Effect of Social Presence Caused by Non-Verbal Cues on a Bulletin Board System to Enhance Subsequent Communication

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Abstract

Social presence, the degree to which persons feel socially and emotionally connected, is an important factor for promoting Computer-Mediated Communication. Some interfaces to visualize non-verbal cues of social interactions within computer-mediated communication were proposed and later developed on a Bulletin Board System. These effects to enhance social presence and to promote communication were examined by analyzing the content of the discussion logs. The results suggested that the visualizations enhance social presence, and that the social presence promotes subsequent messages.

Introduction

According to a lack of non-verbal cues in text-based communication, the Computer-Mediated Communication (CMC) user tends to misconceive the other's emotional state (Kato et al. 2001) and enter a condition of solitude. These effects restrain their communications.

Recently, many researchers reported that social presence, the degree to which persons feel socially and emotionally connected, is an important factor in the satisfaction of CMC users (Gunawardena & Zittle 1997) and that it promotes the communications.

In this study, the effects of visualizing non-verbal cues on a Bulletin Board System (BBS), one form of CMC media, to enhance social presence and its impact on promoting subsequent communication are analyzed by analyzing the content of the discussion logs, as proposed by Garrison & Anderson (2003) and Murphy (2004).

Method

Some interfaces for visualizing non-verbal cues of social interactions within CMC were proposed and later developed on a BBS in a pilot study (Sato et al. 2001). In this experiment, the effects of two visualizations of the user's popularity and impression of the message were examined.

Examined BBS

Figure 1 shows the examined BBS. Details of the visualization features are the following.

Relations between messages Messages are displayed as a 3D-box-node. The user can see the contents of the message by clicking the node. The connections among the messages can be visualized in a 3D-tree-structured display. Thus, the number of messages displayed in one screen is increased.

Popularity The user can identify the degree of popularity by messages being displayed at various shades. Whenever a user reads the message, the message becomes lighter.

Elapsed time from posting As time passes since the message was posted, the message becomes darker.

Impression The impression of messages is shown as a color variation from red to blue in the node. This is decided by the users' votes. Each user can vote for an impression of each message on a four-point scale from "agree" to "disagree". A red node shows a favorable message, and a blue node shows an unfavorable message.

Figure 1: Examined BBS.

Context of the Experiment

The subjects of this experiment were 17 undergraduate and graduate students. Demographically, 15 were male and 2 were female. The range of ages was 19 to 35 and the mean age was 25.4. All subjects were very good at using PCs and reported that they had previously used general BBS.

The subjects discussed using the BBS for four days. The theme of the discussion was "brutal crimes by teenagers" because all participants were majoring in education, so they were familiar with this theme. Posted messages and visualizations were logged and later analyzed.

Analysis

To measure social presence in CMC, many researchers distribute a questionnaire after the experiment. Garrison & Anderson (2003) proposed a more reliable and valid method to measure the real-time social presence of the CMC based on content analysis. They proposed three categories for

messages that represent social presence. Murphy (2004) also proposed six categories.

In this study, these two criteria (shown in Table 1) are used to analyze the social presence that appeared in the above-mentioned discussion. Two raters (the author and another person who is not related to this study) categorize messages of the discussion as to whether they represent social presence or not. If the categorization is a mismatch between raters, they discuss and decide on one category that represents social presence or not.

Table 1: Criteria of Content Analysis.

Garrison & Anderson (2003)	Murphy (2004)	Found Examples
Affective Response	**Sharing personal information**	When I was a child, … Is my idea strange?
	Expressing feelings and emotions	
Open Communication	**Complimenting/expressing appreciation towards other participants**	Reporting data is welcomed! I want to know more details about it.
	Expressing motivation about project or participation	
Cohesive Response	**Recognizing group presence**	Hello, everyone! I hope we will discuss more about this topic.
	Stating goals or purposes related to participation	

Results

49 messages were posted and 88% of them were replies. These messages were read a total of 454 times. 57 impressions were posted by using the impression-voting function in the system. 16 messages (32.7%) were categorized as representing social presence and 33 messages (67.3%) were not categorized (they had no expressions related to social presence).

First, the visualizations of the original messages of 39 replies (of these, 12 replies (30.8%) had social presence and 27 replies (69.2%) did not) were studied. Figure 2 shows the ratio of replies that represent social presence or not for each degree of visualization. The ratio of replies that represent social presence for original messages that visualized much popularity (10/27, 37.0%) and impressions (11/34, 32.4%) tended to be greater than messages that visualized little popularity (2/12, 16.7%) and did not visualize impressions (1/5, 20.0%).
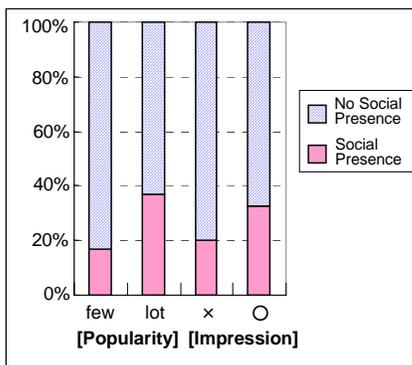
Figure 2: Ratio of Replies
That Represent Social Presence or Not.

Second, the number of replies and the number of total replies (including replies to other replies) for messages that represent social presence or not were counted. Figure 3 shows the average numbers and average total numbers of replies for original messages that represent social presence or not. The difference between each average number of replies for messages that represent social presence or not was tested by t-test. The results reveal significant differences between the two numbers. Both average numbers of replies and average total numbers of replies that represent social presence tended to be higher than the numbers of replies that represent no social presence.
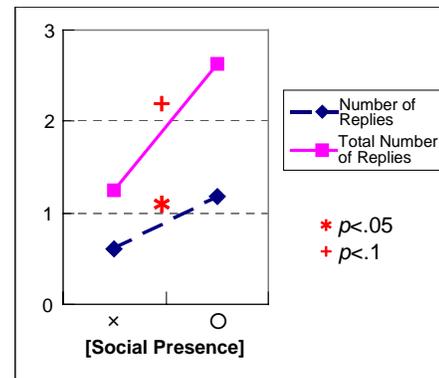

Figure 3: Number of Replies for Messages
That Represent Social Presence or Not.

Conclusions

In this study, the effects of visualizing non-verbal cues on a BBS to enhance social presence and its impact on promoting subsequent communication were analyzed by analyzing the content of the discussion logs. The results suggested that visualizations of popularity and impression of messages enhance social presence. It is also suggested that enhanced social presence promotes subsequent discussions.

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