

TRAINING EFFECTIVE VIRTUAL TEAMS

Presence, identity, communication openness, and conversational interactivity

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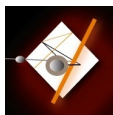
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A recent survey of professional communication practitioners (Blythe, Lauer, & Curran, 2014) shows the broad range of technologies they use to collaborate across an equally broad range of topics and communication purposes. Responses to the survey also demonstrate that effective collaboration requires more than versatility in the use of technology. Collaboration requires communication openness and conversational interactivity among work team members. Geographically-distributed virtual teams often find this openness and interactivity difficult to achieve (Jarvenpas, Shaw, & Staples, 2004). Several computer-mediated communication theories suggest the influences of social presence and online identity on team openness and interactivity. The study reported here draws on the insights of these theories to analyze the focus group responses of 200 participants who completed a virtual-team training program. The analysis shows a complex relationship of presence and identity to communication openness and conversational interactivity. A discussion of responses adds to an understanding of the types of training methods that best prepare participants to communicate in geographically-dispersed professional communication teams.

Keywords. Presence, Identity, Trust, Communication, Openness, Interactivity, Virtual teams.



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Effective teamwork requires communication openness and conversational interactivity among team members (Jarvenpas, Shaw, & Staples, 2004). Members of online virtual teams often express concern over a lack of openness and interactivity among members. Such factors can become more pronounced when geographically-dispersed individuals meet to work as teams in online virtual spaces. As a result, individuals can benefit from a better understanding of the dynamics affecting the openness and interactivity of virtual teams.

This article presents the results of a study designed to investigate the relationship of presence and identity to openness and interactivity in virtual teams. The study took a “communication as design” intervention and invention approach to creating a more effective virtual-team communication training program (Aakhus, 2007, p. 112). Communication as design occurs in the intentional creation of specific techniques, ongoing intervention activities, and invention of procedures designed to reshape the possibilities for interactivity within a communication medium. The purpose of the present study was to examine the habits, practices, expectations, and technology uses that participants have built up within a communication medium. The results, in turn, provide us with insights on how to create an intentional design program to actively advance participant knowledge about the influences that shape, structure, and condition the communicative discourse within that medium (Aakhus, 2007). Through examining such issues, individuals can gain a better understanding of the factors that affect interactions in geographically-dispersed virtual teams as well as insights into what training activities can help prepare participants to work in such contexts.

Presence and Identity

Participant presence and identity are important to virtual team communication. *Presence* is a psychological state in which virtual objects are experienced in a sensory way that is associated with a level of interpersonal warmth and intimacy (Lee, 2004). *Identity* includes the presentation of self and trust in how others

present themselves. Identity “is a crucial element for any social interaction” (Junglas, Johnson, Steel, Abraham, & MacLoughlin, 2007, p. 91).

Presence

Presence is a broad term that includes conceptualizations of telepresence, social presence, copresence, and social copresence (Aymerich-Franch, 2010; Lee, 2004). Telepresence describes a person's psychological state and subjective perception as affected by, and filtered through, the technology (Lombard & Jones, 2007; Nowak & Biocca, 2003). Becoming immersed in the reality of a movie or a video game is an example of telepresence. Social presence describes the degree to which a communication medium facilitates social-emotional communication as well as information exchange (Short, Williams, & Christie, 1976). With more social presence, participants can more easily express emotions and develop relationships.

Copresence defines the sense of connection felt with other participants (Nowak, 2001). Social copresence expresses a mutual sense of social connectedness, relational communication satisfaction, and emotional accessibility among participants (Fägersten, 2010). So, with copresence participants feel others are present with them. With social copresence, participants perceive whether those others have similar feelings or emotional responses. Each of these aspects of presence affects how participants present themselves in an online virtual team, the trust they place in the presentations of others, and how much communication openness and conversational interactivity they engage in within the team.

Identity

Establishing an online identity and reputation is also important for participation in a virtual team. The relative anonymity of online virtual worlds, however, can make identity development somewhat difficult (Junglas et al., 2007). Three theoretical perspectives—the social identity of deindividuation effects (SIDE) model (Postmes, Spears, & Lea, 1998), social information processing (SIP) model (Walther, 1994), and hyperpersonal perspective (Wang, Walther, & Hancock,

2009)—consider the influences on virtual identity development. In summary, the SIDE model focuses on the influence of the medium, the SIP model emphasizes the human agency in construction of an online identity, and the hyperpersonal perspective explores the strategic use of the medium in identity construction and relationship development. Together, these three perspectives provide some basic insights into the multiple influences of identity on virtual team communication.

Social Identity of Deindividuation Effects (SIDE). The SIDE model emphasizes two main effects of the reduced social cues/lack of nonverbal cues available in computer-mediated communication (CMC). The first effect is that communicators overemphasize the remaining cues found in the communication style, word choice, paralinguistic peculiarities, and typographic language (Postmes, Spears, & Lea, 1998). For example, to develop their opinions about others, individuals focus on the words used rather than the facial expressions and vocal intonations that are available in face-to-face situations. These cues promote more stereotypic assumptions about a participant's class, gender, race, ethnicity, and social identity in ways that affect group participation and relationship development (Hancock & Dunham, 2001).

The second effect is how visual anonymity decreases a person's self-awareness and increases group identity and conformity (Sassenberg & Boos, 2003). The SIDE model argues, therefore, that by obscuring certain social cues, CMC encourages more stereotypical communication and conformity to group norms (Flanagin, Tiyaamomwong, O'Connor, & Seibold, 2002; Rains, 2007). So, in online contexts, individuals are more likely to go along with a group decision than to think critically about an outcome.

Social Information Processing (SIP). Social information processing focuses on the strategies of communicators who actively engage in CMC. Team members strategically substitute verbal content for missing nonverbal cues and adapt their information-gathering strategies to make use of the medium's characteristics

(Walther, 1994). Common examples of such substitutions include explicit verbal statements of emotion and relationship, such as “I am happy with the outcome” and “I enjoy working together.” The relative paucity of vocal and physical cues means that information gathering and communication may be slower, and communicators may require more time to develop interpersonal relationships (Tidwell & Walther, 2002). Active communicators, however, develop those relationships nonetheless (Walther, 1994).

Hyperpersonal Perspective. The hyperpersonal perspective acknowledges the impoverished social cues, use of verbal substitutions, time needed for relationship development, and effects of anonymity (Walther, 1996; Wang, Walther, & Hancock, 2009). Communicators, however, are motivated to be liked by others. Participants, therefore, strategically plan, compose, edit, and review their messages; consider their responses; and strategically manage the social information they present to construct a desirable self-image (Tidwell & Walther, 2002; Walther & Parks, 2002). Hence, participants may show a greater tendency to overstate or exaggerate their professional experience or expertise.

Through a reciprocal process of impression management, group members form mutually-idealized perceptions of each other that encourage more open communication. This open communication can reduce interpersonal inhibitions, facilitate greater self-disclosure, and encourage the development of personal relationships (Pena, Walther, & Hancock, 2007). These relationships further facilitate interpersonal trust, intimacy, affection, and positive emotion in ways that often surpass face-to-face interactions (Robinson & Turner, 2003; Walther, 1996).

These theoretical perspectives recognize that presence and identity are strong influences on virtual team communication. Presence affects a person's communication openness and conversational interactivity within the group. Telepresence with the medium, personal social presence within it, copresence with others, and social copresence in the feelings of mutual awareness and understanding among group members all influence participation in the group.

Identity affects group communication and relationship development in complex ways. The reduced social cues, potentially skewed impressions, and visual anonymity all affect how participants present themselves and get to know each other.

Media Naturalness

Media naturalness, a psychobiological theory, predicts that variations in cognitive effort are demanded by a communication medium based on human evolution (Kock, 2004). Media naturalness thus offers an evolutionary theory that predicts that cognitive effort, time, and experience also play a role in developing virtual team communication (Kock, 2004). According to the tenants of media naturalness, participants use cognitive schema (how people are expected to act) and social abilities (how one should respond) to manage presence and identity. These cognitive schema and social abilities also affect a virtual team's communication openness and conversational interactivity.

Through biological and neurological adaptations, human sensory motor organs and brain functions have become optimized for communication in a synchronous, face-to-face medium that uses auditory and visual cues (Kock, 2005). In essence, the ability to communicate through speech and hearing has become important to human cognitive processing. Consequently, a communication medium that incorporates speech, facial expression, body language, colocation, and synchronicity, appears more natural and facilitates more complex human communication. The less a communication medium incorporates speech, the greater the cognitive effort required to convey and understand each other's meanings. For example, face-to-face conversation is more natural than using the telephone, while the telephone feels more natural than email. The more natural a medium, the more easily people can align their mental schema and coordinate multiple, potentially disparate, meanings through their communication. It is, for example, typically more difficult to accurately interpret a complex relational meaning expressed in an email than in a face-to-face conversation. People can, however, learn the new cognitive schema and social

abilities needed to communicate through a less natural communication medium (DeRosa, Hantula, Kock, & D'Arcy, 2004.) This learning takes time, cognitive effort, and experience (Kock, 2008; Kock, Verville, & Garza, 2007). When people develop these new cognitive schema and social abilities, however, the medium feels more natural and participants become more effective in their communication (Kock, 2004, 2005).

Trust, Openness, and Interactivity in a Virtual Team

Interpersonal trust, communication openness, and conversational interactivity are important to team effectiveness but can be difficult to develop in a virtual team. This is particularly true when the members are geographically-dispersed and have never met. Developing the social presence and online identity of team members can enhance their trust, openness, and interactivity.

Trust

Trusting a team member means believing that person will be responsive, competent, and benevolent as well as show integrity in interactions. Trust is based on an assessment of the potential for violations of one's expectations and develops over time in each person's willingness to take a chance and become vulnerable to the other team member (Feng, Lazar, & Preece, 2004; Himelboim, Laricsy, Tinkham, & Sweetser, 2012; Sarker, Ahuja, Sarker, & Kirkeby, 2011). In face-to-face relationships, trust typically is based on a person's appearance, facial expression, communication style, and social reputation (Morrison, Cegielski, & Rainer, 2012). In geographically-dispersed virtual teams with little or no face-to-face interaction, trust is associated with degrees of presence, identity, and cognitive schema, built up through experiences with the medium (Beldad et al., 2010; Leonard & Toller, 2012). Anonymity, reduced social cues, and optimized messages, when combined with a lack of cognitive schema and social ability, can slow the development of trust in an online virtual team (Beldad, Jong, & Steehouder, 2010; Turilli, Vaccaro, & Taddeo, 2010). Developing this mutual

understanding and trust can be particularly difficult when group members come from diverse backgrounds. An absence of trust negatively affects group communication openness and conversational interactivity (Himmelboim et al., 2012; Sarker et al., 2011).

Openness and Interactivity

Communication openness and conversational interactivity are closely related concepts. *Communication openness* describes the level of comfort and ease with which participants share their thoughts, opinions, and emotions in conversation (Ayoko, 2007). This openness is revealed in a person's willingness to self-disclose personal information (Jourard, 1971). *Conversational interactivity* includes both communicator style (i.e., how someone presents information) and responsiveness (i.e., how someone reacts to information that has been presented).

Communicator style involves the degree to which a communicator is contentious, open, dramatic, dominant, precise, relaxed, friendly, attentive, animated, and cooperative (Tu & McIssac, 2002). Responsiveness describes the timeliness, immediacy, synchronicity, rate of information exchange, and feedback of participants in a conversation (Tu & McIssac, 2002). Interactive conversations are more immediate, synchronous, and dialogic.

Communication in a Virtual Environment

In a virtual world, a participant presents and establishes an online identity through an avatar. This avatar is “a manifestation of the self beyond the realms of the physical, existing in a space where identity is self-defined rather than pre-ordained” (Reid, 1994, p. 38). The sophistication in avatar design and perceived realism of the three-dimensional virtual space produce a sense of presence.

Participants meeting in a virtual environment report high levels of social presence as they participate with others perceived by them as avatars (Aymerich-Franch, 2010). Through their avatar-based communication, participants can develop an identity, assess each other's trustworthiness, and engage in

communication openness and conversational interactivity (Leonard & Toller, 2012; Morrison et al., 2012,). In such contexts, participants compensate for reduced social cues, take advantage of the alternative cues that environment provides, and develop group communication that is effective and responsive (Turilli et al., 2010). An individual's verbal and nonverbal communication choices—such as the words, conversational topics, verbal style, avatar appearance, and frequency of interaction—provide explicit and implicit cues. (For example, word choice can set a more formal or informal tone; express class and cultural differences; and provide age, gender, and ethnic background markers.) Through word choice, a person can strategically reveal or conceal personal information to represent an idealized self, present certain aspects of a personal self, and construct an identity that affects group communication openness and conversational interactivity (Adrian, 2008; Gottschalk, 2010).

The study presented here examines the relationships of presence and identity to communication openness and conversational interactivity in geographically-dispersed work groups. The authors used qualitative analysis of focus group data to investigate these relationships as they occur in task-oriented virtual project training teams. The objective of this research was to examine the habits, practices, expectations, and technology uses of participants, and to intervene with a specific set of techniques, activities, and procedures to reshape the communication openness and conversational interactivity for more productive virtual team meetings.

Research Questions

Two main research questions frame this examination.

1. How do geographically-dispersed virtual team members develop a sense of presence, identity (as expressed in self-presentation and trust in others), communication openness, and conversational interactivity?

2. How do differences in the presence and identity of geographically-dispersed team members affect the communication openness and conversational interactivity of virtual work teams?

To address these questions, the authors used a communication as design approach (Aakhus, 2007). Over the course of five years, the team communication projects and activities of a training program were strategically modified, in response to focus group feedback, to provide more positive opportunities for social presence and online identity development. This approach resulted in positive changes to team communication openness and conversational interactivity.

Method

To examine the pattern of relationships among presence, identity, communication openness, and conversational interactivity, the researchers used responses from five focus groups having an average of 40 team members each ($N=200$). All virtual team members enrolled in the training program were encouraged to participate in these focus groups. Institutional Review Board approval was obtained for this study through the first author's institution. The focus groups were held in Second Life® at the conclusion of each of five 12-week projects. Second Life is one of the largest and most well-known three-dimensional virtual worlds used by professional organizations today. Numerous for-profit and non-profit professional organizations, including the American Cancer Society, Coca-Cola, Crescendo Design, Kraft Foods, IBM, Pepsi, Pizza Hut, and Starwood Hotels, use Second Life for geographically-distributed virtual team meetings (Sherblom & Green-Hamann, 2013).

The project leaders of these training programs were well versed in CMC and Second Life. They also had experience with teaching interpersonal and small group communication online. These leaders provided the training sessions on a virtual campus in Second Life. Participants who had no prior experience communicating in Second Life performed a series of individual and team focused professional work-related tasks. These tasks included individual research and

interviewing assignments, group discussion, decision making, problem solving, and report writing summarized as follows:

1. Research assignments included going to Second Life historical sites, libraries, museums, shops, pubs, and nonprofit agencies to explore the values and culture of diverse communities in Second Life. From these visits participants learned the diversity of community values and orientations.
2. Interviewing involved asking Second Life residents about their personal media use. Participants learned to question their assumptions about standards of media use.
3. Each team of four or five members had a specific meeting place in Second Life to discuss their research findings and develop each of two consecutive research reports. The first report was on media use and a second one was on the characteristics and values of a particular virtual community in Second Life. Writing these collaborative reports involved extended online virtual team discussion, decision making, and problem solving. During the first project, participants learned some of the challenges of working and writing together in an online virtual environment. In the second project, they applied their knowledge and honed their skills.
4. Each team made written and oral presentations of their media use and virtual community reports to the larger participant group. These reports provided an opportunity for reflection on initial assumptions about standards of media use, community values, and, more importantly, initial impressions formed of the other members of the virtual team.

At the end of each 12-week project session, focus groups were held. These 40-minute focus groups, held in fall 2008, fall 2010, spring 2011, fall 2011, and fall 2012, were facilitated by a project leader not involved in the training session. Participants in each focus group responded to a series of open-ended questions. See Appendix A for a list of these focus group questions.

Based on responses made in these focus groups, the training leaders collaborated to refine the activities used to increase participant exploration of the virtual environment, research, interviewing, communication, and team-building skills for the next session. In addition, the project leaders introduced changes between the training sessions to the use of communication channels. For example, in the fall of 2008, participants used only text for the projects. In the fall 2010, spring 2011, and fall 2011 sessions, project leaders used audio chat (voice) along with text to provide instruction, while team participants continued to use text only. In the fall 2012 session, each team selected one team participant to deliver voice presentations summarizing their projects.

The authors used a constant comparative method to analyze and thematize the participant focus group responses (Strauss, 1987; Strauss & Corbin, 1990). Each of the authors individually coded the focus group participant comments to identify ideas and themes. Then, in a group meeting, the authors compared and discussed each individual code until consensus was reached over the meaning and thematic placement.

For the purposes of this process, a participant idea was considered the unit of analysis. For example, each of the following utterances expressed an idea as part of a longer statement: “It was hard to get your point across”; “Some people can be more open”; and “Group communication was better in Second Life because everyone felt like they had a role” (see Appendix B). Hence, a participant could offer several ideas within one message or complete one idea across several consecutive messages that were interrupted by comments from other participants (Krippendorff, 2004). This analytical approach allows for the investigation of patterns that emerge in discussion of experiences.

The authors grouped similar expressions into coherent and consistent themes such as participant comments about presence, avatar presence, and telepresence. During the process, the authors compared each new idea to the previously created themes. If an idea did not fit into one of the existing themes, a new theme was created. For example, expressions of concern over another member's anonymity, deceptive self-presentation, and trust between team members became a second theme. Themes with substantial overlap were merged

(Creswell, 1998). Through this coding-comparison-consensus process, four major themes emerged.

Results

The study identified four major themes from the responses of participants in geographically-distributed virtual teams: presence, identity, openness, and interactivity.

1. **Presence.** The first theme includes participant discussions of presence in expressions of embodiment, connectedness to one's avatar, and connection to others.
2. **Identity.** The second theme considers issues of identity, as expressed in self-presentation and trust in the presentation of others. Self-presentation includes concerns over authentic representations of self. Trust in others includes concerns about being deceived and judgments about the degree of commitment and accountability shown by **team** members.
3. **Openness.** The third theme is communication openness as expressed in a willingness to communicate **and** the level of comfort in sharing ideas and opinions.
4. **Interactivity.** The fourth and final theme focuses on conversational interactivity in the rate and amount of contribution, equality of participation, and interactive conversational nature of the team communication.

It becomes clear that social presence and online identity are necessary for communication openness and conversational interactivity. Participant experiences of presence and identity change across the five time periods (fall 2008, fall 2010, spring 2011, fall 2011, fall 2012) and the communication openness and conversational interactivity of the teams change with them. Descriptions of how these themes emerged from each focus group are presented below; see Appendix

B for more examples of participant comments supporting each theme from each focus group.

Fall 2008 (Both project leader and participants use text only for communicating.)

In the fall 2008 focus group, participants show a relative lack of presence as evidenced in statements about it being “harder to connect with others” and “judging the person behind the avatar.” This lack of presence connects to concerns of identity and mistrust in the identity of others expressed in comments such as “I don't really know who I am talking to,” “it is harder to get to know someone in Second Life because people can be... someone that they are truly not,” and “deception is a big factor.” These concerns lead to difficulties with communication openness as seen in statements such as “being honest but coming across nice can be difficult” and “you didn't want to make people mad but also didn't want others to take over or not do their part so being honest is necessary at times.” Participants described communication as challenging (e.g., “to get your point across you had to say it more than one time” and “I had a difficult time keeping up”). The fall 2008 focus group participant statements focus on the difficulties of group discussion in Second Life and show a lack of social connectedness.

Fall 2010 (Project leader uses voice and participants use text only for communicating.)

Focus group participants in the fall of 2010 still express a separateness and distance from their avatars in comments such as “My avatars don't influence my actual behavior,” but indicate somewhat greater presence in talking about being a “somebody” in the virtual team (e.g., “It was weird to be somebody else.”). They show an explicit consideration for how they present themselves in the virtual team in statements like “It felt like I was presenting another side of my personality.” This interest in presenting an idealized self-image conveys a sense of connection to others, and a greater sense of identity, trust, and level of comfort in sharing their ideas and believing that others are listening (e.g., “I didn't feel as nervous.

The barrier made me more comfortable in expressing my ideas and feelings.”). Their concern for getting to know each other shows a change in their perceptions of presence, identity, trust, and openness, even while some conversational interactivity concerns persist. They still comment on their inability to coordinate their talk as a team in comments such as “It was hard to keep up with the conversation sometimes because so many people were typing at once.”

Spring 2011 (Project leader uses voice and participants use text only for communicating.)

The spring 2011 focus group participants express more connectedness to their avatars in their use of “I” language, and show more presence in their virtual teams in statements such as “I decided to change my race,” “More residents spoke to me when I was a pretty girl,” and “I didn't feel like it mattered what I looked like too much.” Identity and trust become explicit topics of discussion. This talk focuses on seeing one's avatar as representing a real-world self (e.g., “When my avatar represented my RL identity it was easier to talk to people.”) and believing that one can read others' identity cues (e.g., “You get to know them differently. You can find information that they may have not presented to you F2F.”). Participants make positive expressions of trust and communication in the virtual team. Communication is seen as open, comfortable, and heard in comments such as “It can be easier to disclose” and “Some people can be more open because they are normally socially awkward but they feel more secure in SL.” These positive statements of openness foster honesty in self-disclosure and a sense of getting to know each other. Participants still express some concern for keeping up with the conversation, but describe the communication openness and interactivity in more positive terms (e.g., “It was easy and hard at the same time. It was easy because it easier to be honest about your opinions, but harder because it takes longer for a response.”).

Fall 2011 (Project leader uses voice and participants use text only for communicating.)

In the fall of 2011, participants express a presence with their avatars and with others in the virtual team. Their statements contain an increased use of “I” when talking about the avatars, showing an increased presence and identification (e.g., “I was more outgoing as a fox than as a human,” “I made my hair green,” and “I felt more comfortable in skin that looked like mine.”). Their self-presentation statements such as “you got to know your group members” and “have to trust that someone will actually do their part on time” focus attention on team tasks, getting to know others, and expressions of trust. They show a greater level of comfort in exchanging ideas (“everybody had ideas and wasn’t afraid to say them”), more humor in their communication (“we put a lot of humor in our chats”), and less embarrassment (“messing up was never embarrassing”). They convey standards of professionalism for team interactivity and expect others to respond in a timely manner in statements such as “If it takes too long to answer I find it unprofessional” and “Responding quickly makes things more efficient.” Their statements indicate their greater willingness to communicate more openly and also reveal more conversational interactivity in faster, more spontaneous responses.

Fall 2012 (Both project leader and participants use text and voice for communicating.)

The fall 2012 focus group responses show a change in the conceptualization of presence with a recognition of the communication differences that occur at different locations in Second Life such as “I found that the perception of my avatar, and myself as a user, varied based on location in addition to avatar appearance alone” and a concern for the impressions they personally make on others: “I found myself worrying about whether I was boring or annoying the people I was interviewing.” Identity statements include concerns over being perceived as a “newbie” (a Second Life novice) and an increase in identification as a group and more trust and comfort with members of the group (e.g., “Personally, I felt more comfortable and trusting and “the group started to trust and be more

open to one another.”). Recognizing subtler differences in location, as well as appearance, shows the influence of experience on identity, which affects interpersonal trust, openness and interactivity on the team. The more the team works together, the more members become comfortable, relaxed, and willing to share ideas. Participants describe greater conversational interactivity in a willingness to work together (“We started working together more than individually.”), strategically confirming each other's ideas (“Group communication was better in SL because everyone felt like they had a role and had to confirm when someone talked.”), and making decisions as a team (“We made decisions as a group.”).

Discussion

The focus group responses show a pattern of interrelated differences in participant presence, identity, trust, communication openness, and conversational interactivity. When participants perceive more presence, they also express greater identity in presentation of self and in trust of others. With greater presence and identity come team communication openness and conversational interactivity.

A summary of the focus group results shows that in fall 2008 there is a lack of presence and trust along with difficulties in team communication openness and interactivity. Fall 2010 shows a greater sense of presence and identity is expressed, and there is an engagement with the medium and concern for others as well as an increase in communication openness and concern for the process of interactivity rather than just the mechanics of communicating. In spring 2011, a greater sense of self-presence, identity of the self, and of the social presence others emerge along with an increase of communication openness and interactivity demonstrated in higher rates of disclosure and lively discussion. Fall 2011 demonstrates an even greater sense of presence and identity through strategic choices in self-presentation and getting to know team members as well as an increase in communication openness (humor and lack of embarrassment) and interactivity (quickness of responses, coordination of talk, expressions of honesty, and expectations of professionalism). Finally, the fall of 2012 presence is

presented in terms of “being there” with others. Identity roles are expressed in appearance, accountability, comfort, trust, and the ability to work together in this virtual environment. Communication openness, expressed through the sharing of ideas, making contributions, and expressing concerns, becomes more relaxed and comfortable as the team works together. This conversational interactivity is perceived as leading to better team decisions. Communicating through the virtual medium may slow down their sharing of ideas, but respecting the roles, developing explicit expectations of others, and achieving a common group goal gets easier with experience.

This changing pattern of responses across the five focus group sessions shows a growing sense of presence and identity. With greater presence and identity come more interpersonal trust, communication openness, and conversational interactivity. The 2008 participants express concerns over the reduced social cues and visual anonymity. As the social identity of deindividuation effects model suggests, this concern leads to an expressed anxiety for the potential of deception and comparatively less trust, openness, and interactivity in the team. The 2010 participants focus on active, strategic means of presenting themselves and for gathering information about other participants. The 2011 participants shift the conversation further to a self-presentation of their real-life identities.

As social information processing predicts, these teams express increasingly less concern with deception and focus more on ways of strategically gathering information from the multiple available sources in the medium as a way of getting to know team members, although these methods are somewhat different than those used in face-to-face relationships. Following a hyperpersonal perspective, the spring 2011 participants describe editing their social cues and self-presentations, getting to know other team members in a positive way, and trusting those others to do their part of the work. The 2012 participants move beyond these self-presentation concerns to expressing a desire of not wanting to bore or annoy their fellow participants. Media naturalness theory argues that these changes in presence and identity represent shifts in the cognitive interpretive schema enacted by participants.

As participants learn new cognitive schema and social abilities appropriate to the communication medium, they become more comfortable in their relationships and shared understandings. This increased level of relational comfort leads to more interpersonal trust, which stimulates greater team communication openness and conversational interactivity. The increased openness and interactivity, in turn, create a more efficient and effective communication medium through which team members can better get to know each other, and more easily coordinate and manage their multiple meanings.

The training program developed in ways that helped participants explore individual, personal, social, geographic, and cultural differences in media use. For example, various training sessions involved interacting with a Canadian university group, a Norwegian military organization, and an instructor presenting an online lecture while being physically located in Beijing. Group discussions after each of these sessions sharpened participant focus on personal-cultural assumptions and the need for explicit communication to negotiate multiple, diverse understandings. Even among geographically-dispersed team members within the same cultural group, the need to strategically use the medium to generate greater communication openness, conversational interactivity, and coordinated team member understanding became apparent. Learning to expect differences in understanding, rather than assume implicit agreement among team members, and finding ways to explicitly discuss those differences in assumptions and orientations became key aspects of the training program.

Conclusions

The purpose of this study was to create a more effective virtual-team communication training program by using a communication as design intervention and invention approach (Aakhus, 2007). The intent was to design and modify an ongoing set of practices, procedures, and intervention activities for use in the communication medium that facilitate participant knowledge of the influences that shape, structure, and condition communicative discourse in virtual teams.

The human process of communication is not distinct from the medium within which it takes place (Fenwick, 2010). There is a relationship between the human action and the technological context that affects the online communication and knowledge sharing within the potentialities and affordances of the technology. Participant assumptions and communication medium factors influence a virtual team's communication and interactivity in ways that affect team development and knowledge sharing (Majchrzak, Faraj, Kane, & Azad, 2013). Participant knowledge, skill, and expertise cannot be isolated as single elements or dimensions of the larger communication system. Shared team understandings and ways of interacting constantly emerge through the communication, and the influences of the medium continuously interact with that emergent process in ways that bring forth that shared understanding. Professional communication practitioners can enhance the effectiveness of their communication within the medium by using specific communication strategies that make use of those influences.

Communication is key to training geographically distributed virtual team members who meet in online environments. An effective training program must influence the communication patterns in ways that validate participant contributions and construct positive group dynamics within that medium. The present results show that

1. Improvements in a participant's skills in using a technology and changes in expectations for communicating through that technology can facilitate team communication. These changes in skills and expectations are necessary but not sufficient to establish greater presence, identity, trust, openness, and interactivity.
2. Experience and expertise with a medium, however, can improve a participant's sense of presence, identity, trust, openness, and interactivity through the formation of more effective cognitive schema and social skills in using the medium.

3. Participants who develop these skills, experience greater presence and identity, and demonstrate more communication openness and conversational interactivity.
4. A training program that focuses on specific virtual communication strategies that describe the communication choices made, and explicitly explores the resulting thoughts, feelings, and perceptions of participants, can facilitate the development of an online presence and identity.
5. A training program in which participants are held accountable for thinking about communicating strategically and encouraged to listen to diverse opinions develops a better sense of mutual trust that facilitates participant motivation to collaborate in virtual team decision making.
6. Encouraging reflective virtual team observation, such as explicitly describing an experience from multiple perspectives, imagining how others might interpret the event, and considering alternatives, helps develop a complex cognitive schema among team members.
7. Training participants to pay attention to issues of social presence and online identity facilitates their cognitive schema development in ways that benefit team communication openness and conversational interactivity.
8. Actively evaluating the communication behaviors that occur in the virtual team; describing the strengths, weaknesses, and influences of the medium when communicating through a technology; considering the resulting group dynamics; and reflecting on ways to improve team decision-making and problem-solving, help to build communication openness and conversational interactivity.

The present study's results demonstrate the development of participants' abilities to use the technology and, through explicit reflection on their assumptions and expectations of communicating through that technology, facilitation of a greater sense of presence, identity, trust, openness, and interactivity. The "communication

as design” intervention activities and tasks employed in the present project included both individual and team chores that helped participants become more familiar with communication in Second Life. The individual tasks were designed to facilitate participant development of their own sense of presence and identity within the medium. The team tasks provided participants the opportunity to develop a sense of presence, identity, and online reputation within the presence of others with whom they worked. These activities improved the participant ability to collaborate with others in the virtual environment. Both the individual and team activities helped build communication skills so team members experienced the medium as more natural, and their collaboration became more effective and efficient within the team.

Today's professional communication practitioner must choose both an appropriate communication medium, including the simultaneous use of multiple technologies, and the communication strategies to engage in each stage of a team's collaboration. To choose the best medium, today's professional communicators must become broadly knowledgeable and competent in the use of technology, but technological proficiency alone is not sufficient. Increases in personal knowledge, experience, and skill with a medium can lead to a reduction in CMC apprehension, an increase in motivation, and an ability to communicate through the medium in ways that positively affect presence, identity, openness, and interactivity (Sherblom, Withers, & Leonard, 2013).

Communication training programs that go beyond just developing expertise with a medium and facilitate communication presence and identity can foster more effective personal cognitive schema, social skills, group communication openness, and conversational interactivity in a virtual team. Training programs that include activities designed to specifically develop participant awareness of others can increase that sense of presence and identity. Explicit training exercises that use guided experience and growth in expertise with the medium can increase virtual presence and online identity. Consistent with media naturalness theory, as participants perceived the online environment as a more natural communication medium, they reported an increased sense of presence, identity, trust, openness, and interactivity. This, in turn, facilitated team

communication openness and conversational interactivity, and team decision-making and problem-solving effectiveness followed.

Limitations and Future Research

There are, of course, limitations to this study that should be considered along with these implications. The present results provide strong evidence of a relationship among presence, identity, trust, openness, and interactivity, but given the nature of the present study, a causal relationship cannot be established at this time. To better understand the complexities of relationships and influences, future studies should explore the causal relationships among presence, identity, trust, openness, and interactivity more fully. ■

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Appendices

Appendix A: Focus Group Questions

Directions: Please have a seat. We're going to get started with general questions and comments about the collaboration projects.

1. Describe your experience communicating with the other residents of Second Life (SL) using your avatar.
 - Did other SL residents communicate differently with you based on your avatar?
 - Why do you think there were differences in the communication?
 - Why do you think there were no differences in the communication?
2. Let's move to any comments you have about each of the team projects you completed. How would you describe your team's communication during the team project?
 - What worked well in terms of the team's communication on the project?
 - What were the challenges to team communication on the project?
 - How did your team overcome those challenges in the project?

3. During the second team project, did your team's communication change now that you were an established team? How?
 - Any changes in the team's dynamics?
 - Use follow-up questions as necessary to get specific examples.
4. What did you like about communicating in Second Life (SL)?
 - How do you think SL compares to face-to-face (FtF) communication? How does SL compare to other forms of computer-mediated communication (CMC)?
 - Can you think of situations in the future in which using SL might be advantageous?
5. What did you not like about communicating in SL?
 - What are the disadvantages to communicating in SL?
 - What strategies did you use to try to overcome these disadvantages?
6. Did you choose any other technology (in addition to Second Life) to communicate with your team during these projects? If so, which media did you choose, and why?
7. How did you feel about communicating using the combination of text and voice?
8. How did you feel about the use of voice for the team presentations?
9. If you logged in to Second Life from home (or elsewhere), how did that affect your communication with the team?
10. How will your experience here help you adapt to new technologies in the future?
11. Any final thoughts? Thank you for the feedback.

Appendix B: Sample of Focus Group Participant Comments¹

Focus Group Participants (N = 200)	
Presence	
Fall 2008 (n=33)	<p>We get to be cartoon characters.</p> <p>We still have stereotypes, because in SL you are judging the person behind the avatar, you are judging the avatar.</p> <p>It is harder to connect with others.</p> <p>I think that I felt more connected with [others] in RL.</p>
Fall 2010 (n=37)	<p>It was weird to be somebody else.</p> <p>My avatars don't influence my actual behavior.</p>
Spring 2011 (n=52)	<p>I decided to change my race.</p> <p>More residents spoke to me when I was a pretty girl.</p> <p>People were more likely to talk to me when I was skinnier.</p> <p>When I looked like the Kool-Aid man my interactions were more superficial.</p> <p>I didn't feel like it mattered what I looked like too much.</p>
Fall 2011 (n=38)	<p>People were much friendlier to me when I was a robot avatar.</p> <p>More people talked to me when I was a girl.</p> <p>I was more outgoing as a fox than as a human.</p> <p>I made my hair green.</p> <p>I felt more comfortable in skin that looked like mine.</p>
Fall 2012 (n=40)	<p>People could totally tell if you were a newbie.</p> <p>I found myself worrying about whether I was boring or annoying the people I was interviewing.</p> <p>It might just be the location because some people were talking to me the same when I was a male as when I was a female.... It might just be some places are more uptight.</p> <p>Much easier to get people to talk to you as a female.</p> <p>I found that the perception of my avatar, and myself as a user, varied based on location in addition to avatar appearance alone.</p>

¹ Note: CMC = Computer-Mediated Communication; F2F = Face-to-Face; IM = Instant Message; RL = Real Life; SL = Second Life.

Identity/Trust

Fall 2008
(n=33) I think it is harder to get to know someone in SL, because people can be anything and they may be someone that they are truly not.
I don't really know who I am talking to.
Deception is a big factor.
All those aspects makes it hard to know what people were thinking or their personality.

Fall 2010
(n=37) It felt like I was presenting another side of my personality.
It was more who I really am.
It was more like the "ideal" me.
There was no "getting to know you" phase as in RL, which saved time, but might have us feel less accountable to each other.
I think I would always doubt whether or not I "knew" someone in SL.

Spring 2011
(n=52) When my avatar represented my RL identity it was easier to talk to people.
There were a lot of identity cues that people would bury in their profile description if you took the time to read them.
You get to know them differently. You can find information that they may have not presented to you F2F.

Fall 2011
(n=38) You got to know your group members.
I couldn't tell who the other person really was.
You really had to divide up the work and hope everyone did it well.
Have to trust that someone will actually do their part on time.

Fall 2012
(n=40) Personally, I felt more comfortable and trusting.
Yea, we gained trust for each other which lead to us working better together.
The group started to trust and be more open to one another.
I think a team has a better sense of accountability and a better grasp of the way things need to run in order to be efficient in their work.
We knew everyone's roles and there was more trust that was established.

Communication Openness

Fall 2008
(n=33) It was hard to get your point across and not sound mean at the same time.
It is hard to type criticism because it does sound mean.
Being honest but coming across nice can be difficult.
You didn't want to make people mad but also didn't want others to take over or not do their part so being honest is necessary at times.

Fall 2010 (n=37)	<p>I felt I was more apt to speak up here than in a RL.</p> <p>I didn't feel as nervous. The barrier made me more comfortable in expressing my ideas and feelings.</p> <p>It was like hiding under the table but your voice is being heard at the front of the table... (ha, ha).</p> <p>In face to face I get really nervous that group members will think my ideas are stupid...in CMC, I can't tell if they think my ideas are stupid, so I feel more open about sharing.</p> <p>CMC was better for me than F2F because I felt like everyone listened to me.</p>
Spring 2011 (n=52)	<p>Some people can be more open because they are normally socially awkward but they feel more secure in SL.</p> <p>It can be easier to disclose.</p> <p>More open than face to face.</p> <p>People were generally open. There was the shield (anonymity).</p> <p>Not having to worry about being face to face made it much easier.</p> <p>Easier to disclose information.</p>
Fall 2011 (n=38)	<p>You can say a lot without consequence.</p> <p>People have fewer qualms about being blatantly rude. Everybody had ideas and wasn't afraid to say them.</p> <p>We put a lot of humor in our chats.</p> <p>We were really comfortable with one another.</p> <p>People are more apt to throw ideas out I think.</p> <p>You could say things or bring up topics you might not face-to-face.</p> <p>Messing up was never embarrassing.</p>
Fall 2012 (n=40)	<p>The more we worked together the better the communication was.</p> <p>We were already more comfortable with each other.</p> <p>Everyone's expectations were aligned for the last project so communication wasn't a huge issue.</p> <p>People were more willing to share ideas, contribute, express concerns, etc.</p> <p>The more we worked together the easier things became.</p> <p>We became pals!</p> <p>There was more camaraderie.</p> <p>We were able to joke around more and still get work done.</p> <p>We were much more relaxed on the second project.</p> <p>People were more likely to participate.</p>

Interactivity	
Fall 2008 (n=33)	<p>There can be more information and communication presented in little time.</p> <p>There were times that to get your point across you had to say it more than one time because it may have been something that someone skipped over reading, or was too busy typing that they missed it.</p> <p>I had a difficult time keeping up.</p> <p>It was hard to keep up with the conversation sometimes because so many people were typing at once.</p>
Fall 2010 (n=37)	<p>I feel like [text] chat made it hard. We can all talk at once, and sometimes stuff gets lost in the shuffle.</p> <p>Just coordination really, you would try to establish roles or make a decision but some people aren't reading the logs and then when you go to make a final decision someone has an issue because they didn't agree.</p>
Spring 2011 (n=52)	<p>It was easy and hard at the same time. It was easy because it easier to be honest about your opinions, but harder because it takes longer for a response.</p> <p>In SL it was hard to have group discussions because you couldn't keep track of everyone typing and talking.</p> <p>Everyone talks at once.</p> <p>So many different conversations and topics were being discussed at once. Sometimes the discussion would be going three different ways.</p>
Fall 2011 (n=38)	<p>If I was late or something, I could quickly IM them.</p> <p>Synchronous [communication] didn't have to wait for responses.</p> <p>Sometimes comments got lost.</p> <p>If it takes too long to answer I find it unprofessional.</p> <p>Responding quickly makes things more efficient..</p> <p>It's easy to delay response.</p>
Fall 2012 (n=40)	<p>Group communication was better in SL because everyone felt like they had a role and had to confirm when someone talked.</p> <p>It was difficult at first, I think, because we were trying to understand the style of each group member.</p> <p>I think CMC slowed us down as far as sharing thoughts, ideas, concerns, etc.</p> <p>We started working together more than individually.</p> <p>The more we worked together the easier things became.</p> <p>We made decisions as a group.</p> <p>As a group you work to gain a common goal, but as a team you learn to divide work and get an effort that allows everyone to be proud of their work.</p>

CMC gives you more time to think and say what you are thinking, while trying to respect the expectations of others.
Communication between all of us was really good.
It was a good process; Everyone communicated well.

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