is the kind of interactions that take place between the participants, and the sense of community that is created during the conference, that will impact participants' perceptions of CMC as a "social" medium. These findings support the view that social presence can be cultivated in conference participants. Therefore, the impetus falls upon the moderators of computer conferences to create a sense of online community and make space for social interaction to take place.

A qualitative analysis of UNM student reactions to the 1993 Globaled conference by Gunawardena (1994) indicates that it was a positive experience for most of them in spite of the technical difficulties they experienced. A majority indicated that they "enjoyed meeting people from around the world and hearing their perspectives on distance education." The discussions on the research project, soon became repetitive and boring. However, as a result of this, the conference expanded into topics of group or personal interest; some very relevant and some tangential, but overall a great deal of incidental learning took place. As one student observed: "What I found interesting was that as the conference became repetitive and boring, the group took over to liven it up with humor, social messages, and other topics. We became a community with roles..." Another observed: "This turned out to be the most interesting part because you could get to know personalities, feelings, passions, questions, and so forth, beyond the academic exercise...The experience has broadened my communication paradigm considerably—now I'm interested in things like gophers, and veronica, for example, that I never would have imagined before."

Some students commented that it was easier to enter into conversations on CMC, than in face-to-face contexts because there was time for input. Another found the medium to be quite "personal" and "interesting." A student from Pennsylvania State university who participated and observed the conference, remarked that there was a "strong sense of community"

that developed in the group, and this was evident in the number of students who lamented the ending of Globaled 1993, and wanted to continue the discussions in "Eternaled," the sequel to Globaled.

Implications for Interaction and Collaborative Learning

The results of this study indicate that although CMC is described as a medium that is low in non-verbal cues and social context cues, participants in conferences create social presence by projecting their identities and building online communities. In order to encourage interaction and collaborative learning, it is important that moderators of computer conferences promote the creation of conducive learning environments. CMC participants can be trained to create social presence in a text-based medium and build a sense of community. In order to build social cohesiveness, moderators should start the conference with introductions and social exchanges if the system used is a listserv, or create a separate area for social chit chat in a conferencing system. Developing protocols for CMC interaction, procedures for signing on and using the system, etiquette for CMC discussion, and techniques for managing information overload, will enhance interaction and communication in computer conferences. Conference moderators should facilitate discussions by recognizing all contributions initially, summarizing frequently, and weaving ideas together. When the computer conference is comprised of a cross-cultural group, individual participants should be responsible for providing codes or legends for the idiomatic and colloquial language they use that might only be understood in one particular culture. A safe and friendly CMC community will provide opportunities for many participants to engage in both academic and social interaction.

Building CMC environments that promote collaborative learning has been a concern of many distance education designers. Constructivism has recently begun to influence the design of technology mediated learning environments. Jonassen (1994) observes that according to constructivists, thinking is grounded in perception of physical and social experiences, which can only be comprehended by the mind. The mind produces mental models that explain what the individual has perceived. These models are then used to explain, predict, or infer phenomena in the real world. Constructivists also believe that much of reality is shared through a process of social negotiation. Jonassen discusses the implications of constructivism for instructional design and observes that purposeful knowledge construction may be facilitated by learning environments which (a) provide multiple representations of reality, (b) focus on knowledge construction and not

reproduction, (c) provide real world case-based learning environments, (d) foster reflective practice, (e) enable context and content dependent knowledge construction, and (f) support collaborative construction of knowledge through social negotiation. Computer conferences can be designed to promote the construction of knowledge that is meaningful to the learner. Employing constructivist principles, CMC environments can be designed to provide multiple perspectives and real world examples, encourage reflection, and support collaborative construction of knowledge through social negotiation. However, such learning environments may promote collaborative learning which involves the active construction of knowledge through social negotiation, only if participants can relate to one another, share a sense of community and a common goal. The development of social presence and a sense of an online community becomes key to promoting collaborative learning and knowledge building.

CONCLUSIONS

The studies discussed in this paper point toward social presence as a potentially significant factor in improving instructional effectiveness in both traditional and communications technology mediated distance classes. However, in reviewing social presence research, it is important to examine whether the actual characteristics of the media are the causal determinants of communication differences or whether users' perceptions of media alter their behavior. It was noted that social presence can "be cultured" among teleconference participants, a position different from the view that social presence is largely an attribute of the communication medium. Research has indicated that CMC users in particular develop an ability to express missing nonverbal cues in written form. Therefore, studying a medium from a relational communication perspective offers an approach to the process that differs from a channel-effects view alone. A relational perspective suggests that functional and social factors should be examined.

Results from the studies that examined students' subjective perceptions of CMC suggest that in spite of the low social context cues of the medium, student perceptions of the social and human qualities of the medium will depend on the social presence created by the instructors/moderators and the online community. Within each telecommunications-mediated learning context, the learner is an equal distance from the learning stimuli, and it is only the learners' perceptions of interaction through various media that provide the sensation of social presence.

Instructors/moderators who are used to relying on nonverbal cues to provide feedback such as a smile, head nod, or hand gestures, and who have a lesser-developed ability to vocalize their feedback will be at a loss when teaching via channels such as audio teleconferencing and CMC that do not have the ability transmit certain nonverbal cues. These instructors need to learn to adapt to telecommunications media by developing interaction skills that create a sense of social presence. It is these skills and techniques, rather than the medium, that will ultimately impact students' perception of interaction and social presence.

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