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Social Presence in a  
Multi-user Virtual Environment  
Chat Session

Randall Fujimoto  
Shoyu Learning Solutions

### Abstract

This proposed research study examines the hypothesis that students who communicate in small groups via chat in a MUVE will experience a greater social presence than students who communicate in small groups via conventional online chat. The study will use 100 undergraduate business school students as participants in a two-independent-group design experiment.

Participants will chat in groups of four people for one hour, after which they will be given a social presence questionnaire. If the results show there is a greater level of social presence in the MUVE chat group, this may be because the MUVE chat involves avatars and a 3-D environment or because the MUVE chat is more compelling due to a novelty factor.

### Social Presence in a Multi-user Virtual Environment Chat Session

Online chat is a frequently used communication medium in today's online learning courses. Chat is also the main communications medium in three-dimensional, multi-user virtual environments (MUVEs). A MUVE is a computer-based, three-dimensional (3-D), virtual world in which users interact via avatars. Examples of popular MUVEs today are *Second Life* and *Active Worlds*.

When people chat together online, they are all part of a virtual group. The concept of social presence describes the degree to which each group member feels connected to others in the group during the chat session.

This research proposal will describe an experiment to support the hypothesis that students who communicate in small groups (three to four persons) via chat in a MUVE will experience a greater social presence than students who communicate in small groups via conventional online chat.

Kehrwald (2008) conducted a qualitative study to investigate social presence in online learning environments. A main purpose of the study was to build on existing definitions of social presence and come up with a single, unified definition. In addition, the study investigated the nature, development, and promotion of social presence. The study used 20 students in an online postgraduate program at a regional Australian university. Information collection consisted of a questionnaire, interviews, and group discussion logs.

Social presence was originally described as a media characteristic that increases "the degree of salience of the other person in a mediated interaction" (Short, Williams, & Christie, 1976). However, the study concluded that social presence is actually more about the individual than the medium in defining social presence as "an individual's ability to demonstrate his/her

state of being in a virtual environment and so signal his/her availability for interpersonal transactions” (Kehrwald, 2008). The study elaborated on this definition by highlighting the two main factors that make up social presence: (a) “state of being,” which refers to online participants experiencing each other as real people present in the online environment, and (b) “availability for interpersonal transactions,” which refers to online participants actually being seen as active and involved. This definition of social presence is important because a clear understanding of social presence is required in order to properly test the hypothesis.

Another factor that is important in testing the hypothesis is the effect of MUVE avatars on social presence. Peterson (2008) conducted a study that investigated interactions in the MUVE *Active Worlds*. The motivation for the study came from a desire to learn more about computer-mediated communication tools to teach language skills. One of the main purposes of the study was to investigate if the use of an avatar enhanced a user’s sense of copresence, which refers to the “state of being” factor of the first study’s definition of social presence. The study did not investigate the “availability for interpersonal transactions” factor of the first study’s definition. However, because copresence is closely related to social presence, the results of the study are useful in understanding the relationship between avatar use and social presence.

In the study, 24 undergraduate students from a university in Tokyo performed tasks while communicating in *Active Worlds*. The chat logs of all sessions were collected and then coded and analyzed either manually or using an online text analysis tool.

A main finding of the study was that avatar use created a sense of telepresence and copresence within the MUVE. Telepresence is synonymous with the term “presence” and refers to the “sense of feeling present in a virtual world” (Peterson, 2008). This finding is important because it demonstrates a causal relationship between the use of avatars and social presence.

Mikropoulos and Strouboulis (2004) conducted another study related to the relationship between avatars and social presence. The study focused on both the effect of input devices, such as keyboard and mouse, and the effect of avatars on the sense of presence. In the study, “presence” was used as a more general term containing three dimensions, one of which was social presence. The other two dimensions were personal presence (a person’s sense of being in the virtual environment) and environmental presence (a person’s feeling that the environment acknowledges his or her avatar’s existence).

The study’s participants were 29 elementary school students, all 12 years old. The students were given tasks to complete in a MUVE (SUPERSCAPE VRT) and then answered a questionnaire with 54 close type and six open type questions. A main finding of the study was that the use of avatars contributed to a sense of social presence. This finding supports the hypothesis.

Finally, Bente, Ruggenberg, Kramer, and Eschenburg (2008) conducted a study investigating the effects of computer-mediated communication (CMC) via text, audio, audio-video, and avatar. The study noted that much research exists comparing text chat, audio, and audio-video CMC, but there are no existing studies comparing these three media to avatar-mediated communication. One of the main purposes of the study was to study the influence of avatars on social presence. Social presence was broken down into four unique dimensions: intimacy, spatial copresence, behavioral contingency, and social attentiveness. The study gave no predictions mainly because of the limited research available on the effects of avatars in CMC.

The study used 150 students from a wide range of disciplines and grouped the participants into same-gender dyads. Participants that knew or recognized their partners were

excluded from the study. Each dyad was randomly assigned to one of five experimental conditions: text chat, audio, audio-video, low-fidelity avatar, and high-fidelity avatar. Each participant wore special tracking sensors, such as data gloves, chest belts, and headsets, in order to automatically record nonverbal behavior. The dyads had to collaborate on a management decision task by communicating via their assigned experimental condition. After completing the task, each participant answered a series of questionnaires, including a 58 5-point Likert scale questionnaire focused on social presence measurement. The study analyzed both the questionnaires and the non-verbal data captured by the special tracking sensors to arrive at its conclusions.

The study found that the text chat experimental condition scored lower than the other four conditions in intimacy and spatial copresence. This finding helps to support the hypothesis, but further research is needed to determine if the lack of significant differences in the other two dimensions (behavioral contingency and social attentiveness) between the avatar and text chat conditions is relevant to the hypothesis. Another finding in the study was that both the low-fidelity avatar and high-fidelity avatar conditions produced nonverbal behavior data similar to the audio-video condition. This finding is significant because investigation into the characteristics of nonverbal behavior in audio-video CMC may lead to understanding specific factors that help support the hypothesis.

Each of the four studies used slightly different definitions of social presence. The first study attempted to standardize the definition, but the other studies referred to social presence as either containing various subdimensions or being a dimension of overall “presence.” Nevertheless, all the studies agreed on the general idea that social presence refers to both the

sense of being together with others in a virtual environment and the availability and willingness to interact.

Out of the four research studies reviewed, the last study came the closest to directly supporting the hypothesis because it was the only study to directly compare text chat with avatar-mediated chat. However, the study used only dyads instead of small groups of participants, and group size may have a significant effect on social presence.

## Method

### *Participants*

The study will use 100 undergraduate business school students (50 men and 50 women, mean age = approximately 21 years). Participants will be randomly assigned to four-person groups. Each participant will be screened to check if he or she knows another participant in the group by asking each person if he or she has ever had a conversation with another person in the group. If a person has had a past conversation with another participant, that person will be removed from the group, and another person will be randomly assigned to the group and also screened for prior conversation with the other three group members. After all the groups are formed, each group will then be randomly assigned to either the text chat or MUVE chat environment.

### *Design*

The study will use a two-independent-group design to conduct an experiment that compares the social presence levels of the participants assigned to a text chat group to the social presence levels of the participants assigned to a MUVE chat group.

### *Procedure*

The participants will be told to imagine that they are in a simulated business scenario that requires discussion about a specific topic. In this experiment, the participants will be told to imagine that they are owners of a new pizza restaurant near their campus and to discuss ideas about how to build the business to best compete with the other local restaurants. After listening to the business scenario, the participants will be assigned to their rooms and workstations. Participants in the same groups will not be assigned to the same room. Depending on the size of the facility, some groups may have to wait until other groups have completed their chat sessions. Group members that have to wait will be required to remain in rooms where they may not converse with any other member in their group. Workstations will all be pre-configured so that the participants can immediately begin chatting in either the text chat environment (*Yahoo Messenger*) or MUVE chat environment (*Second Life*). Participants will be pre-assigned user accounts in their text or MUVE chat environments and will be identified in the chat environment by first name only. Each four-person group will chat for one hour in their assigned chat environment on the specific topic. At the end of the one-hour session, participants will be given a questionnaire that measures social presence. The questionnaire is based on the social presence questionnaire used by Sallnas (2005) and consists of 13 Likert scale questions.

### Results

Social presence levels will be measured by tallying up the scores of each participant's questionnaire (see Appendix A). Each of the 13 questions will be scored on a scale of 7 to 1, with the score of 7 given to an "X" marked in the far left box and a score of 1 given to an "X" marked in the far right box. Questions 2, 3, and 5, however, will be scored the opposite way because they are stated with the characteristic identified with lower social presence on the left in

order to control for yea-saying. A higher total score on the questionnaire suggests a higher social presence level during the experiment.

The means and standard deviations of the total scores for both groups will be calculated. A t test for independent samples will determine whether or not there was a significant difference between the two groups. In analyzing the results of the t test, the null hypothesis can be rejected if  $t(98) > 1.660$  ( $p < 0.05$ ).

### Discussion

If the t test shows that students who communicate in small groups via chat in a MUVE experience a significantly greater social presence than students who communicate in small groups via conventional online chat, this means that there exists one or more characteristics specific to the MUVE chat that contribute to the feeling of social presence. To identify characteristics specific to MUVE chat, the differences between a MUVE and conventional online chat environment should be examined. The main differences between a MUVE and online chat environment are that the MUVE chat incorporates the use of avatars and a 3-D environment.

The use of avatars may contribute to a higher sense of social presence because users may feel a sense of identification with a visible human figure on the screen. In the latest versions of some MUVE environments, avatars are becoming much more realistic and can even take on some of the facial characteristics of their creators. The ability of avatars to use gestures and facial expressions, such as laughing, may also contribute to a higher sense of social presence.

The 3-D environment of the MUVE may contribute to a higher sense of social presence because the visible, virtual world gives the users some context about where and with whom he or she is chatting. In addition, the fact that users are able to see their spatial relationship to the others in the chat session may affect social presence levels.

In addition to using avatars and 3-D environment, a MUVE differs from a conventional online chat environment in that many people have never participated in a MUVE. The novelty of the MUVE environment may be another factor in causing a social presence level difference. Many people are accustomed to chatting in a conventional online chat environment, so if they are asked to chat in a new interface that they have never used before, their level of social presence may go up simply because of a heightened attention to a new interface.

There are various limitations of this study, including the ability to generalize the results to other groups other than the business school participants. Business school students are probably more technically literate than the general population, so the study's results may not apply to other groups, including children and older adults. Another limitation is that because the experiment used *Second Life* as the MUVE and *Yahoo Messenger* as the conventional chat environments, the results might not pertain to other MUVES (such as *Active Worlds*, *Project Wonderland*, or *Croquet*) or conventional chat environments (such as *AOL Instant Messenger* or *Google Talk*). In addition, both types of environments are constantly upgrading their technology, so the study's findings may not apply to future versions of either *Second Life* or *Yahoo Messenger*.

Because of the constant technological innovations in all types of chat environments, future research will need to focus on the new or improved characteristics that arise from these innovations. For example, the latest avatar technology in the *Project Wonderland* MUVE allows users to create more realistic avatars, so the effects of avatar realism on social presence levels could be a topic of future research. Also, future research is needed to explore gender and age differences in comparing social presence levels in a MUVE chat versus a conventional online chat. There are measures other than social presence that could be researched in future studies.

For example, a study could compare the task performances of teams communicating in a MUVE and a conventional online chat environment in order to measure teamwork. Finally, future research can compare environments other than conventional online chat environments, such as cellphone texting or micro-blogging, to MUVE environments in regard to their effects on social presence and/or other measures.

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12. It is easy to express emotions

I totally agree |\_|\_|\_|\_|\_|\_|\_|\_| I do not agree at all

13. It would be easy to know if the other person is angry or not in this environment

I totally agree |\_|\_|\_|\_|\_|\_|\_|\_| I do not agree at all

\* Should be reverse scored in order to contribute to the overall totals