Learning with Invisible Others: Perceptions of Online Presence and their Relationship to Cognitive and Affective Learning

Tracy Russo
University of Kansas, Communication Studies Department
102 Bailey Hall, 1440 Jayhawk Blvd., Lawrence, KS 66045, USA
trusso@ku.edu

Spencer Benson
University of Maryland College Park, Cell Biology and Molecular Genetics
Microbiology Bldg, College Park, MD 20742, USA
sb77@umail.umd.edu

Abstract

This study investigated the relationship between student perceptions of others in an online class and both affective and cognitive learning outcomes. Data were gathered from student survey responses and instructor evaluation of performance. Results from this study indicated significant correlations between student perceptions of the presence of other students in the class and scores on an attitudes scale and their satisfaction with their own learning. This finding demonstrates the salience of other students in the learning environment to affective learning outcomes. Perceptions of the instructor's presence were significantly correlated with both affective learning and with student learning satisfaction. This outcome in an online class is consistent with findings on teacher immediacy literature in traditional classes and highlight the role of the teacher in establishing a learning environment. Results relative to cognitive learning showed that student reports of their perception of their own presence in the class were significantly correlated with performance in the class and with the grade they would assign themselves.

Keywords

Online presence, Affective learning, Cognitive learning, Immediacy

Introduction

As increasing numbers of college-level courses are developed for delivery via the World Wide Web, pressure grows to identify components of online learning environments that contribute to or support learning. Much of the research focus in online education has been on technical characteristics such as platforms, download speed, engaging links, streaming audio and streaming video. Evaluating the role of technology itself on learning has merit, but technology does not operate independently to create a learning environment. Student interaction online, like student interaction in face-to-face classrooms, is a critical component of the learning context. This appears to be especially true for one of the largest groups served by online classes, non-traditional or adult students, whose expectations are likely to include dynamic interaction with others and learning constructed through discussion (Brandt, 1997).

Just as in face-to-face environments, the communication behaviors that students enact contribute to others' perceptions of them and to the overall learning dynamic. Based on research about face-to-face classes, it can be argued that behaviors that support student engagement are likely to contribute to both positive attitudes about the class and to enhanced learning. In particular, student perceptions that others in the online course are immediate, "present," or significant to the interaction may help establish an environment in which students attend to one another, share ideas, trust one another, and collaborate (Picciano, 2002; Short, Williams, & Christie, 1976). It may be argued that when students find online classes impersonal or isolating, they may disengage physically, by dropping the course or simply failing to finish it, or psychologically, by doing the minimum to complete the requirements but not engaging either the material or the other participants. Attrition rates in online classes frequently are cited as demonstration that the technical delivery system is inadequate for learning. Although many online classes have little turnover, Moore (1997) and Terry (2001) reported attrition rates as high as 50 percent in some online classes. Carr (2000) reported that online course completion rates are often 10 to 20 percentage points lower than in traditional courses. Because of its relationship to such outcomes, presence is a key concern of this study.

Cognitive learning or comprehension and retention of knowledge (Christophel, 1990) is an important outcome for students, teachers, and institutions. In addition to cognitive learning, another important indicator of distance learning success is affective learning. Affective learning represents the attitudes students develop about the course, the topic, and the instructor. When students have positive affect about these targets, it can be argued that they will be more likely to complete courses, become involved intellectually with the material and the others in the online class, and be more satisfied. Affective learning involves student responses to the instructor, but other students online also make important contributions to the process and product of distance classes. A student's sense of the salience or presence of others online, like her sense of face-to-face classmates, is a critical component of the learning environment (LaRose & Whitten, 2000).

In an effort to extend knowledge of the effects of engagement on student outcomes in a distance learning environment, this study examined students' perceptions of presence in an online graduate class in genetics and the degree to which these perceptions were related to both students' learning and their attitudes about the course.

Mediated presence, perceptions of others in online interaction

Social presence most frequently has been considered predominantly a characteristic of a communication medium. Measuring presence as a function of the medium (Short, Williams, & Christie, 1976), however, does not account for context, task, experience, or individual differences (Picciano, 2002).

Recognizing the limitations of media-based conceptions of presence, scholars present alternative definitions. Lombard and Ditton (1997) frame presence as the "illusion of nonmediation," wherein a user would respond as if the medium were not there. Researchers in distance education integrate human behavior to a greater degree. Tu (2002), for example, argues that social presence is the degree of person-to-person awareness that occurs in a mediated environment. Garrison, Anderson and Archer, (2000, cited in Rourke, Anderson, Garrison & Archer, 2001) see presence as a projection of one's personality as well as of their ideas.

Immediacy's relation to presence

The examination of presence in online learning is informed by the literature on immediacy, especially teacher and classroom immediacy. Anderson (1979) defines immediacy as a function of the psychological distance that a communicator puts between himself or herself and the object of his or her communication. Immediacy is related to presence in that both focus on the salience of individuals in communication. A person can convey immediacy or non-immediacy nonverbally (through such signals as physical proximity, stance, touching, relaxation, speech duration, voice quality, facial expression, and formality of dress) as well as verbally. Because most online classes do not include interactive video allowing teachers and students access to nonverbal immediacy behaviors, online participants must rely on verbal messages. Text-only interactions are not without signals of immediacy, however. Verbal immediacy is indicated by a variety of behaviors that include calling others by name, using personal examples, and soliciting personal views or opinions (Gorham, 1988). Grammatical and lexical measures that indicate affection, inclusion, and involvement also reflect verbal immediacy (Wiener & Mehrabian, 1968). Walther and Burgoon (1992) note that research in intimacy indicates that verbal or text components not only convey immediacy but may compensate for reductions in immediacy that are assumed in online contexts. In the online classroom where nonverbal cues often are not available, cues of verbal immediacy serve as the primary means of establishing psychological connection among participants.

The primary focus of immediacy research in the classroom has been on teacher behaviors, but teachers are not the only salient participants in the learning environment. As LaRose and Whitten (2000) argue, students reinforce one another's behavior through verbal comments. Further, other students may provide social and academic support online. Thus, student interaction may contribute to web course effectiveness. Although online courses are perceived by some researchers to be deficient in actual and perceived student interaction (Benbunan-Fich & Hiltz, 1998; Hiltz & Wellman, 1997; LaRose & Whitten, 2000), others have reported that online student discussions improved academic performance (Althaus, 1997). Hiltz and Wellman (1997) found that online discussions resulted in increased student satisfaction, a component of affective learning, in addition to being associated with achievement levels comparable to face-to-face classes.

Given the concern of teachers, administrators, and students about the efficacy of online education, it is appropriate to examine outcome variables, in particular affective and cognitive learning, in light of the exigencies and characteristics of the asynchronous online learning environment. Students' feelings of connection

in the classroom, especially their perceptions of the presence, immediacy, or salience of teachers and other students, clearly has the potential to influence these outcome variables. Therefore, this study of an entirely asynchronous graduate class in genetics begins by examining the levels of presence students perceive with RQ1: What levels of presence did students assign to the other students, the instructor, and themselves?

Learning outcomes - cognitive learning

Cognitive learning or the comprehension and retention of knowledge (Christophel, 1990) is an important outcome in most learning contexts. Teacher immediacy in face-to-face classrooms has been shown to be positively correlated with cognitive learning (Christophel, 1990; Gorham, 1988; McCroskey, Sallinen, Fayer, Richmond, & Barraclough, 1996; Menzel & Carrell, 1999; Rodriguez, Plax & Kearney, 1996).

Cognitive learning is most frequently operationalized in research on online courses as course performance or as performance on selected student tasks. Given the difficulties in using performances, especially where in distance education the instructor has little or no control over when, how, or with whom a student works on a paper or exam, and issues of grade distribution, researchers have sought for alternative measures. Two approaches to self-assessment have been suggested as viable alternatives to grades for measuring learning. Sanders and Wiseman (1990) proposed that cognitive learning should be defined as how much students thought they had learned in a course. The second self-assessment approach, one known as learning loss (Richmond, Gorham, & McCroskey, 1987; Witt & Wheeless, 2001), measures perceived student learning as a function of how much students thought they learned in the class subtracted from how much they thought they would have learned from the ideal instructor. Although the focus of these studies was on the communication behaviors of the teacher, the second research question in the present study examines the relationships between teacher presence behaviors and cognitive learning as well as the relationships between student perceptions of presence of both other students and themselves and cognitive learning: RQ2: How were perceptions of presence related to students' cognitive learning in the course?

Learning outcomes - affective learning

Affective learning represents the attitudes students develop about the course, the topic, and the instructor. Although research demonstrates a consistent positive relationship of teacher nonverbal immediacy and student affective learning, the relationship between verbal immediacy and affective learning has been studied less frequently. Teacher immediacy in face-to-face classrooms has been shown across a number of studies to be positively correlated with affective learning (Kelly & Gorham, 1988; Sanders & Wiseman, 1990). Freitas, Myers and Avtgis (1998) further reported that teacher use of nonverbal and verbal immediacy behaviors were strongly correlated with student affective learning and, through it, with students' perceived cognitive learning.

Addressing the frustrations experienced by online learners, instructors, and their institutions, LaRose and Whitten (2000) note the importance of connection in the learning environment in arguing that many Web courses fail to address the leading concern of learners — lack of interaction with the instructor and fellow students. They further argue that learner motivation may suffer in Web courses because of a lack of teacher immediacy (LaRose & Whitten, 2000).

Research has shown that in traditional classrooms, the immediacy of the teacher is an important correlate of affective learning and connection between student and teacher (Ellis, 2000). Although research has indicated that distant students expected less nonverbal immediacy from telecourse teachers (and presumably even less from asynchronous online teachers) than on-site students expected (Witt & Wheeless, 1999), teacher immediacy (Gorham, 1988; Freitas, Myers & Avtgis, 1998; Sanders & Wiseman, 1990) and intimacy (Ellis, 2000) remain important correlates of student satisfaction and affective learning.

Research in online learning environments demonstrates the significance of perceptions of others. Perceptions that others in the class were "present" accounted for 60% of variance in overall learner satisfaction in one study of the use of a text-based medium (Gunawardena & Zittle, 1997) and showed a significant positive correlation ($r = .44$) with satisfaction in another study of text-based computer conferencing (Gunawardena & Duphorne, 2000). Based on these findings, the third research question was developed to further examine the relationship between perceptions of presence and affective learning: RQ3: How were student perceptions of other students' presence, the instructor's presence, and their own presence related to their affective learning, that is, to their attitudes toward the course and subject?

The Context: Online Graduate Genetics

This study focused on a spring 2002 class, LFSC 630, Principles of Transmission Genetics: Historical and Modern Perspectives, taught by the second author at the University of Maryland. This class was part of a completely asynchronous online program offering a masters degree in Life Sciences to science teachers in high schools, community colleges and technical colleges.

Twenty-two students were enrolled in this class, 16 women (70%), and seven men (30%). All but two were teaching full-time at the high school or community college level during the course. They accessed the class from a wide variety of locations; in addition to a number of students scattered across Maryland, they were located in Delaware, Maine, Florida, George, South Carolina, Wisconsin, California, the North Pole, and the Yukon. Several students had taken other courses in this program, but for about half this was their first online class. All but one student (95%) completed the class; family circumstances were responsible for the one incomplete.

The class used the WebCT platform. Students accessed the materials from their homes or from their work locations. Course components were organized in ten one-week-long modules and included the following:
➢ Readings – a genetics text, a biography of a significant geneticist and some journal articles
➢ Problems from the text and others from the instructor, posted weekly
➢ Online discussion in response to several content or content/thought questions posted each week; students were required to answer two questions weekly. At the end of each unit, the instructor posted a summary of the discussion and provided additional material or focus where necessary.
➢ An optional weekly synchronous chat, serving much like the instructor's online office hours, where process and content questions were answered. The transcript of the chat was available on the course site for those who could not attend. This was significant because students were as many as five time zones apart.
➢ Teaching tips, responses to assignments, generated independently or in groups of varying sizes
➢ Writing assignments, including reflection papers
➢ Exams

Methods

The purpose of this study was to examine the relationship between perceptions of presence in an online class to affective and cognitive learning outcomes. Data were collected in several forms: through an end-of-course self-report survey, a self-assessment of class performance, and, as an operationalization of cognitive learning, the percentage of points earned during the course.

Perceptions of presence

To assess perceptions of presence, students were asked to complete a survey at the end of the course. The survey asked them to rate on a scale of 1-5 (with 5 being the highest) the amount of presence they perceived in the other students and in the instructor, as well as to rate the amount of presence they believed they had in the class. The single items for each presence target were framed in the style of: As you came to the end of the class, what level of mediated presence did you perceive in the other students?

Affective learning

The survey also asked students to report their attitudes about the course. Seven single items asked for assessment of: student satisfaction with their learning, satisfaction with the online delivery system, the degree to which the delivery system contributed to their learning experience, the degree to which this online course was more enjoyable than others they have taken, the degree to which the class was a positive learning environment, and the degree to which the class had provoked heightened awareness of and reading in the topic area. In addition to the quantitative questions, several open-ended questions allowed students to identify the most and least helpful elements of the course.

Cognitive learning

Cognitive learning was measured in three ways. Two measures reflected self-assessment. A single item in the summative survey asking for student assessment of their learning was adapted from Witt and Wheeless (2001): Compared to what I might have learned, my learning in this course was (much more, more, the same as, less,

much less). The other assessment was a self-assigned grade. Students had the opportunity in the final exam to identify the grade they would give themselves for the course and write a paragraph explaining their own assessment. They were offered extra credit for providing that information. The third measure was the percentage of points earned during the class.

Results

The first research question sought to identify how much presence students perceived others students and the instructor had and how much presence they perceived they themselves had in the online class.

Overall, students reported perceiving fairly high presence in the other students (mean = 3.94 on a scale of 1-5 where 5 was highest) and in the instructor (mean = 3.94). Their assessments of their own presence in the class was somewhat lower (mean = 3.71). There were no statistically significant differences in their assessment of the presence of the three targets.

Table 1. Means and standard deviation for presence measures

	Mean	Standard Deviation
Other students	3.94	.87
Instructor	3.94	1.16
Self	3.61	.98

Research Question 2 asked to what extent these perceptions were related to students' attitudes toward the course and the subject. Seven items were included in the summative course survey to answer this question. Students were asked to report their satisfaction with their learning, satisfaction with the online delivery system, the degree to which the delivery system contributed to their learning experience, the degree to which this online course was more enjoyable than others they have taken, the degree to which the class was a positive learning environment, and the degree to which the class had provoked heightened awareness of and reading in the topic area. In addition, consistent with assessments of affective learning (Anderson, 1979, Gorham, 1988) two items were used to evaluate perceptions about the course topic. Students also were asked to report the extent to which they had a heightened awareness of the course material, genetics, and were doing increased general reading about it. Each item was in five-level Likert form, generally anchored with "a great deal" and "none."

A scale called *attitude* reflecting attitudes about the class material and class experience was created from the seven survey items. The mean for this scale was 17.0 (range = 8-23, sd = 3.91). Reliability for this scale using Cronbach's alpha was .81.

Table 2. Means and standard deviations of items in *attitude* scale

Item	Mean	Standard Deviation
Satisfaction with own learning	4.22	1.00
Satisfaction with delivery system	3.67	1.08
Delivery system added to course	3.11	1.13
Enjoyed this course more than others	2.72	.96
Course makes me more aware of topic	4.33	.59
Course makes me read more about topic	4.05	1.11
Course was good educational environment	3.28	1.07

Perceptions of instructor's presence (r = .70, p = .001) were positively and statistically significantly correlated with the attitude scale variable. In addition, both perceptions of other students' presence (r = .69, p = .00) and the instructor's presence (r = .52, p = .03) were significantly correlated with student responses to the single survey item addressing satisfaction with their learning in this class.

The third research question examined the relationship between perceptions of presence and student learning. Learning was operationalized in three ways, as the total number of points a student earned in the class, as student assessment of how much they learned, and as the grade students would assign themselves.

Although students did earn some points through participation, most of the points reflected performance on homework assignments and examinations. Mean percentage of points earned was 88 (range 68 – 108, sd = 9.9). Interestingly, self-assigned grades and points earned were not significantly correlated (r = .46, p = .07).

Table 3. Correlations among variables

	Others	Instr	Own	Points	Rating	Attitude	Satisf
Perceptions of others' presence		.40	.18	-.01	.07	.40	.69**
Perceptions of instructor's Presence			.14	-.06	.33	.70**	.52*
Perceptions of own presence				.58*	.75**	.05	.15
Percentage of points earned					.46	-.04	-.11
Self-rating of grade in class						.32	.00
Attitudes about the class							.63**
Student satisfaction with learning							

* Correlation is significant at the 0.05 level (2-tailed)
** Correlation is significant at the 0.01 level (2-tailed)

Correlation analysis revealed a statistically significant positive relationship between student perceptions of their own presence and the points earned in the class (r = .58, p = .03), as well as between student perceptions of their presence and the grade they assigned themselves (r = .75, p = .00). In self-assignment of grades, the range of responses was 2 to 4 on a 4-point scale, with 4 representing a grade of A. The mean was 3.3 and the standard deviation was .54.

Interestingly, the self-reported measure of learning was significantly correlated with students' self-assigned grade (r = .64, p = .01). Scores on this item ranged from 2 to 5 on a 5-point scale, with a mean of 3.2 and a standard deviation of .81.

Discussion

Results from this study demonstrate the importance of the presence or immediacy of the other participants in an online class to affective and cognitive learning outcomes. Perceptions both of the presence of others and of the instructor were significantly correlated with scores on affective learning and particularly on student satisfaction with their own learning. In emphasizing the importance of connection with others in online classes, these findings support the arguments of Rourke et al. (2001) and Oren, Mioduser and Nachmias (2002) that social presence is necessary for development of an effective community of inquiry. Because a feeling of connection may encourage students to engage the material as well as the other people, this also may increase the likelihood that students will complete online classes. Findings of this study also address LaRose and Whitten's (2000) concerns that online classes may fail to connect students with one another and similarly may offer fewer opportunities for connection between teachers and students.

Although perceptions of instructor presence were strongly related in this study to both attitudes and satisfaction, it is significant to note that satisfaction with learning was correlated more highly with perceptions of others (r = .69) than with perceptions of the instructor (r = .52), emphasizing the considerable role for the other students in the class. As LaRose and Whitten (2000) have noted, other students serve as important referents in online classes. In addition, online interaction among peers offers more than academic exchange. Social support and content-related interaction both can support idea development, affirmation, and encouragement. In this class, student postings revealed the importance of online interaction as a means of ambiguity reduction. Students posed procedural and content questions, provided answers (or suggestions), thanked one another for ideas, and provided encouragement.

This study makes an important contribution in demonstrating the presence of a relationship that is often posited or assumed. As Hiltz and Wellman (1997, p. 2) argued, "virtual, or electronic, communities involve sociability, emotional support, and a sense of belonging as important ends in themselves, though they are often accompanied by exchanges of information and services." Opportunities for students to connect with one another and the instructor in this class, through discussion boards, synchronous chat, and a shared context, were statistically significantly related to positive feelings about the course. Student comments in open-ended questions on the summative survey and the open-ended self-assessment question in the final exam further demonstrate the role of student interaction as key to a positive online learning environment. One student noted in identifying the most useful element of the class, "The discussion problems were the most helpful because you could see other

students' responses and ideas." Another wrote, "Online discussions have been the best part and learning tool of all my online classes thus far." And yet another noted, "The other students were the best element of this course. The discussion boards were one of the best tools of the course."

Consistent with the literature on teacher immediacy (Christophel, 1990; Freitas, Myers & Avtgis, 1998; Gorham, 1988; Kelly & Gorham, 1998; Sanders & Wiseman, 1990), perceptions of the instructor's presence were significantly correlated with both the attitudes scale and student satisfaction with their learning. The role of teacher makes the instructor especially visible and especially important in establishing the tone and initial norms for the learning environment. This study provides clear evidence in an online class for this relationship.

The relationship of students' reported perceptions of their own presence with the outcome variables was especially compelling. Students' perceptions of the presence they had in the class were significantly correlated with the teacher's assessment of their performance in the class, with the grade they would assign themselves, and with their attitudes about the course. The strongest relationships with perceptions of own presence were with performance, both as assessed by the instructor and as evaluated by the students themselves. It may be argued that this reflects the effect of self-efficacy or self-confidence (Jackson, 2002). Students who saw themselves as performing effectively may also have felt their contributions to the online discussion were valuable or salient, thus they assigned themselves high presence ratings. This result may also reflect more engagement among those students whose interest level, and possibly their effort, was higher. A third alternative is much less likely. The instructor might have seen these students as more engaged and evaluated their performance more highly. Because most points in this class represented solutions to genetics problems and therefore were largely objective, individual evaluation played a very small role. More investigation of students' assessment of their own presence and its relationship to outcomes is in order.

Implications for instructors and designers

These findings systematically demonstrate the significance of student-student as well as teacher-student interaction in online classes. While instructor immediacy or presence was related in this study to attitudes and satisfaction, as would be expected, this study highlights the importance of interaction among students to attitudes about the class.

This study provides evidence for incorporating interaction among students into class design. This may be important to instructors, facilitators and course designers who are discouraged from requiring and/or supporting interaction. Facilitating interaction is time-consuming and often demanding. It is easy to argue that interaction is not required for some subjects, some contexts, or some students. As Terry (2001) has found, however, even in some of the classes where interaction might be considered unnecessary, specifically those focused on math, attrition rates are particularly high. This suggests an opportunity to support student learning and performance through student-student interaction in essentially any online class. Establishing and supporting opportunities for students to establish both their own salience and provide social and material support in online classes, especially by working with the material together, offers important tools to enable heightened performance.

The finding in this study of a statistically significant relationship between students' performance and their perceptions of their own presence in the class adds weight to the argument for interaction. The ability to work online with other students, offer ideas, ask for support, and solve problems also allows students to articulate their understanding and to work through the material with an eye to others. This may better prepare them for assignments and exams, thereby improving their overall performance. This relationship merits further attention.

Limitations and directions for future research

This study is limited by the small sample size and by the homogeneous nature of the sample. More importantly, however, the findings reflect the difficulty of operationalizing and measuring presence. In the end, presence is what people perceive it to be, but potential inconsistency in how students interpreted the presence items may have influenced the findings. A multifaceted presence instrument, one that examines presence with more than single items and addresses the construct more by evaluating specific behaviors rather than a global effect, would provide richer data. Future research should address operationalization both of presence and of performance. Examination of additional types of online classes with other types of students also would provide opportunities to refine measurement and evaluate validity across contexts. Another useful extension of this research would examine change in perceptions of presence over time, as classroom dynamics develop. It is increasingly clear

that the degree to which online students feel that they are engaged with others influences classroom outcomes, and refinement of our understanding of both process and product of online presence is in order.

Acknowledgements

References

Althaus, S. L. (1997). Computer-mediated communication in the university classroom: An experiment with on-line discussions. *Communication Education, 46,* 158-174.

Anderson, J. F. (1979). Teacher immediacy as a predictor of teaching effectiveness. *Communication Yearbook, 3,* New Brunswick, NJ: Transaction Books, 543-559.

Benbunan-Fich, R., & Hiltz, S. R. (1998). Educational applications of CMC: Solving case studies through asynchronous learning networks. *Journal of Computer Mediated Communication, 4.* Retrieved December 21, 2004, from http://www.ascusc.org/jcmc/vol4/issue3/benbunan-fich.html.

Brandt, S. D. (1997). Constructivism: Teaching for understanding of the Internet. *Communications of the ACM, 40,* 112-118.

Carr, S. (2000). As distance education comes of age, the challenge is keeping the students. *The Chronicle of Higher Education, 46* (23), Retrieved December 21, 2004, from http://chronicle.com/free/v46/i23/23a00101.htm.

Christophel, D. M. (1990). The relationship among teacher immediacy behaviors, student motivation, and learning. *Communication Education, 39,* 323-340.

Ellis, K. (2000). Perceived teacher confirmation: The development and validation of an instrument and two studies of the relationship to cognitive and affective learning. *Human Communication Research, 26* (2), 264-292.

Freitas, F. A., Myers, S. A., & Avtgis, T. A. (1998). Student perceptions of instructor immediacy in conventional and distributed learning classrooms. *Communication Education, 47* (4), 366-373.

Garrison, R., Anderson, T., & Archer, W. (2000). *Critical inquiry in a text-based environment: Computer conferencing in higher education*, retrieved December 21, 2004, from http://communitiesofinquiry.com/documents/CTinTextEnvFinal.pdf.

Gorham, J. (1988). The relationship between verbal teacher immediacy behaviors and student learning. *Communication Education, 37,* 40-53.

Gunawardena, C. N., & Zittle, F. J. (1997). Social presence as a predictor of satisfaction within a computer-mediated conferencing environment. *The American Journal of Distance Education*, *11,* 8-26.

Gunawardena, C. N., & Duphorne, P. L. (2000). Predictors of learner satisfaction in an academic computer conference. *Distance Education, 21* (1), 101-117.

Hiltz, S. R., & Wellman, B. (1997). Asynchronous learning networks as a virtual classroom. *Communications of the ACM, 40*, 44-48.

Jackson, J. W. (2002). Enhancing self-efficacy and learning performance. *The Journal of Experimental Education, 70* (3), 243-255.

Kelly, D. H., & Gorham, J. (1988). Effects of immediacy on recall of information. *Communication Education, 37*, 1978-207.

LaRose, R., & Whitten, P. (2000). Re-thinking instructional immediacy for web courses: A social cognitive exploration. *Communication Education, 49* (4), 320-338.

Lombard, M., & Ditton, T. B. (1997). At the heart of it all: The concept of presence. *Journal of Computer-Mediated Communication, 3* (2), retrieved December 21, 2004, from http://www.ascusc.org/jcmc/vol3/issue2/lombard.html.

McCroskey, J. C., Sallinen, A., Fayer, J. M., Richmond, V. P., & Barraclough R. A. (1996). Nonverbal immediacy and cognitive learning: A cross-cultural investigation. *Communication Education, 45,* 200-211.

Menzel, K. E., & Carrell, L. J. (1999). The impact of gender and immediacy on willingness to talk and perceived learning. *Communication Education, 48* (1), 31.

Moore, G. (1997). Sharing faces, places and spaces: The Ontario Telepresence Project Field Studies. In K. E. Finn, A. J. Sellen, & S. B. Wilbur (Eds.), *Video-Mediated Communication*, Mahwah, NJ: Erlbaum, 301-321.

Oren, A., Mioduser, D., & Nachmias, R. (2002). The development of social climate in virtual learning discussion groups. *International Review of Research in Open and Distance Learning, 3* (1), retrieved December 21, 2004, from http://muse.tau.ac.il/publications/77.pdf.

Picciano, A. G. (2002). Beyond student perceptions: Issues of interaction, presence, and performance in an online course. *Journal of Asynchronous Learning Networks, 6* (1), retrieved December 21, 2004, from http://www.sloan-c.org/publications/jaln/v6n1/v6n1_picciano.asp.

Richmond, V. P., Gorham, J. S., & McCroskey, J. C. (1987). The relationship between selected immediacy behaviors and cognitive learning. In M. McLaughlin (Ed.), *Communication Yearbook, 10*, Beverly Hills, CA: Sage, 574-590.

Rodriguez, J. I., Plax, T. G., & Kearney, P. (1996). Clarifying the relationship between teacher nonverbal immediacy and student cognitive learning: Affective learning as the central causal mediator. *Communication Education, 45, 2*93-305.

Rourke, L., Anderson, T., Garrison, D. R., & Archer, W. (2001). Assessing social presence in asynchronous text-based computer conferencing. *Journal of Distance Education, 14* (2), retrieved December 21, 2004, from http://cade.athabascau.ca/vol14.2/rourke_et_al.html.

Sanders, J. A., & Wiseman, R. L. (1990). The effects of verbal and nonverbal teacher immediacy on perceived cognitive, affective, and behavioral learning in the multicultural classroom. *Communication Education, 39*, 341-353.

Short, J., Williams, E., & Christie, B. (1976). *The social psychology of telecommunications*, London: John Wiley.

Terry, N. (2001). Assessing enrollment and attribution rates for the online MBA. *T H E Journal (Technical Horizons in Education), 28* (7), 64-69.

Tu, C.-H. (2002). The measurement of social presence in an online learning environment. *International Journal on E-Learning, 1* (2), 34-46.

Walther, J. B., & Burgoon, J. K. (1992). Relational communication in computer-mediated communication. *Human Communication Research, 19* (1), 50-88.

Wiener, M., & Mehrabian, A. (1968). *Language within language: Immediacy, a channel in verbal communication,*. New York: Appleton-Century-Crofts.

Witt, P. L., & Wheeless, L. W. (1999). Nonverbal communication expectancies about teachers and enrollment behavior in distance learning. *Communication Education, 48* (12), 149-154.

Witt, P. L., & Wheeless, L. R. (2001). An experimental study of teachers' verbal and nonverbal immediacy and students' affective and cognitive learning. *Communication Education, 50* (4), 327-342.