

Application of Social Presence Principles to CSCL Design for Quality Interaction

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Abstract

Social presence is a key approach to activating interactions in Computer-Supported Collaborative Learning (CSCL), but its approaches, definitions, and evaluations have not been coherently presented in previous research. This chapter provides practical suggestions and implications regarding CSCL, to help motivate social interactions among students and ensure effective and attractive learning. Three major approaches and focuses are discussed first: features of communication media (e.g., Short, et al., 1976); interaction and the learner's perception of interaction (e.g., Gunawardena & Zittle, 1997; Tu & McIssac, 2002); and learner's ability (e.g., Garrison et al., 2000; Garrison and Anderson, 2003) Integration and refinement of the central concepts are then illustrated. Conditions to establish social presence are introduced, using three steps for both individuals and groups: expression, perception, and recognition, which are all applicable to CSCL design. Media features are also explored as determinant factors when promoting social presence in a learning community.

Introduction

A trust relationship among members is generally an important factor contributing to smooth communication in a community or group. This is true for communities within the field of Information and Communication Technology (ICT) As ICT advances and the pedagogical paradigm shifts from teacher-oriented to learner-oriented, interest has grown in using computer networks and social media for collaborative learning. This approach is called Computer Supported Collaborative Learning (CSCL)

CSCL is defined as a collaborative learning environment based on a social constructivist approach (Vygotsky, 1978), in which learning is regarded as cognitive change promoted by interaction and activities among group members (King, 2007) Goldman, Digiano, and Chorost (2009) point out the potential of ICT applications to create powerful learning environments that support distributed, interactive, collaborative and constructive learning and learning assessment. Learners benefit

from collaborative learning using social media, because electronic collaboration tools provide them with opportunities to solicit and share knowledge while developing common ground or intersubjectivity with their peers and teachers (Hara, Bonk, & Angeli, 2000)

Successful CSCL requires quality interactions; quality interactions need social interaction to establish a group culture, and an exchange of experiences as a foundation for knowledge production (Reneland-Forsman & Ahlbäck, 2007) One of common concerns in CSCL is how to support learners' social interactions, i.e., how to best activate collaborations in a learning community. Social presence, an approach intended to resolve this concern, focuses on quality interactions using CSCL structures as a framework.

Social presence is a concept related to one's perceptions of oneself and others, and to social interactions in a community which could promote a trust relationship and play an important role in promoting CSCL. Social presence was originally defined as the "degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationship" (Short *et al.*, 1976) Social presence seems to increase the learners' satisfaction with learning (Gunawardena & Zittle, 1997) and with social interactions, which are the foundation of social learning (Tu, 2000) Garrison and Anderson (2003) redefined social presence as "the ability of participants in a community of inquiry to project themselves socially and emotionally, as 'real' people, through the medium of communication being used" and introduced the indicators of social presence such as "self-disclosure" and "quoting from other's messages." Social presence is also related to cognitive skills. When social presence is established, cognitive presence, a condition of higher-order thinking and learning, is enhanced and sustained (Garrison & Anderson, 2003) However, there is no consistent agreement on concepts and approaches to social presence among researchers. This is due to the broad diversity of social media, including social software such as Facebook, and Twitter, and to the many mobile devices now available. Further, new research methodology and data analysis methods related to social networks have been introduced, and possible ICT applications to educational settings have been widely expanded in response to research findings and the implications of computer-mediated communication (CMC) associated with CSCL.

This chapter introduces social presence theory as a framework for the design and application of social software for learning, and organizes conditions to promote social presence in the use of social software in educational settings. The intent is to identify major issues of existing social presence theories and to refine concepts of social presence in ICT learning environments, taking currently available social media tools into consideration. We wish to discuss essential conditions and approaches which foster the establishment of social presence for collaborative learning. This work is intended to help instructional designers and developers refer to the conditions and technologies that promote social presence for quality interactions in CSCL.

Background

The importance of interaction and collaboration are strongly emphasized for effective and meaningful learning, as a result the current pedagogical paradigm shift to constructivism, social constructivism, and situated learning. Research and practice on CMC for CSCL have increased sharply. CSCL is an interactive learning environment based on the principles of social constructive learning. One of the key issues is how to best ensure active and continuous interaction in CMC (Barnes, 2008) In particular, interpersonal communication should be promoted to ensure an active virtual learning community in social media. Collaborative learning with high interaction between learners in both computer-based and face-to-face situation can promote high performance in the realm of socioemotions such as satisfaction (Benbunan-Fich et al., 2005) To provide readers with a solid background, we will briefly discuss the importance of interactions in CSCL, and of current issues related to social presence.

Importance of Interactions in CSCL

Collaborative learning is encouraged within the perspectives of constructivism, social constructivism, and situated learning. From the constructivist viewpoint, it provides opportunities for learners to claim ownership of their learning, learn meaningfully in authentic settings, and offers a recursive, interactive, multi-perspective practice (Nett, 2008). Social

constructivists emphasize the socio-cultural dimension of learning (Bruner, 1960), social interactions (Bandura, 1977) and scaffolding with the zone of proximal development (Vygotsky, 1978) Kim (2001) focuses on the importance of culture and context in understanding phenomenon in community for collaborative learning. Based on theories of situated learning, the diversity of members is seen as a factor for success within a community of practice (Wenger, 1998) Learners learn through immersion in meaningful practices based on their backgrounds and experiences within a community (Cazden et al., 1996)

These theoretical backgrounds indicate that “interactions among various types of members are important learning experiences for individuals and the community at large” (Buraphadeja & Dawson, 2008) Learning environments and assignments for collaborative learning should be designed to ensure meaningful learning, authentic settings and contexts, and the interaction of diverse individuals. Collaborative learning differs from cooperative learning; it is also distinct from interactive learning with an underlying premise of consensus building through member-cooperation (Theodore, 1999) This suggests that interaction should be a prerequisite for collaborative learning (Reneland-Forsman & Ahlbäck, 2007)

One of differences between face-to-face collaborative learning and CSCL is that in CSCL communication and interactions are mediated via technology. Lehman and Conceição (2010) point to the importance of a sense of presence in internet-based social settings. A sense of presence in online learning can enhance the relationships among community members (Munro, 1998) For smooth and meaningful interactions, creating of a sense of presence in online settings (as we do in face-to-face settings) should be a first step toward significant communication.

Social presence has proven to be a useful concept when analyzing the conditions needed for virtual learning communities in CSCL. Promoting social presence can create cohesive and interactive learning communities, and can also promote cognitive learning behaviors (Garrison and Anderson, 2003) Goertzen and Kristjánsson (2007) conducted qualitative research on the relationship between social presence and interactive learning in TESOL classes. They suggested that social presence deepened the collaborative learning process as a result of the associated

promotion of utterance, which activates interpersonal communication and cognitive engagement. Social presence helps educational practitioners and system developers design interactive learning environments.

In this section, we focus on applying concepts of social presence to CSCL design to promote quality interaction. As advanced technologies have become available, diverse ways of collaborative activities can be provided. This affects the design of social presence in CSCL development.

For CSCL design, pedagogical implications should be implemented which consider media selection and evaluation focusing on both the learning process and the learning outcome. CSCL often uses CMCs which involve synchronous and asynchronous communications and variety of media. Media broadly include individual components of software (e.g., text, pictures, animation, audio, video, and real objects), software, including social software such as social networking service (SNS), and electrical and electronic devices. As to media selection, currently e-mail, bulletin board systems (BBS), chat systems, and video conferencing systems are most often used for CSCL. Combinations of computers, mobile phones, game machines and portable devices enable ubiquitous learning.

Media selection is assumed to influence communications. Compared with traditional settings, Hughes (2007) argues that the relative anonymity of online community may overcome exclusion and prejudice based on color of skin, gender, accent, etc., but online communication can also emphasize one's background and characteristics. For example, textual communications provide clues to one's background without everyone being fully aware of them (Hughes & Scott, 2005) Media selection directly affects interactions and the sense of presence in CSCL. Straarman, Krol, and van der Meijden (2005) report that interactions differed in accordance with three collaborative learning conditions; face-to-face without computer, computer-mediated, and face-to-face with computer.

CMC research highlights features and aspects of online communication relative to learning, examining the process in terms of synchronous vs. asynchronous and formal vs.

informal communications. Online communication is viewed as an artificial experience due to the lack of eye-contact, the lack of a shared social and physical context (Bozkaya, 2008) and the lack of media richness and support for verbal and nonverbal communication behaviors (Burgeon, Buller, & Woodall, 1996) Bozkaya (2008) also criticizes the limited possibilities for informal communication in CMC. Those limitations and restricts increase the significance of social presence design in CSCL.

A lot of research has inferred CMC is beneficial for learning. For example, learning based on asynchronous discussion has the potential to increase learners' levels of thinking, such as critical thinking, upper levels in Bloom's taxonomy and higher-level thinking (e.g. Garrison, Anderson, & Archer 2000; Havard, Du, & Olinzock, 2005) CMC also strongly supports the ideas of social constructivism and situated practice (Buraphadeja & Dawson, 2008) In order to maximize the potential of CMC, features and aspects of online interactions and communications should be selected based on the learning objectives of learning activities and tasks. This has direct influence on the success of the learning process in CSCL.

Evaluation methods and learner interactions should be considered when designing a CSCL learning process (Luppicini, 2007). Visualization of the learning process, cueing, and contents may affect the resulting levels of interaction (Nakahara, 2003) Those factors which might affect the sense of presence and the quality of interactions in CSCL should be taken into account in CSCL designs.

Issues Related to Current Concepts of Social Presence

Social presence is essential if CSCL designs are to result in group cohesion and group culture. Increasing social presence could help students promote quality interactions in CSCL. However, there are three main issues related to current social presence concepts that must be applied if designers are to achieve effective CSCL design. Designers must be aware of various definitions of the term "social presence," they must focus on partial perspectives of social presence, and they must be familiar with media-specific concepts.

As to the first issue, there is no universally accepted definition of social

presence; the specifics of the concept vary from study to study. This makes the application of principles of social presence difficult and confusing.

In regard to the second, the boundary and focus of each concept seem not to cover what should be covered in terms of social presence. When comparing several well-used concepts, each deals with no more than a fraction of the whole phenomenon of social presence. A unified understanding of social presence is necessary; especially when principles of social presence are used for multi-module CSCL designs with complex conditions for interactions.

The third concern is that existing concepts have tended to be media-specific. More universal and generalized concepts for social presence are necessary to reliably achieve quality interactions using combinations of new technologies for effective CSCL design.

Originally, social presence was understood as the degree to which one person perceived the presence of others when their communications were mediated by tools such as telephones and audiographic TV. As recent information technology has advanced and come to be used in educational settings, many scholars have reconsidered the concept of social presence. Short et al. (1976) define it as the “degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationship.” Short (1974) investigated the differences in discussion generated by varied media (face-to-face, audiographic TV, and audio conferencing), from the viewpoint of output. The results reveal that the discussion output generated by face-to-face and audiographic TV surpasses that of audio conferencing. Short (1974) suggested social cues such as eye-contact and gestures strongly influence communication.

Short et al. (1976) suggest that social presence is a concept that explains psychological perception by communication media, both with and without social cues, concerning two features: intimacy, such as eye-contact and smiling (Argyle and Dean, 1965); and immediacy, such as facial expression (Wiener and Mehrabian, 1968)

In the 1990s, as educational practitioners have become increasingly interested in using information and communication technology in education, many researchers interpreted social presence in various ways in their experiments and applied practices. Yamada and Kitamura (2010) have reviewed papers on social presence

and have classified the organized concepts of social presence as displayed in Table 1.

Table 1. Concepts and Definitions of Social Presence (Yamada & Kitamura, 2010)

| Researchers | Focus | Evaluation | Definition |
|---|--|------------|---|
| Short et al. (1976) etc. | Feature of communication media | Perceived | “the degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationship.”(Short et al., 1976) |
| Gunawardena and Zittle (1997), Tu and McIssac (2002) etc. | Interaction, and learner’s perception of interaction | | “the degree to which a person is perceived as a “real person” in mediated communication.”, “When it(interactivity) is realized and when participants notice it, there is ‘social presence’ ” (Gunawardena and Zittle, 1997) |
| | | | “the degree of feeling, perception, and reaction to another intellectual entity in the CMC environment” (Tu and McIssac, 2002) |
| Garrison et al. (2000), Garrison and Anderson (2003) etc | Learner’s ability | Expression | “the ability of participants in the Community of Inquiry to project their personal characteristics into the community, thereby presenting |

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|--|--|--|--|
| | | | themselves to the other participants as ‘real people’” (Garrison et al., 2000) |
|--|--|--|--|

The first view of social presence is concerned with media type. Short et al. (1976) suggest using four bipolar scales based on semantic differences in technique (unsociable—sociable, insensitive—sensitive, cold—warm, and impersonal—personal) for the evaluation of CMC. In this view, media is seen as having a social presence. As a result, people perceive media’s social presence.

The second view expanded on the first. The second definition focuses on the interactivity between learners in CMC. When groups use the same CMC in their online learning, social presence depends on interactivity. Some learners seem to perceive social presence in active discussion using BBS, others do not. Gunawardena and Zittle (1997) suggest that teachers have dual roles in collaborative learning. Teachers have not only teaching role, but also a facilitating role in collaborative learning online. Gunawardena and Zittle (1997) conducted a research project investigating the effect of social presence on learning satisfaction, from the perspective of facilitating the modulation of discussion and the perception of interactivity in online discussion. Their research revealed that a high perception of social presence has positive effect on learning satisfaction. Tu and McIssac (2002) investigated and redefined social presence from social psychological view, adding variables such as social context and privacy. They found that learners focused on other’s intelligence in interaction, but privacy such as sharing personal information was not correlated with social presence significantly.

The last definition of social presence differs substantially from previous concepts. Social presence is seen as the ability to participate in affective and social expression in CMC. Garrison et al. (2000) redefined social presence as indicated in Table1, suggesting that social presence must have expressive functions for the establishment of group cohesion in asynchronous text-based communication. Garrison et al. (2000) and Garrison and Anderson (2003) explained social presence as one of the elements in “Community of Inquiry (COI),” in which teachers and learners interact in text-based online communication. Social presence is regarded

as a necessary element for creating a trusting environment for interpersonal communication, in order to develop an atmosphere hospitable to discussion. Rourke et al. (1999) proposed the indicators of social presence in asynchronous text-based CMC as displayed in Table 2.

Table 2. Indicators of Social Presence (Rourke et al., 1999)

| Category | Indicator | Definition |
|-------------|--|---|
| Affective | Expression of emotions | Conventional expressions of emotion or unconventional expressions of emotion, including repetitious punctuation, conspicuous capitalization, emoticons. |
| | Use of humor | Teasing, cajoling, irony, understatement, sarcasm. |
| | Self-disclosure | Presents details of life outside of class, or expresses vulnerability. |
| Interactive | Continuing a thread | Using the reply feature of software, rather than starting a new thread. |
| | Quoting from others' messages | Using software features to quote others entire message or cutting and pasting selections of others' messages. |
| | Referring explicitly to others' messages | Direct references to contents of others' posts. |
| | Asking questions | Students ask questions of other students or the moderator. |
| | Complimenting, expressing appreciation | Complimenting others or contents of others' messages. |
| | Expressing agreement | Expressing agreement with others or content of others' messages. |
| Cohesive | Vocatives | Addressing or referring to participants by name. |

| | | |
|--|---|--|
| | Addresses or refers to the group using inclusive pronouns | Addresses the group as “we,” “us,” “our,” “group.” |
| | Phatics, salutations | Communication that serves a purely social function: greetings, closures. |

Garrison and their research colleagues redefined social presence as a factor of the learning process in their COI model. This model contributes to active research on social presence in CMC-based learning. Hughes et al. (2007) investigated the effect of social presence on the establishment of group cohesion in learner-centered learning using Bulletin Board Systems (BBS) The results reveal that the groups which include learners who express social presence through such techniques as the use of emoticons and self-disclosures have high group cohesion. Allmendinger (2010) investigated whether nonverbal signs such as thumbs-up and raised hands promote social presence, learning motivation, and interaction in avatar-based learning, but the relationship between nonverbal communication and social presence was not confirmed.

Recent research of social presence revealed the second and third viewpoints of social presence seem to be integrated. Arbaugh et al. (2008) developed a system of COI measurement which consisted of three parts: cognitive presence, social presence, and teaching presence. Table 3 displays this measurement system.

Table 3. Social presence items in COI measurement (Arbaugh et al., 2008)

| # | item |
|---|--|
| 1 | Getting to know other course participants gave me a sense of belonging in the course |
| 2 | I was able to form distinct impressions of some course participants |
| 3 | Online or web-based communication is an excellent medium for social interaction |
| 4 | I felt comfortable conversing through the online medium |
| 5 | I felt comfortable participating in course discussions |
| 6 | I felt comfortable interacting with other course participants |
| 7 | I felt comfortable disagreeing with other course participants while still |

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| | maintain a sense of trust |
| 8 | I felt that my point of view was acknowledged by other course participants |
| 9 | Online discussion helped me to develop a sense of collaboration |

Traphagan et al. (2010) investigated the factors affecting three COI elements, using Second Life and TextChat.com. They suggested that group cohesion, tools, and tasks have an influence on social, cognitive and teaching presence.

Cohesion, which is a factor for the establishment of social presence, was confirmed as a strong factor. Seet and Quek (2010) also suggested that there is a strong correlation between group cohesion and social presence, forming active learning attitudes. Their research also revealed that social presence is one of the predictors of quality project work.

Social presence assists the formation of fruitful relationships between learners and teachers, enhances a learner's identity as "a group member," and promotes interaction between learners in CMC-based classrooms (Sherblom, 2010) Thus, social presence facilitates communication in virtual learning communities.

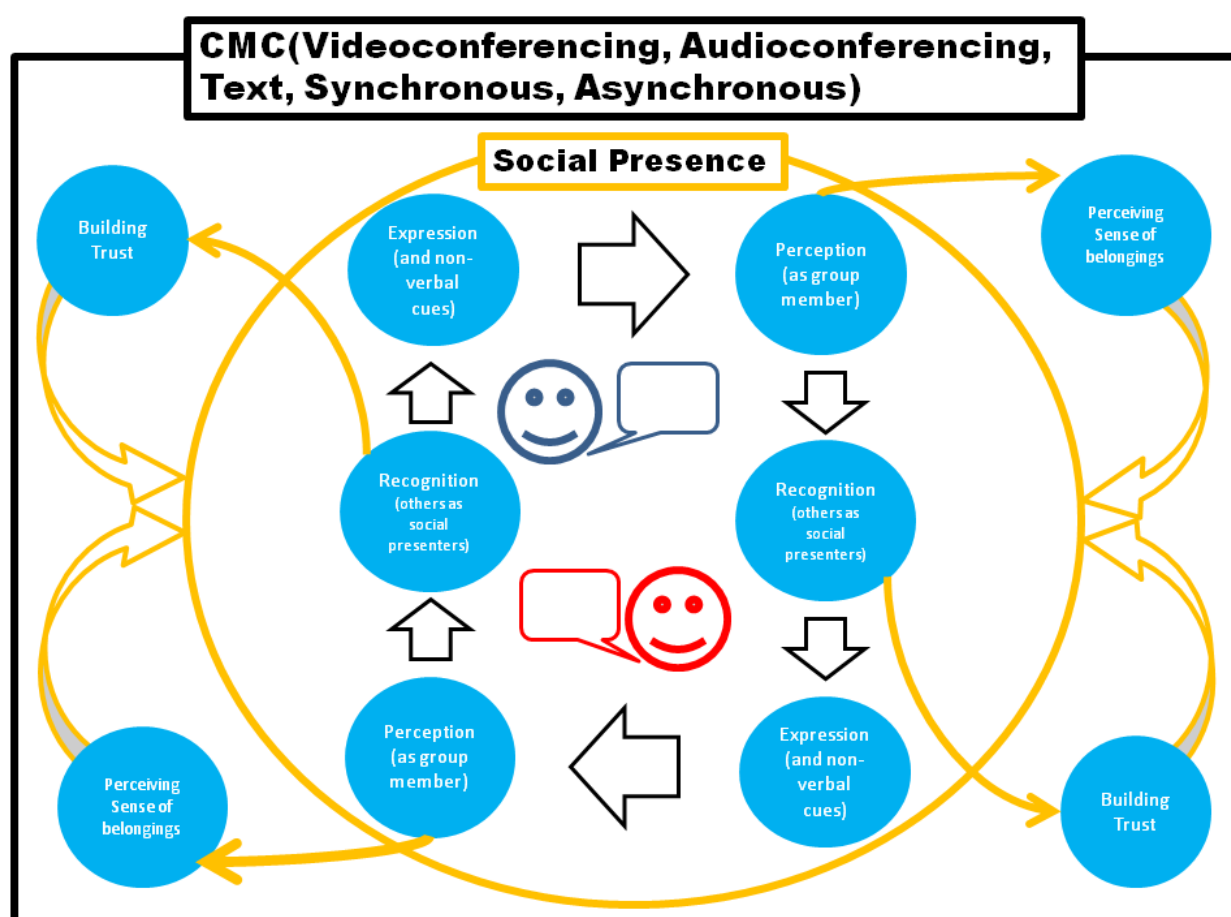
However, several points, such as the chosen communication medium, should be considered in order to ensure effective communicative work in CMC environments. Walther (1996) suggested that four points should be considered: the utterance sender, the receiver, the medium channel (e.g., synchronous or asynchronous), and feedback, which strongly reinforces interaction. Social presence can facilitate continuous communication. Kehrwald (2010) suggested that social presence has a cumulative feature which promotes successive interpersonal communication. Feedback process in CMC and the cumulative feature of social presence promote interpersonal communication, as previous research indicated, can be regarded as important phases of recognition of others as social presenters.

New communication technologies are and will be developed, extended and applied to educational settings. Current social presence perspective has various concepts, partial view, and media specific view. It seems to be difficult for people concerned with education to design CSCL. It is required to organize and integrate social presence concept.

Reconceptualization of social presence

As the above review of the previous research indicated, social presence can be reconsidered as cycle model: expression, perception, and recognition. Figure 1 shows cycle model of social presence.

Figure 1. Cycle model of social presence



This model is based on the features and effects of social presence as follows:

- Social presence is expressive and perceptive.

Social presence shortens psychological distance between members in virtual learning community, build trust and make atmosphere for

discussion, as time passes.

- Social presence is established through social and affective interaction, using social cues in CMC which learners use.

This model consists of three phases; expression, perception, and recognition. In this model, the CMC type determines the strength of social presence, due to the difference in the variety of social cues which learners can use. Learners can use nonverbal cues such as eye-gazing in video conferencing; text chat doesn't allow learners to use these tools, but allows the substitution of emoticons for non-verbal cues. Learners first utter ideas and opinions and so on, with the expression of social presence following Rourke et al. (1999) as displayed in Table 2. Others read or listen to his/her ideas, and perceive a learner's social presence at the same time. Therefore, others receive sense of community ("we belong to the same group," etc.) Next, others recognize the learner as a "social presenter," that is, as a person who tries to express intimacy and to create an atmosphere for friendly discussion.

This phase plays an important role in building trust. Trust is one of the central factors for the creation of social presence, in order to establish a fruitful learning community. Tu (2002) investigated the relationship between social presence and privacy. His research revealed a significant correlation between social presence and privacy. Learners perceive a there to be a risk in sharing personal information; however, trust seems to be triggered by the exchange of personal information from as daily life. Online communication can continuously build trust between learners in learning community, therefore it plays an crucial role in creating and enhancing social presence (Tu and McIssac, 2002)

In the recognition phase, the learner decides to express his or her social presence through such interactive tools as self-disclosure and inclusive pronouns. This decision ensures that learners come to recognize others as group members, and develop increasing trust. The sense of community and trust heightens social presence within a group. The conditions available in CMC design to heighten social presence are organized in next section.

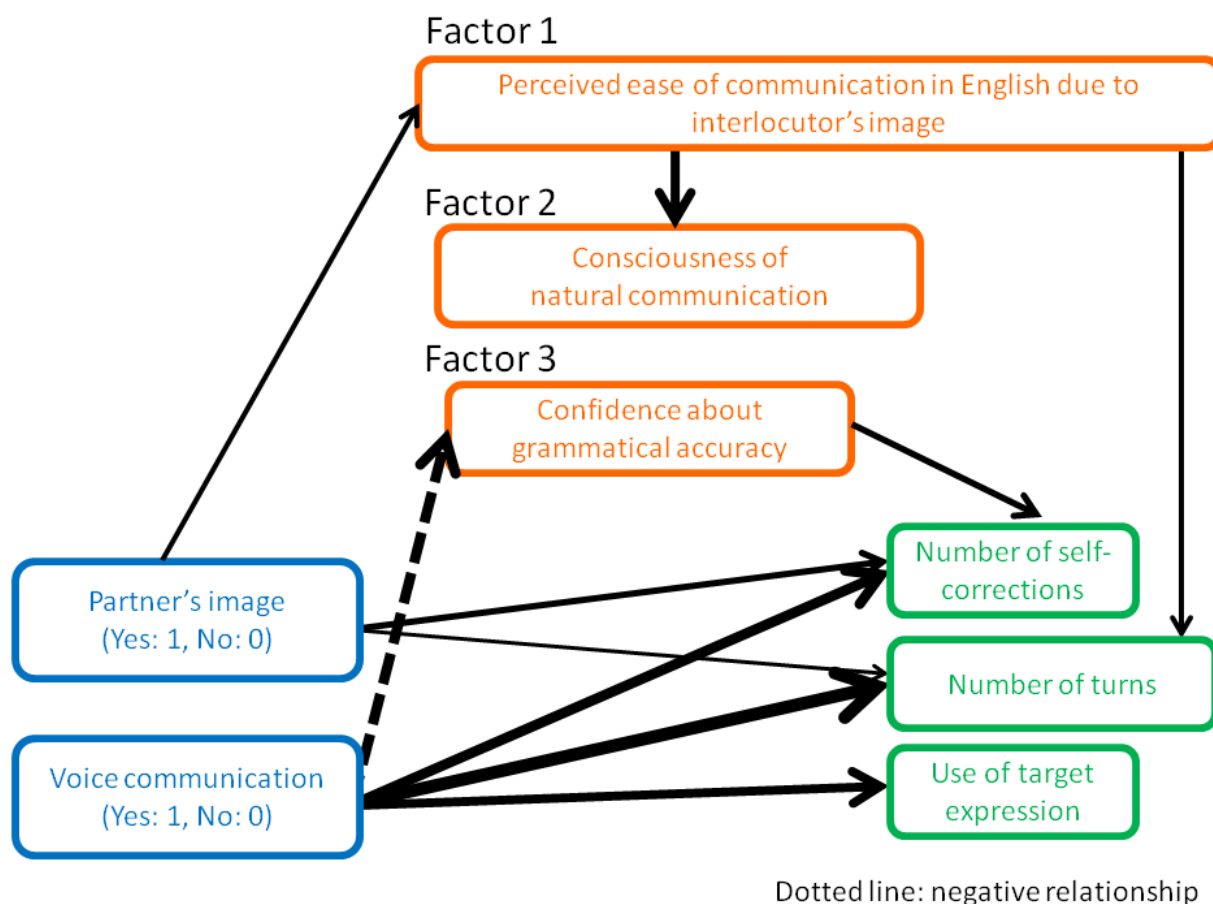
The cycle model of social presence demonstrates the process and phases of social presence. In each phase, there are several conditions to establish and heighten social presence.

In the expression phase, categories mentioned in Rourke et al. (1999), and Garrison and Anderson (2003) are very effective factors affecting social presence. However, depending on the CMC type, learners are allowed to use available social cues, which promote interpersonal communication. This model includes the use of non-verbal cues as additional element of CMC interactions. In this phase, the key is to support self-disclosure, in order to encourage the establishment of social presence using technology.

Emoticon and reply functions are often used in text-based CMC tools. Audiographic technology facilitates communication with the use of social cues. The degree of interactivity differs among various CMC types, as Short et al. (1976) suggested. However, social presence can demonstrate changeable features in the effect of the same CMC tools, due to a learner's personality and communication style (Tu, 2000) This supports the view of "social presence as personal ability to express social emotion for building active learning community" (Garrison and Anderson, 2003)

Yamada (2009) investigated the overall effects of communication media on psychological factors and learning performance in an English learning environment, compared with four CMC tools; video conferencing, audio conferencing, text-chat with partner's image, and plain text-chat. All CMC tools displayed useful target expressions. The results of path analysis revealed that voice communication has a positive influence on learning outputs. Learners expressed themselves more often, modified their grammatical errors more, and used more target expressions in a voice communication environment than in text-chat. However, the use of text-chat raised learners' grammatical consciousness, and increased their confidence about grammatical accuracy. A partner's image has a strong effect on the perception of natural communication, which increases the number of utterances. Figure 2 shows the overall relationship between media, perception, and learning outputs.

Figure 2. The relationship between media, social presence, learning consciousness, and learning output (Yamada, 2009)



Recent devices such as the iPad and the Android tablet allow the use of hand-writing functions. Hand-writing, which is one of our cultural communication habits, is also interpreted as personal information. Li and Akahori (2007) indicated that revising reports using handwriting applications promotes a learner's perception of social presence in language learning settings.

In the expression phase, one of challenges to the establishment of social presence is the lurker. Lurkers do not contribute their ideas, opinions, and feelings to the group interaction. Information associated with a lurker's behaviors, such as log-in time, can be important to support their willingness to express their social presence using the available technology. Mixi (<http://mixi.jp>), which is one of the most popular SNS in Japan, allows active users to see a "footprint list," that is, to

see who visited a profile owner's page, and when they visited. Users also see their friends list page, which displays a friend's latest login time stamp ("five minutes ago," "one day ago," "three days ago or more"). These functions provide useful ways to show a lurker's social presence. These functions also help learners perceive a lurker's social presence (in next phase)

The function of the perception phase is to allow learners to perceive themselves as "group members." This is true not only of those categories which Rourke et al. (1999) suggested, but also of others with a similarity of type. Visualization and raised consciousness assists learners to perceive the similarity to other members. Self-introduction is often used in SNS.

Text-mining technology seems to be useful to support research of the perception of social presence. Text-mining functions extract inclusive pronouns from members' postings, and visualize the strength of group cohesion graphically using the frequency of inclusive pronouns. Social network analysis and visualization may facilitate the perception of a group. Social network analysis is used to analyze the construction of relationships within a social network (Scott, 2000) Using the number of emails sent and received between learners as a data sources, visualization of relationships between learners in a group can help learners to perceive group cohesion. As mentioned before, several studies have indicated that the avatar-based CMC-like Second Life software establishes and heightens social presence. Avatar-based CMC helps learners share virtual space, which promotes the perception of "co-presence" (sharing the same space and looking figures each other)

In this model, learners recognize others as "social presenters." Setting criteria to build trust and making opportunities for the expression of social presence can shorten psychological distances between learners and promote the next social presence cycle. Sharing introductions and messages from learners' friends can be criteria for building trust between learners. Walther et al. (2008) indicated that messages from friends of profile owners promotes social attractiveness and builds trust of a profile owner in Facebook. In Facebook, active users can push the "like" button when they like messages or recognize messages from friends as important. This feature also increases users' trust. It indicates a user's position among their friends. In Facebook, users write postings on their friends' walls, where others can

read them; then readers, responding, can push the “like” button to indicate notice and support. Thus, the “like” button offers good opportunities to build trust and express user’s feelings and ideas, helping establish social presence. Community building also creates opportunities to build trust and go to next cycle. Table 4 shows the metrics of phases of the establishment/promotion of social presence and technologies.

Table 4. The metrics of social presence, technologies and functions

| Social Presence Phase | Role | Examples of technology and function |
|-----------------------|--|--|
| Expression | • Transferring personal information through interpersonal communication with social cues | Video conferencing, Audio conferencing, Emoticons, Hand-writing |
| | • Creating opportunities to build group cohesion | Reply function, Avatar (Sharing the same space), Displaying other group situation |
| Perception | • Perceiving themselves as group members | Self introduction function, Text mining, Social network analysis and its visualization, |
| | • Perceiving that learners’ group is active | Visualization of information associated with learner’s behaviors (login time etc) and of frequency of posting. |
| Recognition | • Building trust | Community building, Sharing message from profile learner’s friends, |
| | • Creating opportunities to | “Like” button, Sharing |

| | | |
|--|---|---|
| | utter feelings, opinions and ideas with social presence | message from profile learner's friends |
|--|---|---|

Social media such as SNS (Facebook, etc.) and Twitter seem to be effective in the establishment and promotion of social presence, but results depend on usage. Hew (2011) reviewed the previous research about the educational use of Facebook from both the teacher's and the student's viewpoints. Hew (2011) reported that there is no significant difference between the Moodle BBS and Facebook in the creation of social presence, because learners were restricted to the use of the discussion application in Facebook.

Though results depend on learning goals, the elements of synchronous or asynchronous CMC and of the place CMC is uses have affects on social presence. Dunlap and Lowenthal (2009) suggested that Twitter allows learners to express and receive a sense of social presence due to features such as synchronicity and the just-in-time message. In teacher education, Twitter promotes teachers' reflections, reduces the sense of isolation in a virtual world, and builds a sense of community, because teachers use Twitter in their mobile phones (Wright, 2010)

Social presence has a cumulative feature over time (Kehrwald, 2010) Trust is built and becomes stronger as a result of the existence of strong relationships between learners over long periods of time (Walther and Burgoon, 1992) Expression associated with self-disclosure, inclusive pronouns such as "we," the use other members' nicknames—all these promote the perception of belongings to a group. Therefore, learners in learning communities build trust with each other as a result of finding common points through self-disclosure (Rice, 1993), and then express themselves further. This looped process repeats until the life cycle of the learning community ends.

Social presence facilitates the development of a cohesive learning community and supports cognitive learning processes, such as active discussion through inquiry between learners (Garrison, 2007) This looped model allows instructional designers and educational practitioners to easily find the key structures to enhance interaction between learners, which is important to facilitate CSCL. This chapter establishes the categories of relationship between social presence processes and

information technologies. Support for the enhancement of social presence tends to focus on expressive functions, such as the use of non-verbal cues and emoticons; however, technologies such as network model analysis and visualization can promote perceived social presence, in which learners easily come to recognize others as “social presenters.” This view of the process seems to help system designers develop effective CSCL.

CONCLUSION AND FUTURE RESEARCH

This chapter has focused on re-organizing prior presentation of social presence, reviewing CSCL, social presence, and media communication research, and has suggested metrics for the design of CMC and support technologies, in order to establish and heighten social presence. It is essential to establish social presence to ensure productive educational experiences in CMC environments. Social presence facilitates discussion and communicative learning through interpersonal communication.

Social media provides popular tools to communicate with people all over the world through CMC. However, when social media is applied to educational use, educational practitioners and instructional designers should consider the features of various social media objectively. Social presence concepts can be great guides to help design and apply social media for educational purposes. This chapter shows the relationship between the social presence phase and the technology for the design of CMC.

Future research is required to investigate the relationship between social presence and learning behaviors. Swan et al. (2009) showed the potential for research based on a COI framework. They recognized the necessity of research into the relationship between social and cognitive presence, which demonstrates a strong relationship between learning behaviors. Yamada (2010) has developed CMC systems which allow learners to categorize expression into several types, such as questions, opinions, and agreement and disagreement. Integration of social media and cognitive tools may have an effect on active learning behaviors with social presence.

Measurement of development will be also required. This loop model

integrates the viewpoints of expressive and perceived social presences. Correlation of data between social presence databanks and expression associated with social presence should prove useful not only for future research, but for the development and evaluation of CSCL environments based on social presence. These data compilations are now under development.

As information and communication technology advances, the technology to express perceived social presence will appear; it will be necessary to conduct successive research about social presence and technology use in educational settings.

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