

The Effects of Socialization in Virtual Reality on Self-Confidence

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Introduction

Virtual reality (VR) is a rapidly growing industry. Some of the first viable consumer VR headsets, namely the Oculus Rift, HTC Vive, and PlayStation VR, were released a short time ago in 2016. These headsets in this early wave of consumer VR headsets were slow to be adopted due to a variety of reasons such as the high price barrier and the small number of existing VR applications. More recently, however, the low-price release of the Oculus Quest 2 and Meta's shifted focus towards extended reality has massively increased the number of VR users and led a boom in the industry. As of June of 2022, less than two years after the release of the Oculus Quest 2, an estimated 15 million units were sold (Heaney, 2022). For comparison, only five million PlayStation VR units were sold in the first three years of its release (*PlayStation™ Network Monthly Active Users Reaches 103 Million*, 2020).

There are many uses for this new VR technology from fighter pilot training simulations, to virtually exploring faraway places, to playing games with friends. The wide range of uses of this rapidly growing technology will have many far-reaching effects on society. One of the most popular uses of VR technology is for meeting and socializing with people online. Two VR games that are primarily based around socializing with people, VRChat and Rec Room, are consistently ranked among the most played Steam VR games according to Steam player statistics and are currently ranked second and thirteenth, respectively (*Most Played VR Games Steam Charts*, 2022). VRChat and Rec Room are both based around a variety of virtual environments that players are able to freely visit and explore. Some of these environments are created purely as spaces to meet and hang out with people, while others have built-in minigames or other special purposes. The virtual environments created in these games tend to make socialization in VR notably different from socialization in person for a number of reasons. For example, the

flexibility of user avatars and appearance, the availability of diverse social environments that exist across different platforms, and the general lack of repercussions that is present in virtual spaces may all have different impacts on players' social experiences.

An important issue that comes to light regarding socialization in VR is how the social experiences people have in VR affect their social development. I argue that social VR, such as VRChat and Rec Room, supports the development of users' self-confidence in social interactions in non-virtual settings by providing them with environments that encourage them to practice using their social skills. To demonstrate this, first, I provide an overview of the literature on VR and related technologies and their impacts on social development. Then, I will analyze a series of interviews conducted with VRChat and Rec Room players, using ideas of technological determinism and the theory of affordances. Through this analysis, I find that there are a few key features of VRChat and Rec Room that promote the development of users' self-confidence. Finally, I will end with a discussion of the implications of the social benefits that social VR applications can have on users.

Literature Review

Computer simulations, with and without VR, are known to be effective at promoting users' social development by helping mitigate a variety of mental health and social issues. Some studies on the subject analyze existing VR and related technologies to find an overview of the effectiveness of VR technology in promoting certain social developments. These studies have shown the success of early computer simulations in mitigating social problems such as eating disorders and substance abuse (Smokowski & Hartung, 2003) and newer VR-based training programs in aiding with developing social skills such as communication skills (Howard & Gutworth, 2020). They have also shown the effectiveness of using VR technology for exposure

therapy (Diemer & Zwanzger, 2019). Targeted experiments have also shown the effects that VR experiences can have on social attributes and behaviors. VR-based public speaking exposure intervention has been shown to be comparably effective with traditional exposure intervention techniques (Denizci Nazligul et al., 2019).

Additional studies show that VR simulations can improve user self-confidence for performing complex tasks. VR-based training with an antromastoidectomy simulation has been shown to improve participant self-confidence relating to their surgical skills (Mickiewicz et al., 2021). Similarly, VR training for performing brachytherapy (Taunk et al., 2021) and for neonatal resuscitation (Sarvan & Efe, 2022) have also been successful in improving participant self-confidence relating to the procedures.

Negative social experiences in VR can also negatively impact participants' social behaviors outside of VR. Experiments based on social exclusion in VR have proven to have negative impacts on participant prosocial behaviors and proxemics (Kothgassner et al., 2017). Studies have also shown that body insecurities can still affect the interactions of VR users (Tremblay et al., 2022), showing that body and other similar insecurities can still have negative impacts on social interactions in VR. Highlighting the possibility of experiencing negative social interactions in VR, research has shown the difficulties of preventing harassment in social VR applications and brings to light additional ways that users' social development can be harmed (Blackwell et al., 2019).

Whether positive or negative, these studies all suggest that social interactions in VR can have noticeable effects on users' social development. However, they all focus on controlled test or simulation environments rather than the casual interactions that people are likely to experience when playing with VR. In order to show that social VR such as VRChat and Rec Room supports

the development of users' self-confidence for nonvirtual social interactions, I will be using the technological determinism framework along with Norman's expansion on the theory of affordance.

Technological determinism embodies the idea that technological development is the key governing force in society that determines social change, as described by Smith and Marx (1994) as well as Bimber (1990). Technological determinism is applicable here because I will be describing the ways that VR technology as it currently stands guides social change, especially on an individual user level, regardless of how society has shaped VR technology. I will be using the theory of affordance to narrow the focus of my research. The theory of affordance is based around the idea that the interactions an object or technology affords a user are inherent to the construction or shape of the technology. Donald Norman's expansion on the theory of affordance applies the theory to software applications and focuses on the perceived interactions that software provides to users (2004). In other words, it focuses on the interactions with software that a user understands are possible. I will apply the theory of affordances by looking at the design elements of VRChat and Rec Room and the perceived inter-player interactions they afford to demonstrate how the two social platforms support the development of users' self-confidence.

Methods

In order to explore the effects that social VR can have on users, I conducted 12 interviews with young adults who spend a substantial amount of time playing VRChat or Rec Room. I chose to conduct this research through interviews because the relatively unexplored nature of this topic means that there is little information to base my research around. Holding interviews allows me to find and create a basic overview of some of the impacts of social VR. 6

of the 12 interviews conducted were with VRChat players and the other 6 were with Rec Room players. I solicited interviewees by making a request on the VRChat Reddit page, asking in the Rec Room Discord server, and personally asking people in game if they were interested in helping. The interviews were semi-structured so that the interviewees could lead the conversations with their own thoughts and experiences. The interviews were based around the users' perceptions of their own self-confidence and how it has been impacted by social VR, with a focus on the affordances of the two social VR platforms. Specifically, I asked about the users' social habits both within VRChat and Rec Room and in non-virtual settings. I also asked if they thought that their self-confidence or social behaviors had changed due to their experiences using the social platforms, and about what features they thought were particularly helpful with encouraging positive social interactions in game. In order to give a starting point for different game features that the interviewees may find beneficial, I prepared a small list of example features that we could talk about. The questions used to guide the interviews can be seen in Appendix A. After conducting the 12 interviews, I extrapolated common themes from the responses I received in each interview to see which affordances in VRChat and Rec Room are inclined to influence users' self-confidence.

Analysis

Through the interview responses, I found that an important characteristic that distinguishes social VR platforms such as Rec Room and VRChat from many other forms of social interaction is the ease of approaching and leaving other players. Socially, it is considered much more normal to walk up to random other players and start talking to them than it is in most other social settings. Both VRChat and Rec Room also encourage this behavior by suggesting popular environments for players to join and letting players travel between them at will. This

means that it is easy for players to find other players to socialize with and for them to leave if they find themselves in uncomfortable situations. One VRChat player described this dynamic as being like a “safety blanket,” where, if an interaction goes wrong, he will most likely never see the other player again. Meanwhile, if it goes well, he can befriend the player (Tugsten, personal communication, February 25, 2023). Other players, such as a VRChat player known by the alias Bestronis, talked about how this streamlined ability to approach and leave other players let him practice his conversational skills and become more confident talking with people in real life (Bestronis, personal communication, February 28, 2023). Many of the players interviewed shared similar thoughts based around the idea that having the ability to practice social skills so easily in VRChat and Rec Room led to an improvement in their self-confidence for socializing in non-virtual settings.

Similarly, the ability to easily choose and change the environment in which a player wants to meet people distinguishes VRChat and Rec Room from other social settings. Both games support many different environments that players can choose between depending on what they are interested in at the time; some are intended for simply hanging out with other players, while others are created for dancing, singing, or playing games. One VRChat player talked about their appreciation for themed worlds, such as one based around Doki Doki Literature Club, that further encourage social interaction by letting them meet other players with similar interests (StarScapez, personal communication, March 2, 2023). Another VRChat player talked about their appreciation for minigame worlds that can encourage particularly engaging social activity (Red_Fox_Angel, personal communication, March 3, 2023). In addition to choosing what type of activity players want to join, Rec Room player JoeNuts420 pointed out that it is helpful being able to avoid worlds that he thought tended to have unpleasant or unfriendly people based on the

environment that the world was designed for, such as clubs (JoeNuts420, personal communication, March 14, 2023). These different aspects of the playing environment systems all help to encourage positive social interactions between players and support players in practicing their social skills.

Unfortunately, the ease of approaching and leaving people in VRChat and Rec Room also opens the floor for different forms of harassment. As has been suggested in the literature review, negative social interactions can have harmful effects on users' sociability and may harm their self-confidence. However, the ability to block other users or leave the area or world that they are in can also help deescalate a negative social situation quickly. Additionally, security settings like the personal space features in both games can reduce the potential for this happening. These features make it unlikely for many negative social experiences to have lasting adverse effects on players' self-confidence or other social skills.

Another important characteristic of meeting people on social VR platforms is that players can present themselves in any way, regardless of how they look or seem in person. For example, players have the ability to use any avatar that they want (within some community guidelines for VRChat or created from a built-in set of customizations for Rec Room) when playing either game. Players also have the ability to express themselves without words, such as through text, drawing, or using hand signals, or to change their voice when talking, a feature built into Rec Room. During our interview, VRChat user MELLOWEDOUT talked about being able to present himself as his ideal self (for example, fit and tattooed), which gave him greater self-confidence when interacting with people in VRChat (MELLOWEDOUT, personal communication, March 2, 2023). One Rec Room player had similar ideas for creating his avatar to represent how he looked before he cut his hair to join the military. He described wanting to

keep his old appearance because he thought his old appearance better represented him as a person (Llama, personal communication, March 14, 2023). Some player demographics, such as furies, also choose to have certain types of avatars to show their interests and express who they feel they want to be (StarScapez, personal communication, March 2, 2023). This is particularly easily in VRChat, where there is an abundance of avatars to choose from and, for example, a large furry community. Having the freedom for players to represent themselves however they choose further encourages positive social interactions in social VR games.

The ability for users to easily hide their identity also provides opportunities for harmful social interactions such as child grooming. The age requirement to play VRChat is only 13 (*Community Guidelines*, n.d.), and children often play VRChat without parental supervision or when they are still underage. Rec Room has a similar age requirement except it has some protections for accounts made for children under the age of 13 (*Privacy Policy*, n.d.).

MELLOWEDOUT talked about his experiences around other users who seemed like they may have been approaching children unsafely (MELLOWEDOUT, personal communication, March 2, 2023). To combat this problem, there are some small defenses for young people playing VRChat. As is the case in a non-virtual setting, community-based defenses are significant. MELLOWEDOUT talked about some experiences with groups of players actively protecting young players from potentially dangerous situations with older users. Accounts for children below 13 in Rec Room also have a limited ability to communicate with other players. Despite this, minors are still largely unprotected and may be more likely to have adverse social developments as a result of harmful social interactions on social VR platforms.

Many of these features of social VR applications are shared with other social platforms or games that are not VR-based. Some important features that are unique to VR-based social

platforms and that are particularly helpful for promoting users' social development are based around body tracking. Both VRChat and Rec Room can be played without a VR setup; one Rec Room player said that she enjoyed playing both with and without a VR setup, but that she was much more social in VR because she could be more expressive (Hannah <3, personal communication, March 14, 2023). A normal VR setup allows for tracking users' hands and heads, which allows for much greater intractability between players compared to flatscreen games. For example, Llama talked about his appreciation for being able to use hand gestures for humorous interactions (Llama, personal communication, March 14, 2023). A few users who had full body tracking setups, meaning they could control their avatar's legs or torso in game by moving their own body, expressed how much more it encouraged them to interact with other players when they could express themselves more fully, like through dancing (StarScapez, personal communication, March 2, 2023; Vinny;), personal communication, March 3, 2023). As with many of the aforementioned features, the idea that body tracking features help users develop greater self-confidence is based around the idea that they encourage social interactions between users. This, in turn, provides a means for users to practice their social skills and helps improve their self-confidence for social settings outside of VR.

Some users were ultimately unsure if playing social VR games has impacted their self-confidence. Of the 12 people interviewed, most of them described themselves as introverts. Some, however, including Vinny;), JoeNuts420, and another Rec Room player with the alias bear, described themselves as outgoing and confident to begin with, and they did not think that they had experienced a notable growth in self-confidence due to social VR (Vinny;), personal communication, March 3, 2023; JoeNuts420, personal communication, March 14, 2023; bear, personal communication, March 14, 2023). Despite this, the potential for social VR to help

people gain self-confidence and the idea that these affordances in VRChat and Rec Room support the development of users' self-confidence in social interactions in non-virtual settings are firmly supported by the interviews conducted. The majority of the small number of players I interviewed thought that VRChat or Rec Room has noticeably positively impacted their self-confidence in social settings outside of VR, primarily based around the idea that socializing in VR is easier than in real life and provides practice for real-life social settings.

Conclusion

Social VR facilitates the growth of users' social skills by providing them with lifelike environments with real people that encourage socialization. This is true in the same way that the aforementioned research shows that VR-based training simulations can improve users' self-confidence regarding medical operations. Socializing is a complex task that can be made easier through practice like any other skill, and social VR games provide easy and fun access to practice. Despite the benefits that social VR can have on users, it is important that people are mindful of the dangers associated with the technology. In particular, children should be supervised by adults when playing and all players should be familiar with the safety features of the games. Future research should look at ways to eliminate harmful social interactions from social VR applications so that users do not have to be careful when playing.

This research could be used to encourage software developers to include social aspects in VR applications, while also cautioning them to take care to try to mitigate the possible problems associated with social VR applications. It could also serve as encouragement for young people thinking about getting into VR. In the future, this research could be expanded on by performing a study analyzing peoples' self-confidence and other social skills before and after using social VR applications. This would give a greater idea about how common it is for social VR to benefit

or harm users' social development as well as to what extent their social development is impacted. As this research stands, it shows that social VR platforms can help better the lives of users by fostering their social development and allowing them to more easily navigate social situations in the world.

Appendix A

Interview Questions:

1. How long have you played VRChat/Rec Room and how much do you play?
2. How would you describe yourself socially in and out of VRChat/Rec Room?
3. If at all, how do you think your self-confidence and social behavior (in VRChat/Rec Room and in real life) has changed since you started playing VRChat/Rec Room?
4. Are there certain things that you look for in worlds or avatars when playing that effect how social you are or your self-confidence?
- 5.
6. Are there certain game features that you think help or encourage you to be more social or self-confident in VRChat/Rec Room?

Such as:

VRChat:

- a. Avatar Dynamics
- b. Hand tracking
- c. Full body tracking
- d. Privacy/personal space settings

Rec Room:

- a. Personal space or ignore bubble

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