

Developing a Social Presence Scale for Measuring Students' Involvement during e-Learning Process

Myunghee KANG

Hyungshin CHOI*

Ewha Womans University

Korea

One of the challenges that online learners face is feeling of isolation and diminishing desire of maintaining active participation during e-learning. Social presence, that is considered to be a vital factor in e-learning, is recently started to receive a support from the field. Although research indicated a significant role of social presence in both learning process and learning outcome, there is no widely accepted measurement scale of social presence. This study, therefore, developed a new scale to measure social presence based on the existing theories and validated it against 723 participants. Nineteen self-report items with three dimensions, co-presence, influence, and cohesiveness, were identified and validated using Exploratory Factor Analysis (EFA) in a preliminary and a follow-up study.

Keywords : social presence, e-learning, e-learners' involvement measure

* Dept. of Educational Technology, Ewha Womans University
choi_hs@ewha.ac.kr

Introduction

Although Internet expanded the way learning is delivered, learners who take online courses face challenges such as feeling of isolation and diminishing desire to maintain active participation in online learning environments. The challenges in part originate from the fact that all contact is electronic and learners study in isolated conditions (Aragon, 2003). 'Isolation, disorientation and questionable existence can make students feel lost and uncomfortable' (Hughes, Ventura, & Dando, 2007, p.18). As a result, students either leave the environment or drop out from online courses.

Having the above in mind, social presence – a degree of interpersonal contact or sense of another through a medium – has gained an attention by educational researchers. Recent studies have provided evidence that social presence plays a positive role in online learning. Research results support the significant role of social presence in both areas: learning process and learning outcome. Positive correlations among online interactions (Tu & McIssac, 2002), motivation (Swanay Steffey, 2001), and sense of belonging (Richardson & Swan, 2003) were found in various research. Also the influence of social presence on learning outcome which implies learner satisfaction (Gunawardena & Zittle, 1997), students' perceived learning (Richardson & Swan, 2003; Rovai, 2002), and learning persistency (Rovai, 2002) was validated.

Despite the importance of social presence in online learning environments, there is no widely accepted measure of social presence. In addition, there is no mutual agreement regarding the concept of social presence. With different definitions on social presence, researchers have measured social presence in dissimilar ways. In this study, we have attempted to consolidate the existing definitions of social presence and to construct a measure hosting the common factors of the different definitions. Based on the review of the existing theories and various measures of social presence, a new scale of social presence was developed and validated using

723 participants who were enrolled in various online courses. In this paper, a preliminary study and a follow-up study to investigate the reliability and validity of this new measure are reported.

Theoretical Background

The Concept of Social Presence

Social presence is defined as the salience of the other in mediated communication and the consequent salience of their interpersonal interactions (Short, Williams, & Christie, 1976, p.65). Other researchers have refined the concept of social presence in CMC (Computer-Mediated Communication) contexts. Biocca and Harms (2002) defined social presence as a psychological state, varying with the characteristics of a medium, the type of interaction and the differences between communication partners.

Table 1. Definitions of social presence

Definitions of Social Presence	References
The salience of the other in mediated communication and the consequent salience of their interpersonal interactions	Short, Williams, & Christie, 1976
A psychological state, varying with the characteristics of a medium, the type of interaction and the differences between communication partners	Biocca & Harms, 2002
The ability of learners to project themselves socially and affectively into a community of inquiry	Rourke, Anderson, Garrison, & Archer, 1999
The degree of feeling, perception, and reaction of being connected to another intellectual entity through CMC	Tu, 2002

Some researchers defined social presence as the ability of learners to project themselves socially and affectively into a community of inquiry (Rourke, Anderson, Garrison, & Archer, 1999). Tu (2002) also studied social presence in-depth and defined it as the degree of feeling, perception, and reaction of being connected to another intellectual entity through CMC (see Table 1).

Measures of Social Presence

As the above various definitions of social presence indicate, researchers measure social presence in different ways. Short et al.(1976) used a set of semantic differential scales and asked questions to evaluate the effect of the medium rather than participants' experience. Biocca, Harms, and Gregg (2001) developed a measure called 'The Networked Minds measure' based on their review of existing research. Three dimensions are identified as co-presence, psychological involvement, and behavioral engagement. Co-presence measures participants' feeling of isolation or inclusion and mutual awareness. Psychological involvement reflects mutual attention, empathy, and mutual understanding. Behavioral engagement includes behavioral interaction, mutual assistance, and dependent action. Biocca et al. (2001) assumed the hierarchy of these dimensions, such that a sense of co-presence is most likely activated for someone to feel psychological involvement and some level of psychological involvement is likely to be activated prior to behavioral engagement.

Tu and McIssac (2002) also proposed three dimensions of social presence: social context, online communication, and interactivity. Social context includes task orientation, privacy, topics, recipients, and social process. Online communication relates to the attributes of the language used CMC environments and the applications of online language. Interactivity is concerned with the activities in which e-learning participants engage and the communication styles they use. Rourke et al. (1999) saw social presence as one element among three elements

(cognitive, social, teaching presence) of their community of inquiry model. They categorized social presence into three categories: affective response, interactive response, and cohesive response. The affective response category includes the expression of emotion, feelings, and mood which are manifested through the use of emoticons, humor, and self-disclosure. Interactive response implies interpersonal support, encouragement, and acceptance of the initiator. Lastly, the cohesive response category refers to building and sustaining a sense of group commitment, and it can be shown via phatics and salutations, vocatives, and addressing the group as 'we', 'our', or 'us'.

While Short et al.'s and Biocca et al.'s measure are subjective self-report scales, Tu & McIssac's and Rourke et al.'s measures are indicators that can be used by qualitative analyses. Table 2 summarizes the dimensions of social presence proposed by previous research.

Table 2. Dimensions of social presence

References	Dimensions of Social Presence
Biocca & Harms, 2002	<ul style="list-style-type: none"> • Co-presence • Psychological involvement • Behavioral engagement
Tu & McIssac, 2002	<ul style="list-style-type: none"> • Social context • Online communication • Interactivity
Rourke, Anderson, Garrison, & Archer, 1999	<ul style="list-style-type: none"> • Affective response • Interactive response • Cohesive response

Roles of Social Presence in e-Learning

Much research has provided evidence that social presence plays a positive role in

online learning (see Table 3). In terms of learning process, Tu and McIssac(2002) found that social presence significantly correlates to online interaction. Swanay Steffey (2001) also revealed a significant correlation between social presence and motivation.

Table 3. Roles of social presence in e-learning

Category	Related Variables	Research Support
Learning Process	social presence significantly correlates to online interaction	Tu & McIssac, 2002
	significant correlation between social presence and motivation.	Swanay Steffey, 2001
Learning Outcomes	social presence is a important predictor of learner satisfaction in computer conferencing	Gunawardena & Zittle, 1997
	social messages among online learners promoted students' sense of belonging and intimacy	Stacey, 2000
	social presence contributed significantly to the predictor equation for students' perceived learning and perceived satisfaction with the instructor	Richardson & Swan, 2003
	sense of community in online learning significantly correlates to perceived achievement and learning persistency	Rovai , 2002

From the learning outcome perspective, there is evidence to support its impact on students' satisfaction and achievement. First, Gunawardena and Zittle(1997) showed that perceived social presence is a very important predictor of learner satisfaction in computer conferencing. Second, Stacey (2000) verified that social messages among online learners promoted students' sense of belonging and intimacy. Third, Richardson and Swan (2003) examined social presence in online

courses in relation to students' perceived learning and satisfaction. The results showed students' perceptions of social presence overall contributed significantly to the predictor equation for students' perceived learning and perceived satisfaction with the instructor. Lastly, Rovai (2002) found that sense of community in online learning significantly correlates to perceived achievement and learning persistency.

Preliminary Study

Participants

440 undergraduate students enrolled in an online course titled 'Design of College Life' at a large university in the fall semester of 2006. This class lasted for eight weeks. 418 of the students participated in the study. The participants were all freshmen. Students had met face-to-face once at the beginning of the module.

Instrument Development

The operational definition of social presence in this study is 'perceived depth of relationships with other learners and the community during e-learning.' Based on the theoretical review of social presence, we came up with three components of social presence. Each component has three sub-components and the theoretical framework of each component is summarized in Table 4.

We developed eighteen items with a five-point Likert scale. The items were analyzed by an expert for content validity and modified based on recommendations. An online survey was conducted and 418 responses were collected. Exploratory factor analysis (EFA) was performed to verify the emergence of the three dimensions of social presence. Principal axis factoring method was used to extract factors. To rotate factors, direct oblimin rotation method was used. Scree testing

with visual inspection was also used to determine the number of factors to be extracted.

Table 4. Theoretical framework for three components of social presence

Main components	Sub components	Research support
Co-presence	Not being isolated	Biocca, Harms, & Gregg, 2001; Short et al., 1976
	Mutual awareness	
	Mutual attention	
Influence	Mutual understanding	Biocca, Harms, & Gregg, 2001
	Mutual interdependence	
	Mutual assistance	
Cohesiveness	Positive interaction	Tu, 2000, 2002; Tu & McIssac, 2002; Gunawardena & Zittle, 1997; Rovai, 2002
	Chances of contribution	
	Sense of group commitment	

Results

The results of EFA with 18 items yielded three factors: co-presence, influence, and cohesiveness. These factors showed the reliability with Cronbach's coefficient alpha .50, .78, and .66, respectively. The six items showing lower loading than .30 were removed. As a result, 12 items were remained. The finalized items with reliability were reported in Table 5. The co-presence factor showed low reliability and required further investigation.

Follow-up Study

Participants

An identical online course titled 'Design of College Life' was offered right after the first online course that was used for the preliminary study. Different students than the participants of the preliminary study took the course. Data were collected from 305 students enrolled in the course. The participants were all freshmen. Likewise, students had met face-to-face once at the beginning of the module.

Table 5. Emerged factors of social presence (preliminary study)

Main components	Remaining Items	Factor loading	Cronbach's alpha
Co-presence	I often feel that other learners are there.	.906	.50
	I have an interest in what other learners do.	.380	
	I feel alone while I am taking the online course.	.378	
Influence	I provide help when other learners ask for it.	.705	.78
	Other learners accept each others' opinions well.	.642	
	We solve difficult problems together.	.641	
	Other learners understand me well.	.593	
	I can convey what I mean accurately.	.506	
Cohesiveness	Other learners' opinions affect what I think.	.479	.66
	My ideas contribute a lot to the team tasks.	.855	
	I feel close to the other learners.	.645	
	I feel like part of a team.	.395	

Instrument Development

Based on the results of the preliminary study, the items were modified. The six items showing lower factor loading than .30 were removed. Twenty seven items were used for the follow-up study. They were constructed by refining the remained twelve items from the preliminary study and adding more items to have the same numbers of items in each subcomponent. Exploratory factor analysis (EFA) was performed to verify the emergence of the three dimensions of social presence. Principal axis factoring method was used to extract factors. To rotate factors, direct oblimin rotation method was used. Scree testing with visual inspection was also used to determine the number of factors to be extracted.

Results

The results of the EFA with 27 items yielded three factors: co-presence, influence, and cohesiveness. These factors showed the reliability with Cronbach's coefficient alpha .74, .76, and .73, respectively. Only the items showing factor loading higher than .30 were retained, as shown in Table 6. As a result, nineteen items (5 co-presence items, 7 influence items, and 7 cohesiveness items) remained with improved reliability.

The final scale obtained from the study is presented in Table 7.

Table 6. Factor loading for items (>.30)

	factor		
	1	2	3
sp_inf3	.568		
sp_inf6	.565		
sp_inf4	.549		
sp_inf8	.531		
sp_inf5	.519		
sp_inf2	.515		
sp_inf1	.427		
sp_co8		.791	
sp_co9		.631	
sp_co6		.425	
sp_co5		.367	
sp_co7		.390	
sp_coh7			.670
sp_coh3			.649
sp_coh1			.440
sp_coh2			.399
sp_coh5			.390
sp_coh8			.387
sp_coh6			.337

Table 7. Retained items of the new scale

Constructs	Items	Cronbach's coefficient alpha
Co-presence	1. I think that other students are aware of my presence.	.74
	2. I feel like I am studying with other students.	
	3. I am interested in what other students are doing.	
	4. Other students are interested in what I am doing.	
	5. The level of mutual interest seems high.	
Influence	1. I think I can convey my ideas clearly to other students.	.76
	2. Other students understand me well.	
	3. I think I can understand well what other students think.	
	4. We accept each other's ideas well.	
	5. Other students' ideas affect what I think.	
	6. We help each other solve difficult problems.	
	7. We help each other.	
Cohesiveness	1. It is pleasant to exchange ideas with other students.	.73
	2. I get quick responses from other students.	
	3. I feel comfortable communicating with other students.	
	4. My ideas help us proceed with group work.	
	5. All the team members contribute to group work.	
	6. I feel close to other students.	
	7. I feel like I am part of a team.	

Conclusion

Social presence is considered a vital factor in e-learning. Existing definitions of social presence, however, are overly broad and tend to be vague. Research reports correlations between social presence and other variables with different definitions and measures of social presence. This study proposed a more focused definition of social presence in the e-learning environment via a thorough literature review. This new measure of social presence is theoretically grounded and went through a validation process. Based on the components of social presence, the items were constructed. These constructs are validated by factor analyses with a preliminary study and a follow-up study. The results confirmed that social presence is composed of three dimensions: co-presence, influence, and cohesiveness. The next step is to conduct a CFA (Confirmatory factor analysis) to confirm construct validity. In addition, the external validity of this scale should be checked with learning outcomes in e-Learning. We hope that this study contributes to establishing a foundation for the measurement of social presence with predictive power.

References

- Aragon, S. (2003). Creating social presence in online environments. *New Directions for Adult and Continuing Education*, 100, 57-68.
- Biocca, F., & Harms, C. (2002). Defining and measuring social presence: Contribution to the networked minds theory and measure. In F.R. Gouveia, and F. Biocca (Eds). *Proceedings of Presence 2002*, 7-36.
- Biocca, F., Harms, C., & Gregg, J. (2001, October). *The networked minds measure of social presence: Pilot test of the factor structure and concurrent validity*. Paper presented at Presence.
- Hughes, M., Ventura, S., & Dando, M. (2007). Assessing social presence in online discussion groups: a replication study. *Innovations in Education and Teaching International*, 44(1), 17-29.
- Gunawardena, C. N., & Zittle, F. J. (1997). Social presence as a predictor of satisfaction within a computer-mediated conferencing environment. *The American Journal of Distance Education*, 11(3), 8-26.
- Richardson, J. C. & Swan, K. S. (2003, February). Examining social presence in online courses in relation to students' perceived learning and satisfaction. *Journal of Asynchronous Learning Networks*, 7(1), 21-40.
- Rourke, L., Anderson, T., Garrion, D., & Archer, W. (1999). Assessing social presence in asynchronous test-based computer conferencing. *Journal of Distance Education*, 14(2), 50-71.
- Rovai, A. (2002). Sense of community, perceived cognitive learning, and persistence in asynchronous learning networks. *Internet and Higher Education*, 5, 319-332.
- Short, J. E., Williams, E., & Christie, B. (1976). *The social psychology of telecommunications*. London: John Wiley & Sons, Ltd.
- Stacey, E. (2000). Quality online participation: establishing social presence. In T. Evans (Ed.), *Research in Distance Education*, 5, 138-153. Deakin University, Geelong. Retrieved June, 19, 2006, from

http://www.deakin.edu.au/education/ripvet/conferences/2000/RIDE/Ch13_Stage.pdf.

Swanay Steffey, C. (2001). The effects of visual and verbal cues in multimedia instruction. Unpublished dissertation. Retrieved August, 1, 2006, from <http://scholar.lib.vt.edu/theses/available/etd-03092001-34749/unrestricted/DissertationITCBSREV3.pdf>

Tu, C. H. (2000). *An examination of social presence to increase interaction in online classes*. Unpublished doctoral dissertation, Arizona State University, Arizona.

Tu, C. H. (2002). The measurement of social presence in an online environment. *International Journal of E-Learning*, April-June, 34-45.

Tu, C. H., & McIsaac, M. (2002). The relationship of social presence and interaction in online classes. *The American Journal of Distance Education*, 16(3), 131-150.



Myunghee KANG

Professor, Dept. of Educational Technology, Ewha Womans University

Interests: e-Learning Content Design, Development and Quality Assurance

E-mail: mhkang@ewha.ac.kr



Hyungshin CHOI

Research Professor, Dept. of Educational Technology, Ewha Womans University. Interests: e-Learning, CSCL(Computer-Supported

Collaborative Learning)

E-mail: choi_hs@ewha.ac.kr