Measuring Social Presence in Virtual Social Game Experience

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Abstract

The pandemic outbreak has caused a major crisis and change in all areas, resulting all sectors need to innovate and adapt to this condition. Limitations and restrictions have made interactivity between human beings decreasing or even, disappearing. Entertainment sector, especially gaming sector tried to resolve this interactivity problems by creating a virtual social game experience (VSGE), which is a form of social game which is played virtually with interactivity and social presence as its basic principles. This study aims to identify social presence in VSGE including the variable and what might cause it. The social presence in VSGE is measured by looking at the sense of co-presence, behaviour of the players, and players' psychological involvement when 'experiencing' the game. Mixed method, both quantitative and qualitative methods were used for this study. Online questionnaire was used to gain the perception of the players regarding social presence using Likert scale, and FGD was carried out to expand the answers of the participants. The results of this research indicate that VSGE is capable to facilitate players' need in interactivity and social presence during the game. The host played an important role in leading the game and providing a good connection with the players.

Keywords
Virtual, game, experience, social presence

1. Introduction
The year 2020 has brought exceptional changes to the global economy. The pandemic outbreak has caused a major crisis in all areas, including business and education. Every sector needs to innovate and adapt to this new condition, and technology has proved a very useful tool to support it (Vargo et al. 2020). As the virus spreads around the world, limitations and restrictions are put in place on the physical interaction of people, and this causes massive transformation.

Education and business were two of many sectors influenced heavily by the limitations and restrictions due to Covid-19. In the sphere of academics and education, face-to-face meetings are suspended, distance learning is not as effective

as offline learning because of the lack of interactivity, and many trainings given to academic staff are not efficient to be carried out (Gonzalez et al. 2020). In business and industry sectors, technology is much used to support the changes, such as digital marketing for brands, technology-based strategies approaches, and online training are done by the industries as well. In entertainment sectors, every industry is forced to reevaluate the way it operates, including gaming sectors which are considered very crucial in this pandemic timing. Games always have the potential to lower stress levels during pandemic timing, and it provides more opportunity to interact with other people especially during physical distancing (Desai et al. 2021).

All sectors influenced have the same major problem - interactivity. Hence, a social-based game experience is created to overcome the problem. The appearance of VSGE (Virtual Social Game Experience) offers solutions and innovation in providing more interaction through virtual forms of play. VSGE relies on the social play aspect, which facilitates social interaction to those who play, and it also offers a broad range of themes that can be adjusted, depending on what the industry needs. It can be used for team building, staff training for industries, and in academic sectors, it can also be used for supporting online distance learning. The main key for VSGE is the sharing of presence with other people in remote locations / in virtual environments, and as VSGE is a game experience which relies heavily on the interactive sectors and presence sharing of the players, research needs to be done to observe the social presence and interactivity of VSGE. This study aims to measure the social presence of VSGE including the variables included. The social presence in VSGE is measured by looking at the sense of co-presence, behaviour of the players, and the players' psychological involvement when 'experiencing' the game.

2. Literature Review
Social Presence and Experience in Digital Games
Social component is one of the important factors of interactivity in virtual social games experience (Yee 2006). Commonly, there are several components in social experiences in playing games: communication of players, collaboration between team members/ players, role-playing, and making friends between players. These components combined with other aspects like psychological involvement and behavioural engagement will create a social presence in playing games.

The definition of social presence varies. Social presence was defined as the sense of being together with other people in one place (DeGreef and Ijsselsteijn 2000). According to Arbaugh et al. (2008), social presence is the ability of people to engage and identify with the community, forming a purposeful and meaningful conversation. In most studies, social presence is often associated with CMC tools (computer mediated communication) or other electronic platforms that enable interpersonal communication in an online setting or virtual world. In prior studies, a sense of presence was found in several scenarios in digital games, ranging from the reaction of the players to text-based reaction in the games, and avatars from the players (Bracken and Lombard 2004). There are three dimensions in social presence that could happen in electronic / digital games (Biocca et al. 2003):

Sense of Co-Presence
Co-presence is a result of social presence that usually happens in multiple player digital games. It is included as one of social presence's divisions. Co-Presence involves mutual awareness of other people's presence. Previous studies found that co-presence can be found in collaborative virtual environments. By creating collaborative virtual environments, co-presence is able to be created and it could be used to improve the quality of interaction and enjoyment (Phillips and Lee, 2005).

Psychological Involvement
According to Biocca et al (2003), the basic sensory awareness of being with other players in a virtual environment might not be adequate to create a sense of social presence. In general, digital games, especially the older ones, lack psychological involvement of the players, which give room for this research in VSGE to enter and develop. Psychological involvement includes the emotional experiences and feelings of the players.
Feelings are the results of several components of emotions that reflect responses and represent the emotional experiences. (Scherer 2005)

Behavioural Engagement
Behavioural engagement is the highest dimension of social presence. In this stage, players who are engaged show high behavioural engagements when playing the game. Behavioural engagement includes interaction and engagement

activities, such as verbal actions (talking, chatting, sharing stories) and non-verbal actions like eye contact, disengaging from the game, etc. Engagements here is defined as involvement of one's interest and attention, in a sustained level and it can place the person in immersive condition. There are four types of behavioural engagement in digital gaming, they are environment directed actions, social-directed actions, self-directed actions, and action directed actions (Bouvier et al. 2013). In environment directed behaviour, players' engagement includes exploring the game area and curiosity of the game world. In social directed behaviour, players are engaged through collaboration, relatedness, competition, etc. To the players, game is an opportunity for them to communicate and expand their social networking and relations.

Virtual Social Game Experience (VSGE)
Virtual Social Game Experience (VSGE) is a form of social game which is played virtually. Social game refers to any games that require social interaction and engagement between the players. Therefore, VSGE is a multi-player game to facilitate the need for social interaction of the players. However, VSGE is not just any multiplayer online games. Peters and Malesky (2008) stated that generally, gamers tend to play conventional online games more often because they look for social interactions and connections in the virtual world, avoiding ones in real life. VSGE is indeed facilitating the need for social presence and interaction in the virtual world, but VSGE tries to bridge the gap between virtual and real world, without avoiding any aspect that forms it. A picture of VSGE is shown in figure 1.
There are several fundamental characteristics of VSGE:
1.) Fun
Fun is an aspect that is easily related to any type of game. Games are needed to be fun, otherwise no one simply wants to play them. (Sweetser 2005). To reach the 'fun' in playing games, one needs to be 'active' participating. Meanwhile, other people might also feel the fun of the game only by watching others. However, the perception of 'fun' is still obtained from other people and in order to feel the fun of a certain game, one needs to have an active interaction with an object (direct interaction or indirect interaction).

2.) Creates Social Interaction and Engagements
Social Interaction created in VSGE is formed by the psychological involvement, sense of presence, and the behavioural engagement of the players.

3.) Creative Use of Platform
The platform used in VSGE varied, and it needs to be easily accessed by all the players. VSGE can use any kinds of platforms, including video communication apps like Zoom Meetings and any engaging applications available on mobile and PC.

4.) Host-Oriented
VSGE uses a host to lead the game and take the players on a game-journey for better interaction and engagement in games.
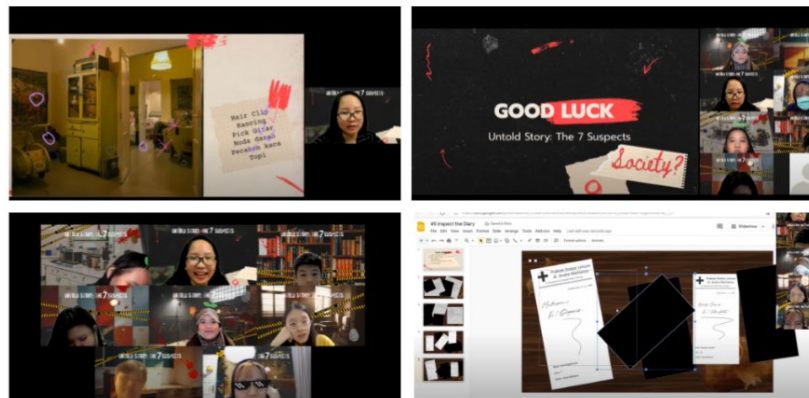

Figure 1. Screenshot of VSGE game

3. Methods

The method used for this study is mixed method, which is defined as the combination of both qualitative and quantitative approaches for a single study. (Tashakkori and Creswell, 2007). The research involves both qualitative and quantitative approaches, using questionnaires and forum group discussion to understand deeper of the subjects discussed. The method of social presence in VSGE is shown in a diagram in figure 2.

We used an online questionnaire / survey for quantitative data collection since it is the most appropriate methodology to measure attitudes and behaviour of game players using Likert scale (Muller et al., 2014). Before doing the data collection, participants were asked to play VSGE together in groups. Questionnaire was spread to 30 participants after playing VSGE to collect the data of their sense of co-presence (by measuring the feeling of togetherness and verbal communication formed during the game), psychological involvement (by measuring emotional experiences like anger, sadness, happiness, and fear, also feeling felt like jealousy, empathy, competitiveness, admiration), and behavioural engagement (such as participation and involvement) when playing the game with other players in the room. The questionnaire used Likert Scale to measure frequency responses. The questionnaire was divided into 4 subscales: demographic (2 items), Sense of co-presence (7 items), psychological involvement (8 items), behavioural engagement (4 items). From the 30 participants, we randomly picked 6 participants to join the forum group discussion (FGD) to discuss the topic further, especially the reasons the participants answered the questions from the questionnaire.

The sample comprised 36 individuals, with 18 male individuals and 18 female individuals, aged between 17-24 years. The data was analysed using SPSS to see the Mean value and frequencies.
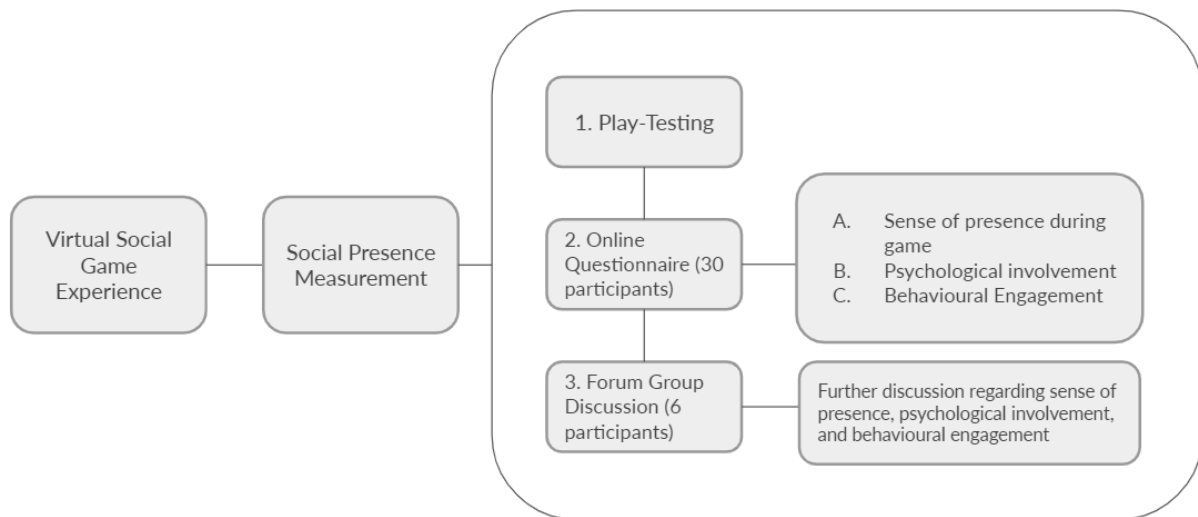

Figure 2. Method of Social Presence Measurement in VSGE diagram

4. Data Collection

The data collection method we conducted is mixed method, which combines qualitative and quantitative data. The sample was purposive sample, because we needed the participants to play the game first before filling the questionnaire. We used questionnaires to measure the social presence of the players (30 participants), and we picked 6 participants to join our group discussion to corroborate our questionnaire data. The data was analysed using SPSS descriptive analysis and Mean value.

5. Results and Discussion

The development of virtual social game experience (VSGE) was born of the aim to enhance interactivity and social presence of gaming experience, especially during physical distancing. The study was designed as a preliminary examination of social presence in virtual social game experience (VSGE), including how the players interact with each other, and the emotions and feelings involved when playing the game. Through this research, VSGE as new form of game can be improved and developed. The questionnaire for this study was a 5 point Likert-scale type

questionnaire, where 1 = never, 2 = seldom, 3 = sometimes, 4 = often, 5 = always. We counted the Mean of the data and the number of participants who answer 4-5 (often and always) to see whether the participants who already played the VSGE game can feel the presence of other players during the game.

Table 1. Means and items of 3 subscales in Sense of Presence

Subscale	Questionnaire Item	Mean	Frequency (4-5 Likert Scale)
Co-Presence	I felt in the same room with other player	4.14	80.5%
	I was aware of other players in the room	3.86	61.1%
	I felt that other players are aware of me	4.50	91.7%
	I called others by their name	3.00	41.7%
	I complimented other players	3.08	47.2%
	I mocked other players	1.04	8.4%
	I swore during the game	1.44	5.6%
Psychological Involvement	I felt angry during the game	1.97	11.9%
	I felt sad during the game	1.37	19.4%
	I felt happy and excited during the game	3.75	61.1%
	I felt fear during the game	2.33	22.2%
	I felt jealous of other players	2.61	33.3%
	I wanted to be better than other players in the game	3.33	47.2%
	I admired other players	4.31	83.3%
	I pitied and felt empathetic towards other players in the game	2.08	16.6%
Behavioural Engagement	I was active participating in challenges in the game	3.50	52.7%
	I felt like giving suggestions and give contribution in the game	3.31	44.4%
	I shared personal stories	2.14	22.2%
	I rejected challenges in the game	1.56	16.6%

Table 1 shows means results and the items of 3 subscales in Sense of Presence. This table illustrates the frequencies of participants answering 4-5 Likert Scales which indicate high in agreement (agree and extremely agree responses) and frequency. We divided the questionnaire sections into 3 subscales in Sense of Presence, which are: Sense of Co-Presence, psychological involvement, and behavioural engagement.

5.1 Sense of Co-Presence

Co-Presence involves mutual awareness of players in one game-room. From 7 items in Co-Presence subscale, 80.5% of them can feel the others' presence in the room, and 91.7% (almost all) players feel that they are being noticed by other players in the room. This is the key to Co-Presence. Some of them also showed cohesive responses, such as calling others by name, or addressing the group as "we". We interviewed some of the players, and they stated that this might happen because they can actually see the other players' videos in online meetings. The use of video communication software in VSGE allow other players to interact better with each other. Interesting finding about Co-Presence subscale, the players feel that it is not necessary to swear or mock other players during the game. Unlike any other online multiplayer game, they feel that in VSGE they can respect other players more. They feel that the host's presence in the room brings more interactivity between players and helps them build a positive connection between players. The cohesiveness between players is also built by the presence of the host that organize the game plots and helps them to interact with each other. The awareness of players are also high during the game. The use of video communication platform eases players in communicating and interacting with other players. However, the lack of interaction can be found if the players refuse to turn on their camera during the game.
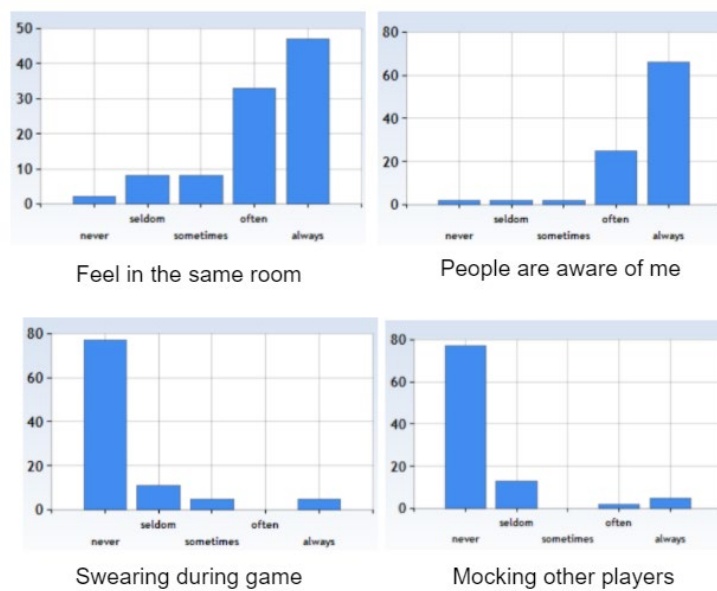

Figure 3. Sense of Co- Presence Likert scale data percentage

Figure 3 shows the data visualization of sense of presence questionnaire data in percentage. From figure 3, we can see that negative actions caused by negative emotions like mocking other players, swearing during game, did not occur much during VSGE game

5.2 Psychological Involvement

In a virtual environment, a sense of co-presence is not enough for players to create a social presence. Players need to have their psychological sense involved in playing the games. It includes emotional experiences and feelings of the players. Emotional experiences involve happiness, sadness, anger, and fear - as four basic emotions. Almost no players felt sad or angry during the game. On the contrary, 61.1 % felt happy during the game. They showed some happy expressions like laughing, smiling, and shouting happily when they completed challenges. In terms of their feeling towards other players, 83.3% of the players feel admiration toward other players in the game. We interviewed some of them and they came up with interesting stories. They feel admiration towards other players when the other players can finish tasks and challenges in the game, they do feel jealous but somehow it does not make them feel sad or unmotivated. They stated that the difficult task and funny challenges the game provides and facilitates make them feel motivated and enjoyable in interacting with other players in the game. We also found that negative emotions and feelings like fear, jealousy, and anger did not occur much during the game, though sense of presence is likely related to any kinds of emotion, positive and negative ones. Emotions do enhance presence, and a virtual environment in a virtual social game experience is hoped to be able to evoke emotions and feelings like joy, excitement, and even

sadness, anxiety, other emotions, and feelings to make the user feel more present. However, the feeling and emotions felt by the players are also influenced by the theme of the games. From the interview with the players, we found three possible variables that can act as emotion and feeling elicitor in games (in this case, it is VSGE):

a. Game Theme Type
Game theme is very likely to influence their players' emotion. For example, survival horror type of game can elicit anxiety and fear to the players, and sad-narrative story line can cause the players to feel sad or even cry.

b. Game Content
Game content refers to game environment, audio-visual setting, soundtracks, and sound FX. Suitable game content can create ambience that led the players to particular emotional states. In VSGE, the way host presents the story to the players can also influence the emotions of the players.

c. Characters
Characters in VSGE can also influence players' emotions. In classic game 'Werewolf', there are werewolf characters, civilians (victims to be), and police. The players who act as civilians might have experienced fear and anxiety during the game because of their characters, meanwhile the players who act as police might feel suspicious the whole game.

Table 2. Theme Type of VSGE Games and Possible Emotional Effects

No	Theme	Description	Emotional Effects
1	Adventure	VSGE type with jungle nature environment, interactive story-driven, exploration of puzzles	Excitement, Happiness, Aggression, Anxiety
2	Comedy	VSGE type with funny content and challenges	Happiness, Joy, Fun, Excitement, Relaxed
3	Horror-Survival	VSGE type with horror storyline and environment	Fear, Anxiety, Aggression, Excitement

Table 2 shows examples of theme in VSGE and emotional effects resulting from it. Based on interview data, the most theme preferred is the adventure type that can elicit many emotional effects in one game.

5.3 Behavioural Engagement

In Behavioural Engagement subscale, we found the answers varied. There are two items that have high Mean (3.50 and 3.51) with 52.7% and 44.4% ini frequencies, which indicates the many players are active in participating and giving contribution during the game. Behavioural engagement in this study includes interaction and engagement activities like chatting, challenge completion, talking, etc. From the questionnaires and interviews, we observed 4 types of engaged-behaviours type that occur:
a) Environmental engagement,
b) Social engagement,
c) self-engagement, and
d) action engagement.
Here, this game (virtual social game experience) facilitates the players to create social relations with other players.

Table 3. Players' Behaviour occurred during VSGE according to four types of engaged behaviour

	Environmental-engagement	Social-Engagement	Self-Engagement	Action Engagement
	Curiousity in digital environment (High)	Collaboration (High)	Pleasure in answering /	Accomplishment (High)

Players' Behaviour	Exploration of digital environment (Low)	Relatedness in team (High)	doing individual challenges (Medium)	Challenge completion (High)
		Competitiveness (Low)		Challenges participation (High)
		Sharing moments with others (Low)		

Table 3 shows the players' behaviours that occurred during VSGE according to those four types of engaged behaviour. Since the game is a team-based players game, the players need to cooperate and work well with the other team players. Mostly,among four engaged-behaviour types, the social-directed behaviour seems to happen during the game. Many players enjoy their roles in the team (collaborative teamwork), and they can feel the connectivity between the players through chats, forums, messages, and direct communication on online-meetings applications. However, the other three types of behaviours also existed. Environmental-engagement occurred during the game with the help of the game-host. Digital environment can only be experienced by the players indirectly since only the host can control the screen that the players see. This is said to be the weakness of the VSGE. Some of the players stated that the environmental engagement could increase if they can access the features in the game themselves, directly. By providing a digital environment that they can discover themselves (through application or controller), the players can be more curious and engaged in the game even better. Action engagement also occurred during the game, and since VSGE is a challenge-based game with quizzes and trivia, the players are pushed to complete the challenges, achieve the goals, and it creates positive emotions that can also motivate the other players to do the same.

6. Conclusion

Virtual social game experience (VSGE) was built to facilitate the need for social interaction between people in the virtual world, and this study was hoped to give feedbacks and suggestions for its further development. Our results revealed that VSGE can give the players more positive interaction between players, especially in terms of co-presence, psychological involvement like emotions and feelings, and the players' behavioural engagement during the game. Happy emotions and feelings tend to occur more than sadness or anger during the game. Emotional effects can also be influenced by the theme of the game, game content, and the characters in VSGE game. The emotions of the players can also be led by the host who is leading the game story line. That is why, host plays an important role during this game. However, there is always room for improvement. There are several aspects that are scored 'Low' in terms of behavioural engagement; they are social engagement and environmental engagement. In social engagement part, competitiveness and moments/stories sharing did not occur much during the game, and in environmental engagement part, we found that the chance of exploring digital world is very low. We believe with bits of improvement in challenge types and plots, the game could increase the social engagement. Also, by improving the gaming technology and more creative use of the platform, we are positive that this game would create a better environmental engagement. For example, in the future, an app integrated with VSGE game can create a more immersive experience.

Moving forward, social presence in general is needed in every online social experience, especially VSGE. Since VSGE tries to bridge the gap between digital and physical world, many aspects of social presence need to be observed and presented in the game.

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Biography

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