Place, Social & Co-Presence: Do They Differ Based on Students' Gaming Experiences?

Mohd Hishamuddin Abdul Rahman, Noraffandy Yahaya, Noor Dayana Abd Halim
Department of Educational Sciences, Mathematics and Creative Multimedia, Faculty of Education,
Universiti Teknologi Malaysia, UTM,
Johor Bahru, 81310, Johor, Malaysia

Nowadays, virtual worlds have been utilized in the field of education as one of the virtual learning platforms. Since the virtual world environment is very similar to video game environment, the gaming experiences of the students might affect their sense of presence in the environment. Thus this study seeks to determine whether there are differences between students with different levels of gaming experiences on their sense of place presence, social presence and co-presence. The study involved 33 part-time diploma students and was carried out for six weeks using questionnaires and interview questions as research instruments. The results of the study showed a significant difference between students with a lot of gaming experiences and less gaming experiences in terms of place presence, and this finding was supported with the data from the interview. However, no significant difference was noted between both groups in terms of social presence and co-presence.

Keywords: Virtual World, Multi-User Virtual Environment, Presence, Place Presence, Social Presence, Co-Presence

1. INTRODUCTION

Rapid advancement of technology can simplify and speed up communication processes. The development of information and communication technology (ICT) for instance, has allowed various learning activities to be conducted virtually. Some of the activities that have extensively exploited such a technology are cooperative and collaborative learning, in which ICT can strongly support the vital elements of the learning activities. The elements of these activities are interaction and communication between students, which are often carried out in a two-dimensional virtual learning environment (VLE) by utilizing Web 2.0 applications such as chat rooms, online discussion forums, social networking sites, and blogs.

Despite being extraordinarily capable of supporting online learning activities, the applications have several drawbacks. The technology is limited to text-based communication; it provides less support in the use of nonverbal communication to convey messages; and it provides users with limited tools to collaborate. These limitations make the applications inferior in supporting communication and interaction hence the learning activities performed in a VLE are considered very limited and not realistic since they are executed merely through text conversations or discussions without any other forms of interactions. Several problems have emerged from these limitations, particularly on the sense of presence which is one of the crucial elements in online learning. Therefore recently, a three-dimensional virtual world has been utilized as a platform of online learning as it possesses potentials in generating various type of presences, such as place presence, social presence, and
co-presence. Moreover previous studies have attested that virtual world can facilitate students’ sense of presence in a virtual environment.

Compared to 2-dimensional VLEs, virtual world environment is more similar to video games environment. Hence students’ gaming experience should be considered as an individual characteristic that might have some impact on their sense of presence in the virtual world. This matter however, has not been extensively focused in previous studies although it is important since more mature students nowadays are enrolling into online learning and they may not be digital natives who are experienced in dealing with such an environment. Thus their sense of presence may be diverse when using the same application. Therefore, this study was conducted to answer the following questions: 1) Did students experience place presence, social presence, and co-presence in the virtual world? and 2) Are there any differences between students with varied gaming experiences in terms of their perceived place presence, social presence, and co-presence in the virtual world?

2. LITERATURE REVIEW

2.1 Presence

The term sense of presence has been defined as an awareness, namely the psychological feeling that a person feels like he or she is in a virtual environment. Despite this person being somewhere else, the sense of presence could make him believe that he is in another place or environment. One scholar professes that the sense of presence can be divided into three categories: place presence, social presence, and co-presence.

Place presence is basically a “sense of being there”. Whereas social presence is the degree to which a person is perceived as a “real person” in a mediated communication, affected by the quality of the communications’ medium provided by the environment. Thus the environment plays an important role in determining social presence. Co-presence, on the other hand, is explained as the sense of being together but it is more into the physiological connection of minds. In this case, a person is able to notice other people in the environment and at the same time, other people are also able to notice him or her.

Previous researchers have concluded that the sense of presence is closely related to students' participation, motivation, enjoyment, and satisfaction. Thus we can consider the sense of presence an important element in any online learning activities. However, it is difficult to generate sense of presence in a two-dimensional VLE, and one of the latest technologies, the virtual world, has been widely utilized in online learning following its perceived potential in generating sense of presence.

2.2 Virtual World

Known as multi-user virtual environment (MUVE), the virtual world is a three-dimensional virtual space that looks similar to the role-playing games but without specific objectives or goals. Compared to the two-dimensional VLE, virtual worlds are very flexible. It can generate a realistic VLE, support various forms of communication and interaction, generate a digital representative (avatar) for the user, and allow users to interact in the environment with some of the in-world actions. These affordances have attracted educators to implement virtual worlds in online learning and have made the tool a popular learning platform today.

Many types of virtual worlds are available online, such as Second Life, Active World, OpenSim, and Open Wonderland. Second Life notably is the most popular virtual world to date. Each of the applications has its pros and cons, and educators should properly choose a virtual world that suits their teaching and learning purposes.

3. METHODOLOGY

3.1 Participants

Thirty-three diploma students from the Introduction to Multimedia class participated in this study. The class was selected because it is composed of students of different age levels and gaming experiences. Apart from that, the class was carried out at one of the biggest computer laboratories in the university. The participants were between 22 and 49 years of age, and the median age was 32 years. Majority of them (31) did not have any prior virtual world experiences.

3.2 Virtual World Development

In the university, the virtual world or three-dimensional MUVEs is not a common technology for teaching and learning. Therefore for this study, we developed a three-dimensional VLE by using Open Wonderland virtual world, which is a JAVA-based open-source virtual world named Virtual Educational World (ViEW). Open Wonderland was chosen because it is free and flexible, and it offers a variety of control over the environment. Using Open Wonderland allowed us to setup the size and privacy of the environment, control the numbers of users, and manage in-world objects. As for the users, Open Wonderland provided them with satisfying features including avatar customization and gestures, text and voice communication, dynamic camera views, and numbers of objects which can be used, modified, relocated, and removed. Open Wonderland can also be run using computers with moderate specifications.

As for the creation of ViEW’s in-world environment, other than utilizing some of the build-in objects, we also developed a number of 3-D buildings and objects by using the Google SketchUp software and imported them into the environment.

3.3 Instrument

Two questionnaires were developed for this study. The first questionnaire was about the participants’
demographic and gaming experiences, in which the items were adapted from a research by author and used to determine the participants' demography and their level of gaming experiences. For instance, the questions consisted of items on the time duration spent for video games and how often they played video games in a week.

To assess the participants' sense of place presence, social presence and co-presence, a second questionnaire was developed. The items for place presence was adapted from author whereas items for social presence and co-presence were modified from author and author respectively. This questionnaire adopted a 5-point scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The Cronbach’s alpha for each section in the questionnaire was 0.68 for place presence, 0.69 for social presence and 0.73 for co-presence thus they are all within the satisfactory range. Furthermore, to support the findings from the questionnaire, several interview questions on place presence, social presence, and co-presence were also structured.

3.4 Procedure

At the beginning, a preliminary study was conducted by using the gaming experiences questionnaire to determine whether the students’ gaming experiences vary. The results showed that there were indeed variations of gaming experiences between the students. Fifteen of them can be considered as having much gaming experiences while eighteen having less. Then the actual study was carried out for six weeks, starting from the week after the preliminary study. The study was conducted during the class learning session, which was held throughout the semester in one of the university's biggest computer laboratory.

In the first week, we separated the participants into two categories: Category 1 (C1) for participants with less gaming experiences and Category 2 (C2) for participants with much gaming experiences. Next, each participant from both categories was assigned into one of the seven learning groups in order to create a learning group that consists of participants from both C1 and C2. Each learning group was coded with a unique colour, name, and logo, and each participant was given his or her own workstation with a computer and a headphone. The workstations of participants from the same learning group were located at different sections to avoid any direct communication and interaction between them. Afterwards, the first training session was conducted to make sure that the participants were familiar with ViEW and that they learned how to do basic things in the environment such as navigating the world, changing the camera views, customizing the avatar, as well as inserting and manipulating objects. The second training session was held a week after.

Then from week 3 to week 5, a cooperative learning activity in ViEW was carried out in every class meeting. Each session lasted approximately 90 minutes and covered different topics. During the learning session, every group was encouraged to use all tools provided and also utilized all the communication channels supported by ViEW. Figure 1 shows some of the screenshots of the learning activities.

On the final week, the presences questionnaire was distributed to all participants, followed by an interview session with eight participants we randomly selected from both C1 and C2.

**Fig.1. The learning activities**

4. DATA ANALYSIS AND FINDINGS

Descriptive analysis was used to analyze the presences questionnaire in order to answer the first research question. Three participants did not fully attend the class during the period of the study, hence their responses were discarded. This reduced the number of participants to 30. From the analysis, we found that the overall mean for place presence, social presence, and co-presence were 3.77, 3.98, and 3.9 respectively while the median value for all items of each presences was 4, although some of the items acquired a minimum score of 2 and maximum score of 5. Therefore we can assume that most of the participants felt strong place presence, social presence, and co-presence while they participated in the cooperative learning activities in ViEW.

As for the second research question, nonparametric Mann-Whitney U analysis was used to investigate the differences in sense of place presence, social presence, and co-presence between the two categories of participants with different levels of gaming experiences. Since three participants’ data were not included in the analysis process, the number of participants with much gaming experienced has changed to 14, while the number of those with less gaming experience has reduced to 16. Findings for each categories of presences are illustrated in Table 1.

Findings from the Mann-Whitney U test (Table 1) suggest a significant difference between C1 and C2 in terms of perceived place presence [U (n1=16, n2=14) = 49.0, p< 0.05] as the U value (49.0) was smaller than the critical value in the table of critical value of the Mann-Whitney U test (72). Moreover, the mean rank value for C1 (11.56), which was much lower than C2 (20.0), indicated that the participants with much gaming experiences felt that they were truly in the virtual world compared to the participants with less gaming experiences.
Table.1 Result of Mann-Whitney U test

<table>
<thead>
<tr>
<th>Presence</th>
<th>Place</th>
<th>Social</th>
<th>Co</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Rank</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1</td>
<td>11.56</td>
<td>15.34</td>
<td>13.41</td>
</tr>
<tr>
<td>C2</td>
<td>20.00</td>
<td>15.68</td>
<td>17.89</td>
</tr>
<tr>
<td>Test Statistic:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mann-Whitney U</td>
<td>49.0</td>
<td>109.5</td>
<td>78.5</td>
</tr>
<tr>
<td>Wilcoxon W</td>
<td>185.5</td>
<td>245.5</td>
<td>214.5</td>
</tr>
<tr>
<td>Z</td>
<td>-2.646</td>
<td>-.106</td>
<td>-1.44</td>
</tr>
<tr>
<td>Asymp. Sig. (2 tailed)</td>
<td>.008</td>
<td>.915</td>
<td>.148</td>
</tr>
<tr>
<td>Exact Sig. [2*(1-tailed]</td>
<td>.008*</td>
<td>.918*</td>
<td>.166*</td>
</tr>
</tbody>
</table>

a. Not corrected for ties

The boxplot graph in Figure 2 was used to support the findings. The graph illustrates that the median values of place presence (each represented by a long horizontal line) for both groups were indeed at different levels. However, this result does not indicate that C1 place presence score was low since it also exceeds the middle score. As for social and co-presence, no significant differences between both group were concluded since the U value of social presence (U=109.5) and co-presence (U=78.5) were bigger than the critical value of the Mann-Whitney U test. These results can also be supported by the boxplot graph in Figure 2 which illustrates that the median values for social presence and co-presence of each C1 and C2 were almost at the same level.

![Boxplot Graph](image)

Fig. 2. The boxplot graph on the sense of place presence, social presence and co-presence of C1 and C2

The results from the interview also indicated a difference between C1 and C2 in terms of perceived place presence. Below are few answers given by some participants from both categories of gaming experiences.

**Question 1:** When you were in ViEW, did you feel like you were really in the virtual world?

**C1:** I did not really feel like that.

**C2 (A):** I felt like I was really there because I could hear voices and I could also move around.

**C2 (B):** Yes, because I could communicate like I was in the real world

**Question 2:** Did you feel comfortable in ViEW?

**C1:** No... I didn't think so.

**C2 (A):** Yes, I felt comfortable.

**C2 (B):** I felt comfortable when my teammates and I could communicate without any problems.

As indicated in the above excerpts, one of the participants of C1 expressed that she did not really experience place presence in ViEW. Whereas the other two participants of C2 indicated that they did experience sense of place presence. These findings strengthen the findings acquired from the Mann-Whitney U analysis.

5. DISCUSSIONS

The current study highlights two research questions, the first of which is “Did students experience place presence, social presence, and co-presence in the virtual world?” Through a descriptive analysis, we found that most participants agreed that they experienced place presence, social presence, and co-presence in ViEW regardless of their gaming experiences. One possible explanation for this might be that a virtual world has the ability to generate a realistic VLE and provide various ways to communicate and interact, thus making the participants feel that they were really there, together with other group members. These findings can also be associated with the fact that audio communication was mainly used by the participants to communicate. Sound or audio can increase the naturalness and realism of a mediated environment. Findings from previous studies have also attested that a virtual world can generate sense of presence, although it is merely a desktop virtual reality.

As for the second research question, the findings from the Mann-Whitney U test indicated a significant difference between C1 and C2 only in the case of place presence; C2 participants relatively experienced place presence compared to C1 participants. In one study, the participants who had prior virtual world experiences had only produced moderate scores for place presence. Hence it is not surprising when the C1 participants, who have less gaming experiences and also did not have any prior virtual world knowledge, experienced less place presence than the more experienced group. However, this does not imply that the scores for place presence of C1 were very low, as the scores exceed the middle score. Therefore unlike the previous mentioned study, both groups in the current study scored high sense of place presence as illustrated in Figure 2. As for social presence and co-presence, no significant differences were recorded between both groups and the scores were also high. These results are in accordance with the findings reported by author, where the scores were positive even when the
students had no expertise in computer or video games.

6. CONCLUSIONS

The results of this study suggest that the use of three-dimensional virtual world can generate the sense of place presence, social presence, and co-presence, and these findings support that of previous studies. We also examined the differences of presence experienced by the two group of participants with different prior gaming experiences in order to further establish our understanding about the effect of one of individual characteristic on presences in the virtual world. From the findings, the only differences found was in terms of place presence between C1 and C2, but both scores were positive. This indicates that students can experience presences in the virtual world regardless of their prior gaming experiences. However, these results might be due to the way we conducted the learning activities, which involved the cooperative learning strategies, the synchronous learning activities, and the utilization of audio communication. Thus, a similar research with different settings needs to be conducted as it might produce a different result. Besides, it would be interesting to add students' satisfaction and performance in the future study as variables, which might be affected by the students' gaming experiences. Moreover, the results we acquired from the study are also in the Malaysian context thus they may differ than those obtained for other countries, due to students' cultural backgrounds that could influence the way they think and use computer-based technologies in the learning processes. Nevertheless, this research has added some insights into this field of study.

ACKNOWLEDGMENTS

This work was supported by the Fundamental Research Grant Scheme (R.J130000.7831.4F372) and initiated by Universiti Teknologi Malaysia and Ministry of Higher Education (MoHE) Malaysia

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