Internet Communication Technologies and Networked Learning: Identity Formation Through Social Exchange

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ABSTRACT

The purpose of this paper is to argue that communication technologies play a non-neutral rather than passive role in formulating both student and teacher identities in verbal and non-verbal social exchanges. Further research into group interaction within peer-based collaborative tools is required to determine how these cognitive tools can lead to higher levels of learning in students. For many years, educators have been exploring ways to improve teaching and learning practices with the help of technologically innovative tools. Cognitive tools used in collaborative learning environments support the interactive construction of knowledge during problem-solving processes as they promote students' adoption of an active learner mode. Increasingly, the social aspects of our e-learning environments are being used to inform how educational episodes should best be designed to take full advantage of the cognitive powers that students possess. While conceptual understandings are foremost to learning, we also need ways of expressing outwardly the representation of our concepts. Language, tools, symbols, and cues are the ways we objectify and communicate our concepts in everyday life inside and outside our classrooms. By furthering our understanding of various e-learning cultures, cues and contexts, we can ensure that the best possible educational scenarios emerge.

INTERNET COMMUNICATION TECHNOLOGIES AND NETWORKED LEARNING: IDENTITY FORMATION THROUGH SOCIAL EXCHANGE

Although instructors have always been faced with diversity in their classrooms, computer-mediated environments offer an even greater range of complex and multifaceted learning environments because of the shifts in geographic and temporal boundaries, as well as the lack of interpersonal social cues in interpersonal communication. Understanding this type of communication within networked learning environments is worthy of further research as trends toward flexible learning environments (e.g., tele-learning; m-learning; e-learning) are physically separating teachers and learners between and among each other. A physical separation affects interpersonal communication within the learning process in various ways. For example, monitoring student cues is important with respect to the provision of opportunities to gain understanding of teaching effectiveness (McAlpine, Weston, Beauchamp, Wiseman, & Beauchamp, 1999).

Building on prior knowledge, making thought processes more explicit, and developing organized knowledge structures are areas instructional psychologists have been intent on exploring for many years. Researchers have replaced a static notion of the learner with more dynamic process-oriented theories. Constructivist theories, although wide and varied, stress the social and active aspects of learning environments and advocate teachers acting more as guides than authoritarians. The learner's social and cultural interactions with the environment and the individual's self-regulation in terms of what they might attribute to their successful or unsuccessful learning experiences have become more pronounced. Weiner's attribution theory, for example, draws attention to attributions the learner makes explicit through self-monitoring, as well as the attribution cues that the teacher passes on to the students. When there is a separation between and among students and teachers, and communication technologies are used to facilitate the learning transactions, interpersonal communication processes change. These communication process changes, referred to by Moore as transactional distance, can alter expository teaching so significantly that new ways of teaching and learning are required (Kanuka, 2001; Moore & Kearsley, 2005). A good place to start in understanding these communication process changes is to begin with what we know about face-to-face interaction.

PSYCHO-SOCIAL RELATIONS TO PHYSICAL PROXIMITY

One way Burgoon, Bonito, Ramirez Jr., Dunbar, Kam, & Fischer (2002) derive an understanding of interdependent message exchange is by defining the properties of face-to-face interactions through the senses. Varying degrees of cognitive, emotional, and behavioural engagement, the ease or smoothness of the interaction, and perceptions of connection, receptivity, similarity and understanding all contribute to a rich, interactive experience. Nonverbal behaviours such as physical proximity, eye contact, touch, body orientation, and body lean enable sensory immersion and create psychological closeness as well as physical and social presence (Coker & Burgoon, 1987; Mehrabian, 1981; Short, Williams, & Christie, 1976). Two people in close proximity automatically share a heightened sense of mutual understanding, connection and common ground. In a study examining proximity, Burgoon *et al.'s* findings revealed that, "Actual or perceived distance can indeed weaken people's task engagement, their sense of connection with one another, and the credibility they ascribe to task mates" (p. 671). Further research is identified as being required to focus explicitly on what nonverbal cues might be available to augment verbal information and how such cues are actually utilized in the interaction process.

At a basic level, face-to-face interpersonal communication requires speakers and listeners to co-ordinate both content and process (Clark & Brennan, 1991; Whittaker, Brennan & Clark, 1991). Effective coordination of communication involves the construction and maintenance of shared beliefs, requiring listeners and speakers to infer and monitor each others' understandings, in addition to their attitudes and motivation. Much of our personal interaction in face-to-face classroom settings, which communicates our beliefs and intentions, requires paralinguistic and non-verbal cueing in addition to our individual utterances (Baron, 2000; Gram, Kanuka, Norris, 2004). Thus, both paralinguistic cueing and utterances infers a shared context that includes both linguistic and physical contexts (Grosz & Sidner, 1986), as well as the management of the conversation, or 'process coordination' (Whittaker, 1995). Individual utterances alone do not adequately convey beliefs and intentions (Allen & Perrault, 1986; Searle, 1990; Whittaker, 1995).

The importance of interpersonal communication on collaborative formations has been demonstrated by research. Research has revealed, for example, that people who are in close proximity to each other are more likely to communicate frequently. This, in turn, results in effective collaboration (see, for examples, Whittaker, 1995). Indeed, research has revealed that physical proximity has a significant impact on social and organizational knowledge, and we are more likely to not only be more familiar with the work of those who are close (e.g., an office next door; sitting in a chair next to us), but we are also more likely to respect the work of colleagues who are in close physical proximity (Kraut, Fish, Root, & Chalfonte, 1993).

CUEING IN COMMUNICATION AND MEDIATION

Theories on the impact of the non-verbal communication assert that paralinguistic cuing is critical to the management and coordination of the conversational content (Clark & Brennan, 1991). Non-verbal communication theories maintain that interpersonal communication requires cognitive cues (i.e., head nods and visual attention) (Clarke & Brennan, 1991; Clark & Schaefer, 1989), turn taking (i.e., head turning, posture, eye gaze) (Kendon, 1967) and social cueing (facial expression) (Argyle *et al.*, 1974). The latter, social cueing, is of particular importance in the formation of learning communities as this element of communication includes negotiations, bargaining, and conflict resolutions (Whittaker, 1995) – elements essential to higher level thinking and learning skills (Kanuka & Anderson, 1998). Further, research has shown that when we have access to visual information, our interactions are more personal, less argumentative, broader in focus, and less likely to end in deadlock (Reid, 1977; Williams, 1977).

There is also evidence that suggests text-based communication can be highly disruptive in the turn-taking process (Collett, Kanuka, Blanchette, & Goodale, 1999). Aspects fundamental to interpersonal interactions that require timely feedback, switching speakers, and clarifications are reduced, or absent; in text-based communications. Conversational turn-taking in this environment is also considerably more time consuming than face-to-face interactions making the communication system suitable for certain types of communication such as information exchanges which do not require fast, dynamic and animated exchanges. In teaching learners to learn, they become members in a community. They learn the social rules of that community, but also learn how to solve problems not just according to rules, but through good interpretations. Good interpretations involve the conceptual understanding of the roles and ways of interacting with a community. Producing and evaluating designs and policies is conceptually integrated with the person's identity as a member of the group (Clancey, 1995). Tools, activities and signs are representations which also give us more direct access to the conceptual understanding inherent within a particular group. While cognitive approaches provide analyses of the ways a learner's knowledge is structured, situative approaches provide analyses focused on the actions of individuals with material and informational systems in relation to one another. Cognitive studies which examine social interactions provide us with important clues about how communication can be used in e-learning environments to motivate students and stimulate their thought processes for deeper levels of learning and increased critical thinking skills.

COMMUNICATION BREAKDOWNS IN E-LEARNING

Garrison, Anderson, & Archer (2000) present a model of community inquiry to distance educators that acts as a guide for the optimal use of computer conferencing transactions. They identify three elements essential to an educational transaction in discourse environments: cognitive presence, social presence, and teaching presence. These authors note that group cohesion is a strong indicator of social presence and that the quality of text-based discourse is heightened when students see themselves as part of a group rather than as individuals. With regard to how social presence develops, Garrison *et al.*, assert that salient factors in participants' developing and sharing social presence through mediated discourse is created through familiarity, skills, motivation, organizational commitment activities, and length of time in having used the media (p. 95). They also note, similar to Burgoon *et al.* (2002), that participants in computer mediated communication environments develop compensating strategies in the absence or reduction of visual cues (Garrison *et al.*, 2000) and adapt technology to their communication practice (Burgoon, *et al.*, 2002).

Since simple information exchanges can be of limited benefit in student learning, distance educators remain committed to eliciting higher levels of thinking in asynchronous text-based communication environments. Jonassen (1997) proposed that cognitive tools were best used as reflection tools to amplify, extend, and even reorganize human mental powers in order to help learners construct their own realities and complete challenging tasks. Cognitive tools using asynchronous communication were thought to provide students with the opportunity to develop argument formation capabilities, increased written communication skills, greater complex problem-solving abilities, and increased opportunities for reflective deliberation (Abrami & Bures, 1996; Garrison, Anderson, & Archer, 2000; Hawkes, 2001; Winkelmann, 1995). Discourse models developed by Garrison *et al.* (2000), as well as Gunawardena, Lowe, and Anderson (1997) sought to explain how students involved in online discussion should move from lower to higher levels of learning. However, in practice, researchers such as Angeli, Valanides, and Bonk (2003), Gunawardena and Zittle (1996), Gunawardena, Carabajal, and Lowe (2001), Kanuka and Anderson (1997), and Thomas (2002) all found evidence documenting how student discussions remain primarily at lower levels of thinking due to an absence of challenging, debating and/or defending between and among students (Kanuka & Rourke, 2005). In testing Garrison *et al.'s* (2000) model of critical discourse, Kanuka and Rourke (2005) determined that students remain mostly in the exploratory phase (phase two of four phases). Similarly, in tests of Gunawardena *et al.'s* (1997) model, students remained in the lower two phases of sharing and comparing information, and discovering and exploring dissonance.

Further research into instructional strategies used in computer-mediated collaborative environments would provide even more empirical evidence of how these cognitive tools are able to promote higher order and critical thinking skills. To discover how higher levels of thinking might best be achieved in online discourse, Rourke and Kanuka (2005) conducted a study to analyze various types of instructional methods which incorporated discussion activities into their design. Specifically, within highly structured instructional methods (e.g., Webquests, Debates, and Deliberative Inquiry) findings revealed a denser concentration of discussion postings in the higher phases of critical discourse models. One explanation for these findings refers to discussion activities which explicitly require students to contend with one another's assertions. Research has also shown that with text-based computer mediated communication technologies, groups are less productive across tasks, have lower expressed satisfaction on tasks related to judgment, and lower cohesiveness than face-to-face groups (Straus, 1997). Moreover, computer mediated groups have less total communication, take more time to complete tasks than face-to-face groups (Hiltz, Johnson, & Turoff, 1986; Weisband, 1992) and experience higher rates of negative interpersonal communication (e.g., flaming). Alternatively, research has shown that face-to-face groups are more productive on all tasks and this difference becomes even greater when the number of task requirements increases (Straus, 1997). Hence, aspects of community important to higher education may be difficult to realize in text-based asynchronous computer-mediated distance education environments (Gram, *et al.,* 2004).

IMPACT OF TECHNOLOGIES ON IDENTITY FORMATION

Technology-mediated communication is a complex process. In particular, it is a complex multimodal process that involves not only speech, but also gaze, gesture, and facial expressions (Clark & Brennan, 1991, Clark, 1996). This research has given rise to the belief that multimodal technologies (such as video conferencing that provides both speech and vision) provide more effective communication than single mode technologies (such as audio conferencing or email and listservs). Somewhat surprisingly, research has not supported this assumption. A review of the research shows that speech alone can be as effective as speech plus video; under certain circumstances speech can be as effective as face-to-face communication and video is not significantly different from speech communication (Reid, 1977; Whittaker, 2003). Some research has even revealed that adding visual information may impair critical aspects of spoken communication (Anderson, *et al.*, 2000). Further, there is evidence from the research on communication media which indicates that audio systems (e.g., Elluminate, Centra), and audio and video systems (e.g., Web cams) can provide more effective interpersonal interactions than text-based communication systems alone (Collett, *et al.*, 1999). Though, this research should be interpreted with caution, as low quality video systems (e.g., discontiguous visual and audio transmissions) may provide distractions to a point where the communication process and the quality can be severely eroded (Whittaker, 1995; Whittaker, 2003). Currently, Internet networking bandwidths do not support high quality and/or stable video and audio systems.

Some research within the field of communication has also focused on aspects of media richness and/or the effects of filtered cues. Results of this research suggest that different communication media affect groups largely through differential transmission of social context cues (or paralinguistic cues). Text-based computer mediated communication is considered to be 'social cueing poor' as it limits the exchange of paralinguistic and interpersonal cues (e.g., age, sex, physical appearance) and other physical surroundings. Social cueing is an important aspect that facilitates and regulates interpersonal interaction, information and monitors feedback (Straus, 1997). Reductions in social cues through the use of reduced-channel media (e.g., text-based communication tools) disrupts the flow of communication causing difficulty in following and understanding discussions (Straus & McGrath, 1994). This can result in diminishing the intensity of interpersonal interactions and social connectedness, as well as increasing a sense of anonymity and feelings of depersonalization (Straus, 1997). In a depersonalized context, in

turn, there is reduced motivation to share personal information and/or inquire about others, as well as reduced expressive communication (Hiltz, *et al.*, 1986). Explanations for these results tend to revolve around the belief that the time and effort required to type versus speak results in considerably less communication in text-based discussions than face-to-face in addition to difficulties in following and understanding the text without supplementary social cues, adding to the cognitive workload (Straus, 1997).

Groups have access to a variety of interchanges: students of the same age interacting with their peers, younger students interacting with older students, and all students interacting with the instructor or various experts. Through this reciprocal interchange among several groups, novices adjust their perceptions and make new choices of language and activities. The computer is used as a tool to facilitate multiple interactions, since students of various ages are commonly placed in the same e-learning classroom. Younger students experience social relations differently from their instructors or older classmates, since the machines they use to mediate their communication often substitutes for face-to-face relations (e.g., Internet chats, cell phones). These technologies enable private subcultures to grow and exist in the public sphere. Hayles (2004) states that our ideas of the body change along with cultural changes, and declares that body boundaries intermingling with technology and information-rich environments leads to shifts in habits, postures, enactments, and perceptions.

DISCUSSION

While there is much we do not know about technology-mediated communication, we can glean from this literature that communication is a complex process. The purpose of this paper is to argue that communication and all its complexities in social interaction needs to be considered in terms of shaping both student and teacher identities with technology playing a non-neutral rather than passive role. Understanding how the non-neutral effects of technology affects students' experiences within the social context of distance learning could also provide distance educators with better insight into designing improved instructional environments which promote critical discourse while addressing a greater number of students' individual needs. Through social interactions in a local community-based practice, language, tools, symbols, and cues are used to objectify and communicate our concepts. Diminished social cues have also been shown to engender social apathy and foster socially undesirable behaviour. Students enter into dialogue with one another having also come from diverse ethnicities and a variety of personal experiences largely shaped by the technological devices which enable specific types of communication in the society within which they have been immersed. Important clues contained in interactive processes between humans in social networked systems may provide an increased level of adjustment by these systems to address the level of cognitive support required by learners. By furthering our understanding of various e-learning processes, we can ensure that the best possible educational scenarios emerge and are translated from theory into practice.

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