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Role of Computer-Mediated Communication (CMC) in Online Teaching and Learning Process

Angirekula V Ramakrishna[1], Basati Vasanthi[2], Kanchi Manipal[3]

[1]Assistant Professor, Dept. of Computer Science and Engineering, Sri Sarathi Institute of Engineering and Technology, Nuzvid, A.P., India.
[2]Assistant Professor, Dept. of Computer Science and Engineering, Sri Sarathi Institute of Engineering and Technology, Nuzvid, A.P., India.
[3]Assistant Professor, Dept. of Computer Science and Engineering, DVR & Dr. HS MIC College of Technology, Kanchikacharla, Vijayawada. A.P., India.

ABSTRACT

Online learning continues to be a popular format for educational experiences because of its flexibility and customizability to students' needs (Allen and Seaman, 2016, Cui et al., 2013). According to Allen and Seaman (2016), 5.8 million students were enrolled in at least one online course in 2014, with the rate of students enrolling in online courses continuing to match or outpace those of traditional enrollments. Allen and Seaman's report further supports these findings by noting that a large number of higher education academic leaders (63.3%) have indicated that online education is critical to their long-term strategy. Nevertheless, researchers and practitioners continue to grapple with concerns over online learning, including student feelings of isolation, disconnection from peers and instructors, and a lack of preparation for learning in an online environment, all of which result in higher dropout rates and the perception of an inferior educational experience (Liu, Gomez, & Yen, 2009). The construct of social presence—the ability to perceive others in an online environment—can go a long way to overcoming these issues. In fact, Boston et al. (2009) found that two affective expression indicators of social presence accounted for more than 20% of the variance in student retention. We have conducted this study to provide a holistic view of social presence in online learning. Through meta-analysis, we examine the nature of the relationship between social presence and student outcomes across contexts, disciplinary areas, and varying measures of social presence.

Key Words: Education, Environment, Online, Social, Teaching and Learning, Traditional

INTRODUCTION

Anyone who listens carefully to the way people say things quickly learns that the particular words a speaker uses to describe an event or experience can be a rich source of information about his feelings and attitudes
Wiener & Mehrabian, 1968, p. 1

While Wiener and Mehrabian (1968) may have been speaking to an audience that could hardly conceive of today's online learning environments, their opening sentence still holds true. As a construct, social presence today is often considered integral to online education; but in fact, the research base stems from work going much further back. For example, researchers in social psychology, such as Argyle and Dean (1965) and Argyle (1969)'s work with nonverbal communication and interpersonal behaviors and Mehrabian, 1966, Mehrabian, 1972) work on immediacy and non-verbal nonverbal communication have all had a significant influence over how we have come to define social presence. Social presence in the online environment is a setting that upon initial glance may appear to be lacking in traditional verbal and nonverbal behaviors.

Computer mediated communication (CMC)

Computer-mediated communication (CMC) is any form of communication between two or more individuals mediated by interconnected computers. Instant messages, computer, audio, and video conferencing are synchronous computer-mediated communication examples, while text messages, email, discussion forums, and mailing lists are asynchronous computer-mediated communication examples.

Characteristics of computer mediated communication

CMC has several characteristics, including the ability to support complex processes of participant interaction, to be multidirectional or bidirectional at the least, and to exhibit both synchronous and asynchronous characteristics.

Types of CMC
\CMC can be synchronous or asynchronous, depending on the timing. Asynchronous CMC occurs when participants are not necessarily online simultaneously, as synchronous CMC occurs in real-time. CMC can also be classified based on the medium or type of message used and the number and pattern of participants.

Examples of CMC (computer mediated communication)
Instant messages, computer, audio, and video conferencing are synchronous computer mediated communication examples, while text messages, email, discussion forums, and mailing lists are asynchronous computer mediated communication examples.

The most clearly defined line between today's research on social presence and its predecessors is the work of Short, Williams, and Christie (1976) based on their communications research on "the effectiveness and impact of person-to-person telecommunications" (p. vi). They coined the term "social presence," and over time their work has been cited regularly throughout the literature. They posited that social presence is a quality of medium, with some mediums having a lesser ability to convey social presence (e.g., text-based communication). "[Social presence] varies between different media, it affects the nature of the interaction and it interacts with the purpose of the interaction to influence the medium chosen by the individual who wishes to communicate" (Short et al., 1976, p. 65).

The widespread use of computer-mediated communication (CMC), the term often associated with the early years of online learning, incented several researchers to begin questioning earlier works to see how previous assumptions related to the newer technologies. Walther (1992), for example, provided a critical evaluation on the role of the medium constraining users' communication, specifically by highlighting weaknesses in CMC research. To illustrate his point, he takes issue with the comparison of task-oriented assignments between simulated computer conferencing groups and face-to-face (F2F) groups with a limited time frame, which by its nature alleviates the advantages of CMC communication channels. Additionally, although he indicated the commonality of comparing verbal communication behaviors between computer conferencing groups and F2F groups, Walther also noted a lack in the examination of nonverbal communication behaviors in F2F in research, which could provide insights into CMC substitutions or equivalences in the research. He also discussed the possibly unfair comparison of F2F and CMC based on contexts and purposes of the communication being studied, including the findings of experimental studies versus authentic CMC groups. At one point Walther explained, "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 …" (p. 63). Later, a meta-analysis of the interpersonal effects of CMC (Walther, Anderson, & Park, 1994), found that the treatment of time (from 15 min to 6 months, in this case) plays a strong role in explaining socially-oriented communication. Walther et al. (1994) go on to say that although room exists to interpret their findings, interpersonal dynamics may not be at the mercy of the medium; up until this point little evidence had supported this case.

Gunawardena (1995) alleviated this tension by situating social presence theory into a particular educational context, and examining the likelihood that users attributed their social presence to either the medium itself or their perception of the medium. The educational context was a multi-university distance education project called The Globalised conferences, and was conducted using a listserv. Gunawardena conducted two studies within this context and found that it was students' perceptions of CMC, and not the medium itself, that derived their impression of social presence. Additionally, she found that because instructors can cultivate or create social presence they need to learn to how to adapt to the medium.

Since the concept of social presence was first linked to online learning, researchers and practitioners have been reconceiving not only what social presence is, but also the particular role/s it plays in online learning (Annand, 2011, Gunawardena, 1995, Kreijns et al., 2014, Lowenthal, 2010, Oztok and Brett, 2011). This is appropriate because the environments being studied have grown beyond text-based CMC and listservs and are researched in a number of disciplines and contexts. These reconceptions are supported by the varying definitions of social presence presented in Table 1. What all of the definitions have in common, and what we accept as the definition for social presence for this study, is the ability to perceive others in an online environment.

Variations in wording aside, as shown in Table 1, we have learned much about social presence and its influence in online learning over the past 20 years, including the perception that it can be (strongly) felt by participants in computer-mediated communication (Gunawardena, 1995, Richardson and Swan, 2003, Swan and Shih, 2005, Tu and McIsaac, 2002, Walther, 1996). Social presence has been shown to influence a variety of factors in students' learning experiences. More specifically, social presence can positively influence students' participation and motivation to participate (Jorge, 2010, Mazzolini and Maddison, 2007, Swan and Shih, 2005, Tao, 2009, Tu and McIsaac, 2002, Weaver and Albion, 2005), course and instructor satisfaction (Akyol and Garrison, 2008, Cobb, 2009, Gunawardena and Zittle, 1997, Gunawardena, 1995, Hostetter and Busch, 2006, Richardson and Swan, 2003, Swan and Shih, 2005), and both actual and perceived learning (Hostetter and Busch, 2013, Joksimović et al., 2015, Kang and Im, 2013, Picciano, 2002, Richardson and Swan, 2003, Russo and Benson, 2005, Wise et al., 2004). Further, social presence has

implications for course design (Arbaugh, 2005, Mykota and Duncan, 2007, Richardson et al., 2013, Swan et al., 2012a, Tu, 2000, Tu and McIsaac, 2002, Vrasidas and McIsaac, 2000) and even for retention and intention to enroll in online course (Boston et al., 2009, Liu et al., 2009, Reio and Crim, 2013). Finally, while the concept of social presence has much to do with the interactions between online participants, it has also been found to permeate areas noted for being completed by individual students such as final projects and papers (Hostetter and Busch, 2013, Richardson and Swan, 2003). Ultimately, social presence research underscores the concept that we should encourage social interaction as a means to engage learners in critical thinking and higher-level learning (Garrison & Akyol, 2013).

Research on social presence has increased not only due to the rise in online learning environments and the search for best practices therein, but also in part because of the popularity of the Community of Inquiry (CoI) survey, of which social presence is measured along with teaching presence and cognitive presence. The CoI is a framework widely adopted in the past 15 years and has been used to develop and evaluate meaningful online learning experiences (Akyol and Garrison, 2008, Arbaugh, 2008, Arbaugh et al., 2008, Boston et al., 2009, Cobb, 2011, Garrison and Akyol, 2013, Kozan and Richardson, 2014, Swan et al., 2008).

The complex measurement of social presence varies sometimes based on specific contexts. The two most common formats for measuring social presence are self-reporting, such as surveys (Arbaugh et al., 2008, Gunawardena and Zittle, 1997, Richardson and Swan, 2003, Tu, 2002a), and behavioral indicators, used to code communication and behaviors (Richardson et al., 2015, Rourke et al., 1999, Swan and Shih, 2005, Swan, 2003, de Bruyn, 2004). Table 2 provides a list of some of the commonly used self-report measures of social presence, as well as those included within this study. Survey usage results include the work of Gunawardena and Zittle (1997) (k = 5), Richardson and Swan (2003) (k = 5), which is based on Gunawardena and Zittle, and the CoI survey or common instrument (Swan et al., 2008) (k = 6). Other instruments (e.g., Biocca et al., 2001, Garrison et al., 2004, Kang et al., 2007, Kang et al., 2006, Kang et al., 2009, Kim, 2011, Shih, 2004, Wise et al., 2004) accounted for eight of the studies listed in Table 2 and were used in the subsequent synthesis via meta-analysis.

To date, the majority of research on social presence in online courses has included the student outcomes of perceived learning and satisfaction, yielding much information about associated variables such as potential moderators, potential relationships between variables, predicting social presence, or using social presence to predict outcomes. Outcomes, in the case of this research, refers to learners' perceived measure of performance.

Student satisfaction, for the purpose of this study, is an indicator of whether learners are satisfied with their learning experience (Li, Marsh, Rienties, & Whitelock, 2016). Several studies have found social presence to have an impact on student satisfaction. For example, Gunawardena and Zittle (1997) examined social presence as a strong predictor of student satisfaction in a text-based computer conferencing environment. Through regression analysis, they found that social presence accounted for 58% of variance in student satisfaction. Likewise, Strong, Irby, Wynn, and McClure (2012) assessed students' perceptions of the learning environment, social presence, and satisfaction in online agricultural education courses. They found that social presence and the learning environment accounted for 26% of the variance in student satisfaction. Similarly, Hostetter and Busch (2006) found that similar levels of social presence could be generated between F2F and online course settings. In addition, they found with regression analysis that 40% of the variance in learner satisfaction was explained by social presence. This coincides with findings from others, such as Wise et al. (2004) and Kang, Liew, Kim, and Park (2014).

Richardson and Swan (2003) demonstrated with their correlational study that students who perceived a high level of social presence in an online course were not only more satisfied with their instructor, but also perceived they learned more than students who reported low social presence. Swan and Shih (2005) conducted a mixed-methods study and found significant correlations between perceptions of social presence (peers and instructors) and perceived learning, as well as between the perceived presence of instructors' and satisfaction with instructors. The qualitative results showed that “students perceiving more social presence also used significantly more social presence indicators to project their own presence to their classmates” (p. 130). Cobb’s (2011) work on nursing education found that social presence was highly correlated to both student satisfaction and perceived learning. Using multivariate regression, Cobb found that social presence accounted for 44% of the variance in overall satisfaction and 36% of the variance in perceived learning. Arbaugh (2008) examined 55 online MBA courses to determine if the CoI framework, of which social presence is a measure, could predict student outcomes. He found that social presence was positively associated with students' perceived learning and their satisfaction with the online delivery medium implemented by courses. Similarly, Kang and Im (2013) conducted multiple regression analyses to determine the factors in learner–instructor interaction that predicted learners' perceived learning and satisfaction in online courses. Using Kang's, 2009 questionnaire consisting of five factors (guidance and facilitating learning; social intimacy; instructional communication; presence of instructor and instructional support), they found that factors related to instructional interaction significantly predicted learners' perceived learning achievement. They also found that these five factors significantly predicted learners' satisfaction.

Only a few studies have examined social presence in relation to traditional academic performance, or grades. Picciano's (2002) early student of traditional academic performance examined the impact of interaction and social presence on performance outcomes. After breaking students into three social presence groupings (low, moderate, and high), Picciano compared mean scores for both a written assignment and an examination, and found that students' perceptions of social presence were not a statistically significant predictor for performance on the examination. However, it was a significant predictor for performance on the written assignment. Picciano concluded that the type of performance measures, in this case an examination versus written assignment, and its alignment with the tasks taking place on the discussion board may be a factor in his findings. Correspondingly, Hostetter and Busch (2013) used a content analysis of graded discussion postings (n = 4000), a social presence survey, and the Classroom Assessment Technique (CAT) which involved a written assignment as a measure of academic performance. The content analysis used Rourke et al.'s (1999) social presence indicator coding schema and was conducted by two independent raters. In this case the researchers found that students who demonstrated higher levels of social presence in the online discussions also perceived higher levels of social presence. A regression analysis indicated that students with higher levels of social presence also performed better on the CAT. Similarly, using an experimental design groups, Joksimović et al. (2015) compared graded student online discussion postings (n = 1747), which were also coded in accordance to Rourke et al. (1999) social presence indicator coding schema. With the treatment groups reporting higher mean social presence values, the researchers found that certain social presence indicators (i.e., continuing a thread, complimenting, and expressing appreciation) were significant predictors of student academic performance, in this case course grades. This led them to conclude that "the ability of a student to project himself within an online learning community is also a significant predictor of academic performance" (p. 13). They also concluded that instructional design and the inclusion of support for meaningful interactions, which allowed for deeper social presence interactions here, are important for better student academic performance outcomes.

For this study, we examined students' satisfaction and perceived learning as target student outcomes for the subsequent meta-analysis. Studies examining satisfaction have long been established as part of the post-secondary research landscape, in part because as a variable, it has been found to influence student persistence, retention, motivation, and success (Astin, 1977, Astin, 1992, Booker and Rebman, 2005, Keller, 1983, Kuo et al., 2013, Pike, 1993, Roberts and Styron, 2010, Schreiner and Nelson, 2013). However, some researchers have criticized the construct of perceived learning as not being as valid or critical as traditional learning outcomes. Thus, we wish to establish our rationale for selecting this construct as a variable. To begin, our selection of student outcomes to include is due in large part to a number of studies related to online learning that have also included these variables; whereas, as indicated previously, very few studies have examined social presence and traditional learning outcomes, such as grades.

Second, we argue that sometimes perceived learning is the appropriate measure for the research context and may be exactly what a number of the researchers planned to examine, never intending for it to be viewed as a substitute for cognitive or traditional learning outcomes. As Richardson, Maeda, and Swan (2010) explained, the outcome measures in a number of studies about online learning are intentionally affective; they are studies concerned with the online learning and the development of social presence and how social presence affected student perceptions of online courses. Affect is still a major source of contention in online learning because a number of researchers and practitioners believe that such education spaces are "not rich enough to communicate affect" (Richardson et al., 2010, p. 331).

Finally, we would like to point out that perceived learning may be a better measure than traditional learning measures has been argued by several researchers who maintain that traditional measures can be problematic to compare across disciplines and across instructors (Arbaugh, 2005, Pace, 1990, Richardson et al., 2010, Richmond et al., 1987, Rovai, 2002).

Social presence has been shown to impact student motivation and participation (Jorge, 2010, Swan and Shih, 2005), actual and perceived learning (Hostetter and Busch, 2013, Picciano, 2002, Richardson and Swan, 2003), course and instructor satisfaction (Akyol and Garrison, 2008, Gunawardena and Zittle, 1997), and retention in online courses (Boston et al., 2009); yet very few researchers have attempted to look across contexts, disciplinary areas, or measures of social presence. The synthesis of past studies can contribute new knowledge with greater certainty than individual studies, which often vary in their qualities, focus, and findings (Lipsey & Wilson, 2000). Thus, our purpose was to identify the pattern of outcomes in previous research on social presence through scrutiny of differences between the studies statistically linked to their variation in results (Lipsey & Wilson, 2000) and to provide a holistic view of social presence for researchers, course designers, and instructors.

Overall, our meta-analysis sought to better understand the nature of the relationship between social presence and student outcomes (i.e., student satisfaction and perceived learning) by systematically integrating quantitative findings in order to determine the reasons for variation across studies. We also explored how the relationship varies among studies that measure social presence as functions of online course characteristics and other moderators. Specific research questions we addressed with the meta-analysis were:

1. How strong is the relationship between social presence and students' satisfaction in fully online courses? To what extent does the strength of the correlation vary across studies?
2. How strong is the relationship between social presence and students' perceived learning in fully online courses? To what extent does the strength of the correlation vary across studies?
3. What are the conditions (e.g., type of scale used to measure social presence, audience of the course, discipline area, and course length) that moderate the strength of the correlations?

Sampling of studies

The target population of this synthesis is a set of studies that report on the relationship between social presence and either students' satisfaction or perceived learning between 1992, when the construct of social presence was first applied in online learning literature (i.e., Gunawardena, 1995, Spears and Lea, 1992, Walther, 1992) and May 2015. As a means of searching relevant studies, we used electronic database and search engines including EBSCO, PsycINFO, ERIC, Education Full Text, digital.

Social presence and student outcomes

Although social presence may not be the only factor to consider when designing or evaluating online courses, this meta-analysis on social presence has revealed its exceedingly important function in predicting essential student outcomes, namely satisfaction and perceived learning. In turn, these student outcomes have consistently been shown to impact student persistence, retention, motivation, and success (Astin, 1977, Astin, 1992, Booker and Rebman, 2005, Kuo et al., 2013, Pike, 1993, Roberts.

CONCLUSION

The possibilities for interaction introduced by CMC, provides a powerful environment for collaborative learning across the globe. As students enter any virtual environment, the nature of the entire communication process is transformed. Where social context clues were once vitally important, the text-based medium of CMC eliminates this variable; however, social presence (Short, Williams, and Christie, 1976) or "the degree to which a person feels 'socially present' in a mediated situation" (McIsaac and Gunawardena, 1996, p. 408) remains significant. Rourke, Anderson, Garrison, and Archer (1999) reinforced this need for social presence as a necessary element in what they identified as the community of inquiry. This type of environment in which instructors and learners engage in deep, meaningful learning is typical in the traditional doctoral level classroom, and Rourke et al., believed it particularly important for asynchronous text-based computer conferencing. As students become self-directed and active participants engaged in CMC, instructors become organizers and facilitators of group communication (Berge and Collins, 1995; Harasim, 1990; Hiltz. 1994; Kaye, 1989). Thus, CMC provides a tremendous pedagogical vehicle, providing a collaborative learning environment for a community of learners. However, with alterations to the communication process, the transformation of instructional delivery is inevitable.

REFERENCES

1. Albrektson, J. R. (1995). Mentored Online Seminar: A model for graduate-level distance learning. T.H.E. Journal, 23(3), 102 – 105.
2. Bailey, E. K., and Cotlar, M. (1994). Teaching via the Internet. Communication Education, 43, 184 – 193.
3. Barnard, J. (1997). The World Wide Web and Higher Education: The promise of virtual universities and online libraries. Educational Technology, 37(3), 30 – 35.
4. Barnes, S., and Greller, L. M. (1994). Computer-mediated communication in the organization. Communication Education, 43, 129 – 142.
5. Berge, Z. L., and Collins, M. O. (Eds.) (1995). Computer Mediated Communication and the Online Classroom, 3 – Distance learning. Cresskill, NJ.: Hampton Press, Inc.
6. Bianco, M. B., and Carr-Chellman, A. A. (2002). Exploring qualitative methodologies in online learning environments. The Quarterly Review of Distance Education 3, 251 – 260.
7. Boettcher, J. V. (1997). Video instruction at a distance. Syllabus, 11(1), 46 – 48.
8. Brookfield, S. D. (1986). Understanding and Facilitating Adult Learning: A comprehensive analysis of principles and effective practices. San Francisco: Jossey-Bass.
9. Brown, F. B., and Brown, Y. (1994). Distance Education Around the World. In B. Willis (Ed.), Distance Education: Strategies and tools (p. 3-39). Englewood Cliffs, NJ.: Educational Technology Publications.
10. Chen, L. (1997). Distance Delivery Systems in Terms of Pedagogical Considerations: A reevaluation. Educational Technology, 37(4), 34 – 37.
11. Dennen, V. P. and Branch, R. C. (1995). Considerations for Designing Instructional Virtual Environments. ERIC Document #: ED 391 489.
12. Eastmond, D. V. (1995). Alone But Together: Adult distance study through computer conferencing. Cresskill, NJ.: Hampton Press, Inc.
13. Erikson, E. H. (1963). Childhood and Society (2nd ed.). New York: W. W. Norton & Company.

14. Freud, S. (1935). A general introduction to psycho-analysis: A course of twenty-eight lectures delivered to the university of Vienna. (J. Riviere, Trans.). New York: Liveright Publishing Corp.
15. Grooms, L. D. (2000). Interaction in the Computer-Mediated Adult Distance Learning Environment: Leadership development through online education. (Doctoral dissertation, Regent University School of Leadership Studies, 2000). Dissertation Abstracts International, 61(12), 4692A.
16. Harasim, L. M. (Ed.). (1990). Online Education: Perspectives on a new environment. New York: Praeger.
17. Hiltz, S. R. (1994). The Virtual Classroom: Learning without limits via computer networks. Norwood, NJ.: Ablex Publishing Corporation.
18. Jaspers, K. (1954). Way to Wisdom: An introduction to philosophy (R. Manheim, Trans.). New Haven, CT.: Yale University Press. (Original work published 1951).
19. Kambutu, J. (2002). Administrators prefer technology-based distance learning. The Quarterly Review of Distance Learning, 3, 341 – 343.
20. Kaye, A. (1989). Computer-mediated communication and distance education. In R. Mason and A. Kaye (Eds.) Mindweave: Communication, computers and distance education (p. 3-21). New York: Pergamon Press.
21. Kimball, L. (1995). Ten ways to make online learning groups work. Educational Leadership, 53(2), 54 – 56.
22. Knowles, M. S. (1968). Androgogy, not pedagogy! Adult Leadership, 16, 350 – 386.
23. Knox, A. B. (1977). Adult development and learning. San Francisco: Jossey-Bass.
24. Lowry, M., Koneman, P., Osman-Jouchoux, R., and Wilson, B. (1994). Electronic Discussion Groups: Using e-mail as an instructional strategy. Tech Trends, 39(2), 22 – 24.
25. Martin, M., and Taylor, S. A. (1997). The virtual classroom: The next steps. Educational Technology, 37(5), 51 – 55.
26. Mc Candless, G. C. (1997). Technology and Faculty Productivity: Measurement or madness? Syllabus, 10(7), 14 – 16.
27. Mc Isaac, M. S., and Gunawardena, C. N. (1996). Distance Education. In D. H. Jonassen (Ed.) Handbook of Research for Educational Communications and Technology (p. 403-437). New York: Simon & Schuster Macmillan.
28. Miller, L. M. (1994). "Computer-based communication and the creation of group identity" or "Questions we could be asking about group interaction via computer." ERIC Document #: ED 383 008.
29. Misanchuk, E. R. (1994). Print tools for distance education. In B. Willis (Ed.) Distance Education: Strategies and tools (p. 109-133). Englewood Cliffs, NJ.: Educational Technology Publications.
30. Piaget, J. (1959). The Language and Thought of the Child (3rd Ed.). (M. Gabain, Trans.). New York: Humanities Press.
31. Poling, D. J. (1994). E-mail as an effective teaching supplement. Educational Technology, 34(5), 53 – 55.
32. Rourke, L., Anderson, T., Garrison, D. R., and Archer, W. (1999). Assessing social presence in asynchronous text-based computer conferencing. Journal of Distance Education, 14(2), 50 – 71.
33. Seagren, A., and Watwood, B. (1996). The Virtual Classroom: Great expectations. Delivering graduate education by computer: A success story. ERIC Document #: ED 394 597.
34. Short, J., Williams, E., and Christie, B. (1976). The Social Psychology of Telecommunications. New York: John Wiley & Sons.
35. Skinner, B. F. (1953). Science and Human Behavior. New York: The Macmillan Company.
36. Sorensen, C., and Baylen, D. (2000). Perception versus Reality: Views of interaction in distance education. The Quarterly Review of Distance Education, 1, 45 – 58.
37. Tough, A. (1979). The Adult's Learning Projects: A fresh approach to theory and practice in adult learning (2nd Ed.). Austin, TX.: Learning Concepts.
38. U. S. Congress Office of Technology Assessment. (1989). Linking for learning: A new course for education (OTA-SET-430). Washington, DC. US Government Printing Office.
39. Walther, J. B. (1992). Interpersonal Effects in Computer-Mediated Interaction: A relational perspective. Communication Research, 19, 52 – 90.