A Framework for Social Presence in Synchronous Cyber Classrooms

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Abstract

Social presence is considered as an essential element to promote social interaction. With the development of online synchronous learning, learners can conduct cyber face-to-face communication with other participants. When social cues are delivered by computer devices in real-time, it becomes a real possibility for students to experience actual learning atmosphere while still retaining the flexibility and convenience of online learning. However, the perceived social presence among learners is not the same for everyone. In order to better facilitate social interaction in a synchronous cyber classroom, this study explored what factors would affect social presence and verified if social presence has positive effects on learner participation and interactivity satisfaction. The results revealed that the major factors affecting social presence are intimacy, user friendliness, responsiveness, extroversion, and cue richness in a synchronous cyber classroom. Moreover, social presence was found to have positive effects on both learner participation and interactivity satisfaction.

1. Introduction

From the viewpoint of social learning theory, social presence is an essential element to promote social interaction, especially in the online learning environments [1]. Social interaction refers to a dynamic sequence of social actions between individuals or groups who adjust their actions and thoughts through their interactions with their partners [2]. Social learning theory considers that people learn not only through their own experiences, but also by observation, imitation, and modeling from others. It focuses on the learning that occurs within a social context. Individual’s psychological processes, social environment, and individual’s behavior are the three major factors which interact with each other continually [3]. Gunawardena [4] pointed out that if social interaction is absent, social learning will not occur. Social interaction between learners and role models is necessary. These role models can be instructors or peers who help others to develop cognitive, affective, and psychomotor abilities. Therefore, learners must acknowledge and value the other person’s social cues to perceive the social presence. From social learning theory perspective, social presence is a major vehicle of social learning [5].

In the past, the online learning environments mostly provided asynchronous text-based discussions which were lacking the immediacy of communication and the effectiveness of interactivity. However, the broadband Internet connection and IP-based video streaming technique have made online synchronous learning with cyber face-to-face interaction possible. In a synchronous cyber classroom, learners can conduct their social interaction via Internet with the help of multiple devices engaging different sensory channels, such as headsets, webcams, keyboards, and mice, for face-to-face communication with other participants. Social cues can be delivered by these communication devices in real-time. These devices allow for creation of a real atmosphere similar to a physical classroom while still retaining the flexibility and convenience of online learning. With this kind of cyber face-to-face feature, the social interaction among instructors and learners can be greatly improved.

The synchronous cyber classrooms are designed and developed based on learning theories and information technologies. These kinds of learning environments are capable of supporting pedagogical strategies such as team teaching, collaborative learning, and peer learning. They support not only instructional activities but also social interaction. Multimedia
materials and communication can be conveyed to every participant supported by some sort of synchronous learning management system (SLMS) and computer devices via the Internet. Learners can experience actual learning atmosphere similar to a traditional classroom. An example SLMS is shown in Figure 1.

The synchronous cyber classroom provides multiple channels for communicating social cues. However, the perceived social presence among learners is not the same for everyone. In order to better facilitate the social interaction in a synchronous cyber classroom, this study explores what factors would affect social presence from the social learning theory perspective. Besides, both learner participation and interactivity satisfaction are regarded as indicators for measuring learning effectiveness and they are related with social interaction directly [6]. Thereafter, this study aims to verify whether social presence has positive effects on learner participation and interactivity satisfaction. Finally, the implications of our findings are discussed for further research directions and practical applications.

2. Methods

2.1. Research framework

Based on the three major elements of social learning theory, individual’s psychological processes, social environment, and individual’s behavior, the source of perceived social presence can be classified into four dimensions: individual characteristics, social relationships, user interface, and real-time interactivity. Individual characteristics reflect the personality of the learner. Learners who are extrovert and have high self-efficacy, may perceive a high degree of social presence [7]. Social relationship is an existent relationship among learners. If learners knew the classmates and understood the individual characteristics of members in a synchronous cyber classroom, they will perceive a high degree of social presence [8]. The quality of user interface also affects the perception of the learner. If the synchronous cyber classroom is user friendly and provides rich cues, it will enhance the perceived social presence of the learner [1]. Real-time interactivity provides immediate interaction through the synchronous cyber classroom. When learners create a good relationship and get appropriate response in real-time, their perceived social presence will be good [4].

Besides, learner participation and interactivity satisfaction are two important indicators for learning effectiveness. If learners perceive a high degree of social presence, they will engage in the learning activities and enhance their satisfaction of interaction with others [9].

The research framework of our study is composed of two parts as shown in Figure 2. The first part is to explore which factors affect the perceived social presence of the learner in a synchronous cyber classroom. The second part aims to verify whether social presence has positive effects on learner participation and interactivity satisfaction.

Operational definitions of the variables used in our research framework are shown in Table 1. A questionnaire was developed following these operational definitions.

![Figure 1. Screen capture of a synchronous cyber classroom](Image)

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![Figure 2. Research framework](Image)

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**Table 1. Operational definitions of variables**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Operational definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extroversion</td>
<td>The degree of a learner’s tendency to be positive and be close to others.</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>The degree of a learner’s self-confidence that he/she can solve general problems.</td>
</tr>
<tr>
<td>Similarity</td>
<td>The degree of a learner’s perception of his/her background being similar to the others.</td>
</tr>
<tr>
<td>Familiarity</td>
<td>The degree of a learner’s perception of the experiences in interacting with other participants (within and without class).</td>
</tr>
</tbody>
</table>
User friendliness The degree of a learner’s perception about the system’s ease of use, naturalness, ease of understanding, and helpfulness.

Cue richness The degree of a learner’s perception of the richness of the cue, including multiple cues, response speed, and the quality of the cues.

Intimacy The degree of a learner’s perception that he/she has a close relationship with others in a synchronous cyber classroom.

Responsiveness The degree of a learner’s perception of the response from others in a synchronous cyber classroom.

Social presence The degree of feeling, perception, and reaction of being connected to other intellectual entities in a synchronous cyber classroom.

Learner participation The degree of a learner’s preference to be involved in the learning activities in a synchronous cyber classroom.

Interactivity satisfaction The degree of learner’s satisfaction with respect to his/her interaction with other participants in a synchronous cyber classroom.

2.2. Participants

The target audience of this study is the learners who have actually had the experience in a synchronous cyber classroom. The pilot test was carried out on April 10 and April 11, 2008 using a paper-based questionnaire. The participants included a class of undergraduate learners and two classes of graduate learners who finished more than one online synchronous course from the department of information management in a Taiwanese university. This department has promoted synchronous cyber learning for several years. Almost all of the learners have engaged in online synchronous learning at some point in time. The valid sample remained as 93. There were 37 females (39.78%) and 56 males (60.22%). The range of their age was between 18 and 24 years old.

The formal test was carried out from April 28 to May 11, 2008 through a web survey system. The web address of the questionnaire was delivered to participants by e-mail and bulletin board system (BBS). The e-mail addresses of learners who were targeted as the subjects in this study were collected from two cyber schools in Taiwan engaged in online synchronous learning. There were a total of 250 samples for statistical analysis.

The number of males (57.20%) is slightly more than females (42.80%). The learners who are more than 20 and under 25 years old are of greater majority (32.00%). There are 117 undergraduate students (46.80%), 122 graduate students (48.80%), and 11 doctoral students (4.40%). In terms of experience of online synchronous learning, highest percentage (22.40%) included those who had more than three years experience, followed by those who had more than half a year but less than one year experience (21.20%).

3. Data analysis

In the first part of research framework, multiple regression analysis was used to test the influence of independent factors on social presence. The results revealed that the major factors affecting social presence are intimacy, user friendliness, responsiveness, extroversion, and cue richness in a synchronous cyber classroom as shown in Table 2. The value of adjusted R square is 0.719 which means that these four variables have a high capacity to explain the variance of social presence. In addition, there is no collinearity problem among the independent variables in this study because the values of tolerance are more than 0.1 and the values of the variance inflation factor (VIF) are less than 10 [10].

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
<th>Co-linearity Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>0.12</td>
<td>0.12</td>
<td>0.97</td>
<td>0.34</td>
<td></td>
</tr>
<tr>
<td>Intimacy</td>
<td>0.56</td>
<td>0.06</td>
<td>0.51</td>
<td>10.26</td>
<td>0.00</td>
</tr>
<tr>
<td>User friendliness</td>
<td>0.45</td>
<td>0.06</td>
<td>0.37</td>
<td>7.31</td>
<td>0.00</td>
</tr>
<tr>
<td>Responsiveness</td>
<td>0.22</td>
<td>0.05</td>
<td>0.19</td>
<td>4.34</td>
<td>0.00</td>
</tr>
<tr>
<td>Extroversion</td>
<td>0.12</td>
<td>0.05</td>
<td>0.09</td>
<td>2.53</td>
<td>0.01</td>
</tr>
<tr>
<td>Cue richness</td>
<td>0.14</td>
<td>0.06</td>
<td>0.10</td>
<td>2.47</td>
<td>0.01</td>
</tr>
</tbody>
</table>

Note: Dependent variable is social presence

Simple regression analysis was used for the second part of research framework to test the relationships of social presence on learner participation and interactivity satisfaction. The results showed that social presence has significant positive influence not only on learner participation (adjusted R square = 0.629, beta = 0.794, p-value = 0.000) but also on interactivity satisfaction (adjusted R square = 0.605, beta = 0.779, p-value = 0.000).

4. Discussions

4.1 Individual characteristics dimension

Extroversion has a significant effect on social presence. The result indicates that the learners who are extrovert can perceive more social presence than those who are not extrovert. An extrovert tends to socialize with others actively through various channels to make a speech conversation or text chat. The feature of real-time will result in more opportunities to make social interactions and exchange social cues for constructing higher social presence in a synchronous cyber classroom. There is a significant correlation between self-efficacy and social presence with a Pearson correlation coefficient of 0.201 (p-value=0.001). However, self-efficacy does not have sufficient...
Explanation power on the variance of social presence in regression analysis.

In instructional practice, characteristics of individuals are difficult to change. However, if instructors understand the characteristics of class members before instruction, they can employ more appropriate strategies to help learners perceive social presence. Gunawardena [4] suggested that the students’ perception of social presence is impacted by the instructors’ skilled use of interaction techniques in initiating online conversations with introductions and salutations. For example, introducing himself/herself can make students more familiar with each other and facilitate to get social cues. The group activity, for instance, is like dividing the learners with higher extroversion into different groups. Such activities can bring an active atmosphere in the group and provide the learners with lower extroversion opportunities to interact with other learners for constructing social presence. When class members interact together over time, the level of social presence can be raised through a process of social construction.

4.2 Social relationships dimension

The results show that both similarity and familiarity have no significant effects on social presence in a synchronous cyber classroom. Because the institutions promoting online synchronous learning are mainly universities, the learners in the same class have no greater variance in ages and education level. The same reason can also explain why familiarity has no significant impact on social presence. If the participants who join an online synchronous course are mainly from the same physical class, they would have certain extent of familiarity, which would result in familiarity with low variance. Further research would be important with larger sample sizes that are not limited to the ordinary university students and have increased variance of sample source.

4.3 User interface dimension

In this study, both user friendliness and cue richness have significant effects on social presence in a synchronous cyber classroom. This result is consistent with the literature review. According to the social presence theory, the critical factors for perceived social presence of learners are dependent on the richness of social cues. Verbal cues and non-verbal cues can be presented in real-time in a synchronous cyber classroom. If instructors want to construct higher social presence in a synchronous cyber classroom, multiple sources of cues must be provided to learners and the quality of cues must be considered. When the learners could not operate normally or conveniently using the user interface, it may cause them to resist to the system. The learners will refuse to use the functions of the synchronous cyber classroom and their desire to interact with other participants will decrease. The quality of audio and video is very important in online synchronous learning. If the noises occur very often, it will interfere with communication among participants. Learners may lose attention to course contents and even lose the reliance to online synchronous learning mode. These problems will affect also the transmission and reception of social cues and may lead to low degree of social presence.

In the instructional practice, online learners must become familiar with the synchronous learning environment in the initial learning sessions. Instructors can encourage learners to prepare the equipments, such as headsets, webcams, keyboards, and mice, for transmitting social cues before an online synchronous course starts and teach them how to set up and use these equipments.

4.4 Real-time interactivity dimension

Both intimacy and responsiveness will result in significant variation of social presence in a synchronous cyber classroom. In practice, the degree of real-time interaction in a synchronous cyber classroom often depends on the instructional strategies and learning activities in the course. Instructors can make learners participate in discussion through guidance, encouragement, grouping, and bonus-penalty type awards [11]. For example, instructors can ask learners to answer a question or broach an issue to discuss. When learners start discussing, instructors can give them some encouragement and suggestion opportuneiy to keep their discussion going on. If there are a large number of the class members, instructors can consider dividing them into several groups. Then each group would start its own synchronous cyber discussion room to talk about the issue. At the same time, instructors should visit the synchronous cyber discussing room one by one to provide them guidance and assistance. They should make sure that every learner has the chance to
communicate with the other participants. At last, praises and bonus points can be given to the active speakers and the enthusiastic learners to establish the climate to interact in a class.

4.5 Learner participation and interactivity satisfaction

As per the result of simple regression analysis, social presence actually influences learner participation and interactivity satisfaction in a positive way. It means improving learners’ social presence can enhance their participation and interactivity satisfaction in a synchronous cyber classroom.

In practice, instructors should enlarge the participation and satisfaction of learners for increasing learning performance. The study found five factors affecting social presence in a synchronous cyber classroom. Instructors can utilize these factors and the above teaching suggestions to improve the level of social presence and therefore enhance the participation and the satisfaction of learners.

5. Conclusion

From social learning theory perspective, social presence which can promote social interaction in online synchronous learning environment is considered an essential element of social learning [5]. In order to better facilitate the social interaction in a synchronous cyber classroom, this study explored what factors would affect social presence and verified whether social presence has positive effects on learner participation and interactivity satisfaction.

Summing up the prior studies about social presence, the factors affecting social presence can be sorted by human side and media side. This study reviewed the literature to find the factors which may influence social presence and redefined them. These independent variables include extraversion, self-efficacy, similarity, familiarity, user friendliness, cue richness, intimacy, and responsiveness. An instrument with sufficient reliability and validity was developed to measure these factors. Such instrument is useful in itself for future research on related issues.

In fact, there are some causal relationships among these independent variables. Future studies can be based on our findings constructing a stable model and employing advanced statistical methods, such as confirmatory factor analysis, partial least square (PLS), and structural equation model (SEM), to investigate the relationships of these variables affecting social presence.

Researchers can collaborate with other institutions which engage in online synchronous learning to enlarge sample size and increase the variety of samples. It can enhance the degree of generalization in the research result. Moreover, the time factor can be considered as an important variable to find out the variation of the perceived social presence of learners in various phases.

Acknowledgements

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References