

The Most Social Platform Ever? A Survey about Activities & Motives of Social VR Users

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ABSTRACT

We present online survey results on social virtual reality (social VR) users' activities and usage motives. Based on content analysis of users' free-text responses, we found that most users, in fact, use these applications for social activities and to satisfy diverse social needs. The second most frequently mentioned categories of activities and motives relate to experiential aspects such as entertainment activities. Another important category of motives, which has only recently been described in related work, relates to the self, such as personal growth. Our results indicate that while social VR provides a superior social experience than traditional digital social spaces, like games or social media, users still desire better and affordable tracking technology, increased sensory immersion, and further improvement concerning social features. These findings complement related work as they come from a comparatively large sample ($N=273$) and summarize a general user view on social VR. Besides confirming an intuitive assumption, they help identify use cases and opportunities for further research on social VR.

Keywords: Social VR, online social worlds, user motives, virtual reality.

Index Terms: Human-centered computing—Empirical studies in collaborative and social computing; Human-centered computing—Virtual reality

1 INTRODUCTION

Social VR refers to an emerging ecology of applications that enable geographically remote users to interact with each other in shared virtual environments through VR technology, i.e., immersive head-mounted displays. In the shared virtual space, users are usually represented by avatars they control with their body-movement due to tracking technology [28, 29, 32]. Many social VR applications emerged since 2015 (e.g., *Altspace VR*, *High Fidelity*, *Anyland*, *VRChat*, *Facebook Horizon*), and especially the announcement of *Facebook Horizon* in 2019, which is currently in beta status (late 2020), indicates that social VR is meant to stay and potentially reshape the ways we interact with remote others. As *Facebook*'s CEO Mark Zuckerberg stated in an interview in 2016 after the company acquired *Oculus*¹, VR is going to be the most social platform that has ever existed. Correspondingly, previous studies indicate, current social VR applications are, in particular, characterized by a variety of experiences comparable to face-to-face interactions in terms of verbal and especially non-verbal expression capabilities, as well as the variety of mediated group and intimate activities they offer [22, 25, 28–30, 43]. Further, in times of limited opportunities for real-world social interaction (as in the ongoing COVID-19 pandemic), as well as use cases where individual people may not be capable of engaging in physical social interaction, social VR's

promise is the access to authentic and meaningful social interactions over distance [22, 43].

Although the body of literature on social VR is steadily growing, it is still unclear what values these applications offer for most users in their day-to-day life. Previous work focused mainly on a systematic description of how these applications' specific features are designed to afford sociality. It thereby often adopted the perspective of social VR designers or industry experts [20, 28] and systematically compared different applications regarding the specific features they offer [29, 41]. A series of qualitative studies were published recently that provide a user-focused perspective on specific topics related to social VR. These topics include long-distance relationships, anonymity, cross-generational interaction, non-verbal communication, and avatars [11, 12, 22–26, 43]. In particular, one of these publications is concerned with offering empirical evidence on what users are generally doing in social VR and why their social VR activities are meaningful to them, without focusing on a specific contextual frame [22]. While the authors identified exciting insights into what makes social VR meaningful for individual users, their results are only based on comparatively small samples ($N=30$), as they conducted in-depth interviews. Hence, even if the authors could collect some exciting individual cases, the current literature body still lacks comprehensive empirical evidence about the users' activities and their motives to use social VR. Furthermore, the currently available findings provide little information about the relative importance of individual activities and user motives compared to each other. Our work, therefore, integrates seamlessly into these interview studies and addresses the following four research questions:

- What are users doing in their favorite social VR applications?
- What are the motives that drive their social VR usage?
- What makes social VR superior to other digital social places?
- What do they want to be improved in the future?

Although we are not the first to deal with these questions, we contribute to further developing the domain by expanding previous research by conducting a large-sample online study with social VR users. In particular, our work can be seen as a natural extension of earlier interview surveys. As already noted by other researchers in this field, a thorough look at these questions helps identify research and development opportunities by indicating what features of social VR are currently valuable for users but may be improved in the future or features that are not yet considered in research. Further, as the way we present our results in this paper cannot do justice to the level of detail of many of the answers we received, we also share the collected raw data with the research community². Eventually, a precise understanding of the "What" and "Why" of social VR usage empowers us to create compelling social experiences for physically apart people.

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¹29th August 2016; Link to Video on Facebook

²Link to the OSF project repository

2 RELATED WORK ON SOCIAL VR

Social VR applications are rooted in the domain of collaborative virtual environments [4], which have a long history in HCI research and for which there are diverse research areas such as experiential differences to face-to-face interaction [1], collaboration techniques [44], proxemics [2], interpersonal touch [3], or collaborative learning [35]. Although social VR is still an emerging consumer application genre, the current literature on this subject is already diverse. It includes empirical work based on the evaluation of multi-user VR prototypes to investigate specific questions in laboratory studies (e.g., [10, 14, 17, 40]). Further, an increasing body of theoretical literature aims to systematize the landscape of social VR design practices (e.g., [17, 29, 41]). These are complemented by interview and observational studies that investigate user-behavior in commercial social VR applications, for example, in the context of harassment [5], self-disclosure [26], and interactions between different age groups [23, 24].

Research concerned with current social VR applications' design practices found different strategies designers employ to shape their platforms' social experience. These strategies refer, for example, to the aesthetics and architecture of virtual places, mechanics that promote the definition and adhering to social norms, and communicative affordances related to the avatars [28]. In particular, it was found that the specifics of a platform's avatar system are, in many ways, tied to the social experience. For example, avatar locomotion and personal space mechanisms determine how fast and close users can approach each other [20]. Further, a feature comparison of several social VR applications found that despite the potential to induce authentic social experiences, there are still many open challenges and opportunities for designing and utilizing expressive non-verbal communication features [41]. Overall, the literature on design practices concludes that there are still many challenges and unused potentials that need to be addressed by practitioners and researchers alike.

However, the body of literature indicates that social VR seems to extend the social and experiential qualities of traditional shared virtual spaces due to its technological characteristics that induce a strong illusion of virtual body ownership over virtual user representations [16, 19, 27, 38] and a feeling of actually being present in the shared virtual worlds [37, 42]. More specifically, VR-mediated social interactions support verbal and non-verbal communication cues and provide experiences similar to face-to-face interaction [9, 21, 25, 30, 39]. The combination of motion-tracking and embodied virtual representations allows users to utilize non-verbal communication cues to support communication and interaction initiation and affords feelings of privacy and social comfort during interactions with strangers while still offering an authentic social experience [25]. Social VR was also found to be of value in intimate social interaction contexts like long-distance relationships. It provides a sense of physical closeness and social presence and supports the replication and sharing of mundane real-life activities, which are essential in such contexts [22, 43]. Further, as social VR extends the experiential quality of creating and using avatars, social VR avatars are a more engaging means for self-expression and identity exploration than in traditional digital social spaces. [11, 12].

Regarding what people generally do in social VR and why they appreciate it, it seems to provide similar but extended opportunities for social connectivity, self-reflective processes, and meaningful experiences compared to traditional digital social spaces [22]. More specifically, social VR users value five types of meaningful activities: activities that utilize the full-body tracking capacities of current VR technology (e.g., non-verbal communication, dancing), mundane everyday activities (e.g., sleeping), activities for mental self-improvement (e.g., improving social skills), cultural appreciation and educational activities (e.g., learning a language), and participation in immersive events (e.g., group meditation) [22]. However, pre-

vious work also identified three specific design recommendations for further support and improvement of these activities: improvement of social connectivity, integration of communication affordances in and out of VR, increasing realism and naturalness [22].

Based on this literature review, social VR seems to support general, and intimate socializing, self-expression and identity exploration, self-improvement and mental health, and learning skills and cultures [11, 22, 43]. However, these results are predominantly based on a series of interview studies with comparatively few participants ($N = 30$). While providing interesting detailed insights, they should not be generalized without further investigation. Furthermore, the currently available findings provide little information about the relative importance of individual activities and user motives when compared to each other. This can be explained by the corresponding literature's qualitative approach, which aimed to reveal individual topics rather than compare them in quantified terms. Therefore, we would like to add to the literature on social VR a more comprehensive view of user activities and motives that assess individual aspects' relative importance based on how many users report them.

3 METHOD

We conducted an online study between May and June 2020 and recruited participants via posts in nine subreddits³ related to VR, social VR, and specific social VR applications: *VRchat*, *RecRoom*, *AltspaceVR*, *Bigscreens*, *SocialVR*, *FacebookHorizon*, *NeosVR*, *virtualreality*. Additionally, we posted the study on a message board of a german digital meetup space dedicated to VR a few days after this community organized a virtual event on the topic social VR⁴. After one week of operation, we also posted updated calls in the bigger subreddits, as older posts that no longer attract attention are less visible for the community. We thereby shared already collected statistics on survey completion rate, social VR usage history and frequency, and the favorite platforms so far to gain more attention. In the posts, we linked the actual online survey, for which we used a custom installation of the survey application *Lime Survey*. We stopped the survey when there was no new participation for several days. Overall, 273 persons participated in the online survey. There was no compensation for participation.

3.1 Research Framework

We applied the Uses and Gratifications Theory (UGT) as a framework for our work, which has its origins in the 1940s in the context of empirical mass communication research and aims to identify media usage motives [6].

This theory's particularity is the assumption of active and self-reflective media users, which, due to personal needs, consciously control their media usage behaviors and aim to use those media that they expect to meet their needs [6, 18]. Despite recurrent criticism of the theory, it is an established, however evolving, approach for understanding media use [34] and is still applied in diverse technological contexts such as social media [31], social virtual worlds [13], video game streams [36], or augmented reality games [8]. An early summarizing categorization of user needs satisfied by general media use included cognitive, affective, personal integrative, social integrative, and tension release needs [18]. Recent research applying UGT reveals a broad spectrum of needs that often offer a more nuanced perspective on the correspondingly studied applications while roughly falling into the early five categories. It is thus equally common for studies that apply UGT to either re-use previously identified categories (e.g., [15, 31, 36]), or to use open-ended questions for exploratory analysis to identify novel types of needs and user motivations (e.g., [15, 31, 46]).

³Link to reddit.com

⁴Link to Virtual and Augmented Reality Frankfurt

3.2 Assessed Data & Measures

The online survey included the question areas social VR usage behavior (custom items), activities and motives (open-ended and questionnaire), perceived benefits of social VR (open-ended), wanted features for social VR (open-ended), perceived social closeness compared to other platforms (custom items), and demographics⁵. As part of a more comprehensive research question, personality traits have also been recorded with the 10-items Big-Five Inventory [33], but are not addressed in this paper.

At the core of the survey were the questions assessing user activities and motives. As social VR is still a comparatively novel application type, we wanted the participants to articulate their thoughts freely. Thus, we decided to use open-ended questions instead of pre-defined items, which they would then have to agree or disagree. We assessed activities with the question "... we would like to know which of the various activities offered by your favorite [social VR] app you use the most. In other words: For what do you use your favorite social VR app?". Motives were assessed with the question "...if you could tell us your reasons and motives for using your favorite social VR app. In other words: Why do you use it? So ask yourself what value the application has for you as a person". In addition to these open questions, we have included the User Motivation Inventory (UMI) [7] to determine the degree of motivation internalization of the participants, i.e. if their engagement in social VR is motivated by extrinsic motivation, or intrinsic motivation and whether it can be assumed that they will continue to use it. The UMI consists of six subscales and, in sum, 18 items and assesses amotivation, external, introjected, identified, and integrated motivation regulation, and intrinsic motivation (7-point Likert scale ranging from strongly disagree to strongly agree). The activities, motives, and UMI questions referred to the participants' favorite social VR apps.

Perceived benefits of social VR compared to other, non-VR social applications like online multiplayer games or social media and wanted features for social VR were assessed with open-ended questions.

To get a statement about the social experience in social VR from all participants we further asked them in how far they experience a social closeness in social VR they can not or do not want to experience in real life and other social applications (7-point ILkert scale ranging from strongly disagree to strongly agree).

The benefits, wanted features, and social closeness features did refer to social VR in general.

3.3 Content Analysis

The first three authors performed an iterative content analysis of the answers to each of the open questions. The analysis goal was an agreement on the definition of clusters of categories to which each answer can be assigned. Thereby, we sought agreement by engaging in informal discussions that followed the answer coding steps. To reduce the impact of individual researcher bias while including diverse perspectives, we started each analysis by reviewing answers independently from each other. The result of this first step was a collection of rough categories from each researcher that we then discussed together in order to craft a shared codebook for the next iteration. Subsequently, we coded the answers independently from each other based on the shared codebook. We again discussed the results and identified the remaining interpretation differences of the shared codebook. Eventually, after agreeing on the derived categories, the first author coded all answers to derive a definite quantification of the identified main and subcategories.

Concerning the question that assessed user motives, we decided to guide the analysis process by applying the categories of *Functional*, *Social*, and *Experiential* needs that were identified in the literature

⁵The survey is included in the supplemental material of this paper

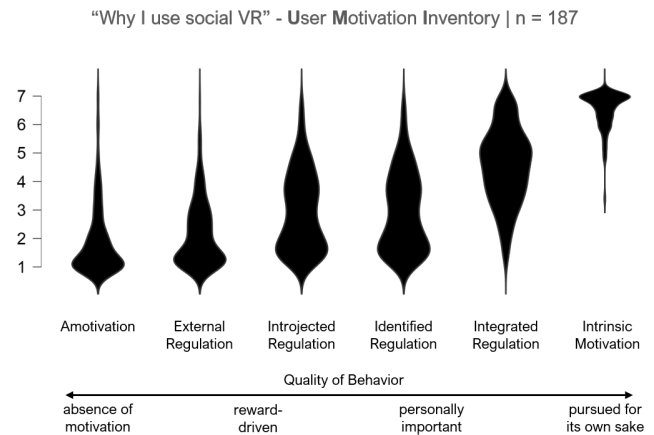


Figure 1: Violin plots presenting the distribution of UMI subscale scores. Higher scores correspond to a stronger agreement. Quality of behavior continuum indicates how self-determined social VR usage is.

as being relevant for the engagement with the virtual social world game *Second Life* [45,46] and which we expected to be relevant in social VR as well. For all answers and partial answers that did not fit into these categories, we first created our own categories that we added to the shared codebook after finding agreement.

4 RESULTS

From 273 participants, we collected 174 complete and 99 incomplete datasets. To use as much of the data as possible, we included all available valid data relevant to the respective analyses. Thus, in the following, the n-values indicate the valid datasets that entered each analysis. Figure 2 provides an overview of the sample characteristics based on social VR usage habits and gender, geographical region, and occupational status. In summary, most participants who provided the information were male, lived in North America, and were employed or studying in some way at the time of the survey. Most of them were between 20 and 30 years old ($M = 23.6$, $SD = 8.74$, $n = 172$). Participants were engaged in social VR for 2.77 years on average ($SD = 1.35$, $n = 265$), whereby half of them (55.7%, $n = 262$) were using it daily at the time of the survey. The majority of participants indicated *VR Chat* as their favorite social VR app (64.4% of those who indicated $n = 258$), followed by *RecRoom* (15.9%), *Neos VR*, *BigScreen*, and *Altspace VR* (each less than 10%). Five other applications were also specified once and summarized in a category *Other*.

4.1 Intrinsic Motivation & Social Closeness

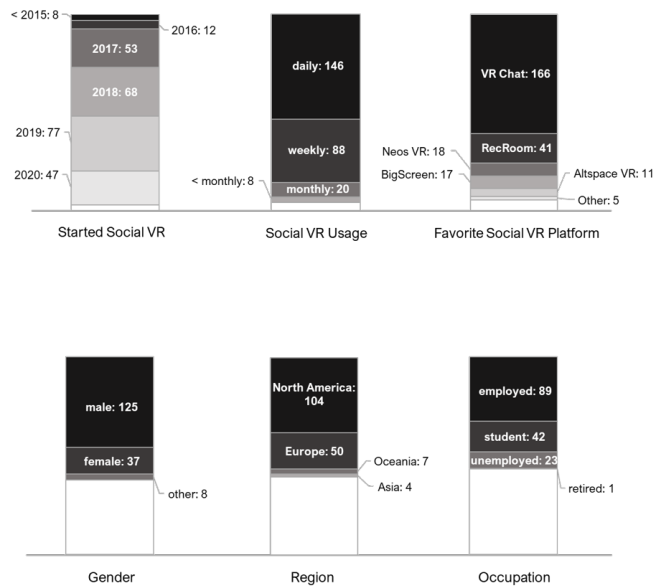
Figure 1 illustrates UMI results, which indicate that the majority of participants use social VR out of intrinsic motivation or at least based on integrated regulation (i.e., because social VR usage is congruent with their personally endorsed values [7]).

From 177 participants, 75% indicated an agreement of at least 5 with the statement that they would experience a social closeness in social VR that they can not or do not want to experience in other social applications ($Mdn = 6$). Similarly, 75% indicated an agreement of 4 or higher with the statement that they would experience a social closeness in social VR that they can not or do not want to experience in real life ($Mdn = 5$).

4.2 User Activities in Social VR

We identified three main types of activities that users reported to do most often in social VR: *Socializing*, *Entertainment*, and *Learning*

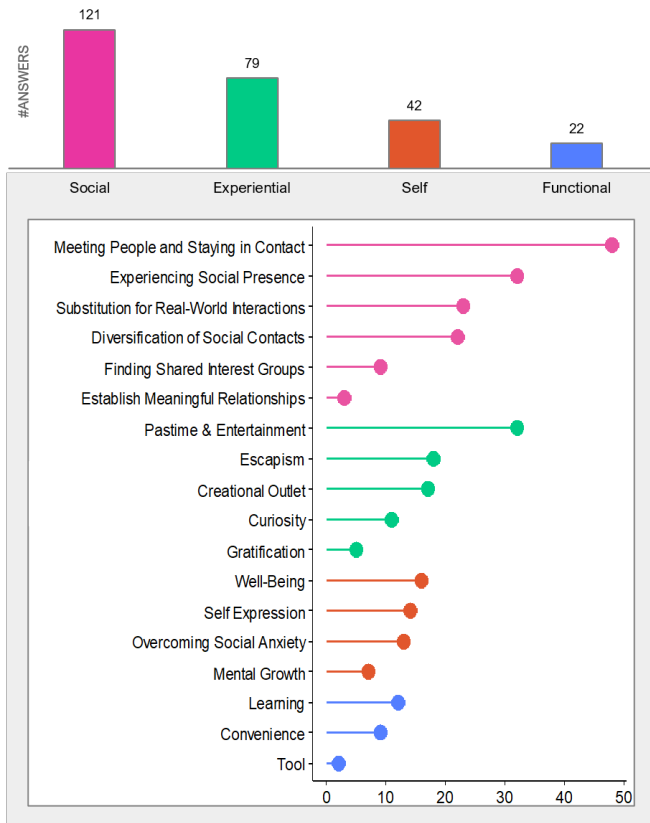
Demographic Information N = 273 = missing values



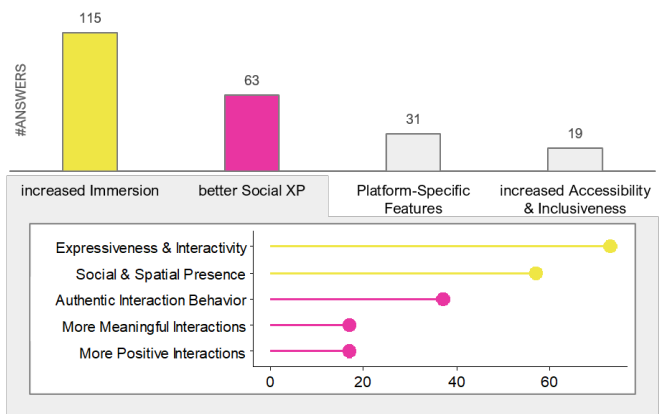
User **Activities** in Social VR | n = 195



User **Motives** of Social VR Usage | n = 180



Benefits of Social VR | n = 170



Wanted Features for Social VR | n = 133

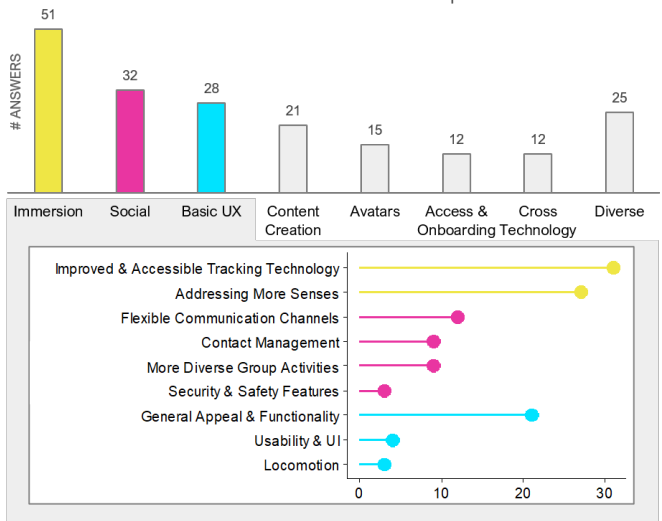


Figure 2: Summary of sample information and content-analysis results. *Sample information*: The missing values indicate how many participants have discontinued the survey. *Content-Analysis*: Bar charts show the number of answers associated with the main categories. Lollipop charts show the number of answers associated with the subcategories for the most frequent main categories. n-Values indicate the number of valid answers that were included in each analysis. The motive chart shows subcategories for all main categories due to the focus on the motives in this paper.

& Working. As Figure 2 illustrates, most users engage in socializing and entertainment activities, whereas only four reported that they engage in learning or working activities (e.g., learn sign language, doing light work by streaming external media into social VR). Further, we identified subcategories of the socializing and entertainment activities that are also illustrated in Figure 2, which we briefly describe in the following.

4.2.1 Socializing Activities

In the *Socializing* category, we included answers that either explicitly referred to variations of the term “socializing”, described how they found friends in social VR or specified the act or social context of interactions. In fact, most participants did not specify exactly in what ways they socialize with others in social VR, e.g., “Well, VRChat is a social interaction platform so I’m using it for that purpose”_(m19). However, if they did, they most often mentioned that having conversations with others, e.g., chatting or talking to others, is what they mainly do in social VR or spend time with others without a specific purpose (e.g., hanging out, chilling). Few participants engage in more intimate social contexts like interactions with significant others, dating, or erotic role play. Many participants also specified with whom they interact socially. 70 users interact with known others (e.g., friends, family, relatives), and 49 users indicated to purposefully seek contact with strangers to make new contacts and friends.

4.2.2 Entertainment Activities

In the *Entertainment* category, we included answers that described activities like gaming (i.a., PvP, board games, user-created), content creation (i.a., environments, games, avatars), and exploration (i.a., built-in worlds, user creations), watching video content, partying and dancing, listening to music, participating in community events (talks, discussions), engaging in role-play (not erotic role play), or simply enjoying to observe others. The most popular entertainment activities were playing games and creating content. Notably, many of the entertainment activities are shared with others. They thus also have a social component (68 mentions): “I get together with friends and new people and watch shows together.”_(m46), “Mainly just finding areas to explore together with other people”_(m19), “I like to draw people’s avatars in the presentation room of VRChat to make them happy”_(f19), “... I just talk with people and listen to music just like in a house party”_(m29), “there is also a fantastic dancing, drinking, and partying community”_(f27).

4.3 Social VR User Motives

We identified four main types of motives or needs that users referred to when explaining their engagement with their favorite social VR application: the categories taken from the literature *Social*, *Experiential*, and *Functional* needs, and additionally needs related to the *Self*. As Figure 2 illustrates, most users referred to social motives and needs, followed by half of them referring to experiential reasons. Almost 25% indicated reasons that are personal and self-related. Functional reasons were the least common. In the following, we describe each category in more detail by addressing its subcategories that are also summarized in Figure 2.

4.3.1 Social Motives

This category refers to the social needs addressed by or the social benefits that result from establishing and maintaining interaction with other users. As Figure 2 illustrates, social VR engagement is based on diverse social needs, ranging from a desire to perceive the presence of others to establish meaningful relationships and finding a substitution for real-world social interactions.

The most common social motive described by the participants is a desire to come and stay in contact with other people: “I use

my favorite social VR app to speak with both friends I have made through it and to perhaps befriend others”_(m21).

The second most common subcategory of social motives summarizes answers that emphasized the degree of social presence provided by VR technology and that it satisfies their need to socialize when explaining why they engage in social VR: “It also helps giving a more physical presence to the people I talk to which gives everything a more genuine feeling”_(m24), “I use it to gain the social interaction I need”_(f22).

For several participants, the engagement in social VR serves as a valuable substitution for real-world social interactions. Their answers often indicate that circumstances over which they have no or limited control restrict their opportunities to engage in real-world social interactions: “Being someone who is very social, but doesn’t always have the luxury to be able to go outside and meet people a lot, it helps me to find people to talk to ...”_(m32). Notably, several participants emphasized that social VR was their major or only access to social interactions due to local COVID-19 pandemic measures: “No reason other than to try to keep social during the COVID-19 lockdown”_(m36), “It’s especially nice during quarantine to get to talk to others while feeling like you’re really in the world there with them”_(fn/A).

Almost the same amount of users indicated that their main motive to use social VR is to diversify their social contacts. Thereby, they i.a. appreciated the access to people from all over the world and thus, different cultures, or to break through their personal social bubble: “I like to use VRChat most to make new friends that I could never meet in my normal life, because I think it’s important to get as many different perspectives about the world as you can and in VRChat it’s easier to do than in the real world”_(m22), “... Keeps my social circle from becoming an echo chamber”_(f24).

Another social need that users satisfy by engaging in social VR is the desire to find like-minded people: “I rarely meet someone where I live that is into the same things. Therefore, I turn to VRChat on the weekends to give me that bar experience and socializing with people that are like me”_(f30).

A few users search for or found meaningful social relationships or assume that social VR supports in establishing those more intimate connections: “[I] Met my significant other in-game.”_(f33), “Social, emotional, and romantic fulfillment”_(f23), “I feel that this allows for closer bonds to form and lets you get to know someone a little better”_(f27).

4.3.2 Experiential Motives

This category refers to needs that are addressed and benefits that arise from the sole experience of social VR usage and includes benefits such as entertainment, excitement, playfulness, and escapism. Thus, users referring to an experiential motivation often experience pleasure and enjoyment while exploring the virtual world and engaging in the various activities it provides.

The most common theme of answers in this category was the seeking and appreciation of enjoyable experiences to pastime and for entertainment: “I use it to have fun”_(m16), “I just like to play VRChat. I don’t have anything that motivates me besides that”_(m19), “Boredom”_(n/A).

The second most common group of answers share the desire for some sort of escapism, or variety from everyday life, i.a., to relax (“It is a relaxing escape. ... a good way to reduce stress”_(m57)), flee from specific real-world problems (“I use it to escape reality. The real world can be stressful and it’s nice to be able to have a second life in VR ...”_(m29)), to get access to activities during the COVID-19 lockdown (“Especially due to Corona virus making things hard to actively go outside and interact with others, VR had made absolute turn around for that”_(f20)).

Social VR was also described as a creational outlet that offers opportunities for creating content and engaging in cognitive stimu-

lating activities "... because of the insanely complex toolset it offers, allowing you to program stuff into your avatars or worlds with node based programming ..." (m18), "... I create work that I like, and it is nice to see others like my work too" (m29).

Another source of experiential benefits is the satisfaction of curiosity that some participants stated to find in exploring community-created or other content: "... I also enjoy meeting other talented people and seeing what they can do musically, artistically and 3D modeling wise ..." (m32), "The openness of creativity. Very little is limited and it's always interesting to see what people will make next" (m25).

Only few answers describe that social VR is a source of gratification that emerges from overcoming challenges and induces feelings of competence: "I consider it more meaningful to compete against other players ..." (m48), "I like playing rec room because I'm good at it, I'm quite insecure so it's nice seeing you are good at something" (f17).

4.3.3 Self-Related Motives

We have identified a group of answers that describe benefits for personal identity, mental health, and personal development and thus refer to motives and needs related to the *Self*.

The most common self-related benefit users described was the support of emotional and physiological well-being: "... VRChat is also therapeutic in many ways. Whether it is to help my meditation, soul-searching, healing, self-reflection or to help aid others in growing into their true, genuine identities, I use VRChat as a way to communicate more than just words." (o22), "It makes me feel less lonely" (m16), "... This game has especially kept me sane during the lockdown here in the UK" (m23).

Several users emphasized that they use social VR because it allows them to express themselves freely in a way they want, be it in terms of role-playing or sharing aspects of them that they usually do not share with others in real life. A nuance of these answers was the appreciation of versatile customization possibilities and the anonymity that avatars provide: "... playing it is the first time that I've really felt free to really express myself and be me without the weight of the real world and all the expectations that go with it." (m22), "... have fun expressing myself in crazy fun ways." (f20), "Because I can use avatars that better express who I want to be I find myself open in telling people about what I like and who I am as a person" (m32).

A reoccurring theme was the notion of having problems with social interactions in the real world (specified or unspecified). Users whose answers we associated with this category described that in social VR they suffer less from the problems with social interactions they have in the real world or that social VR would help them to overcome these problems and improve their social skills: "I'm alone at home and kind of socially anxious. Having an avatar is helping me feel less anxious about speaking with people and helps me talk more." (m24), "I think I use it to fulfill my need for closeness and socialization with people, something that I struggle with in real life." (f19), or "It also has helped me improve my ability to talk to people and get over some anxiety" (f14).

Another self-related motive or benefit was the ambition or observation to grow as a person and expand one's horizons: "It has been a continual source of inspiration, and joy that has me learning, and growing by the day, enriching my lives in numerous ways" (o27), "This app has value to me because it's a way for me to learn new things and expand my horizons" (f14).

4.3.4 Functional Motives

This category refers to purposeful, task-related benefits derived from the completion of previously defined tasks. It includes the acquisition of specific skills and knowledge that are relevant outside of Social VR: "I use it ... as a platform to learn new skills like 3D

modeling and game programming with." (m31), "... learning about different parts of the world first hand from the people who live there also has its value to me." (m22).

Another functional value that some participants described is the convenience that social VR affords to engage in certain activities: "VR gives me an easy way to do that." (m46), "... I'm a pretty sociable person irl, but I vastly prefer VR since it is convenient ..." (f22).

Two participants mentioned to use Social VR as a tool and a means to an end for which they otherwise do not have or want to spend the resources to fulfill it: "... watching a movie in 3d or 2d on a huge screen while actually sitting in a small room is a huge feat in itself." (m31).

4.4 Perceived Benefits of Social VR

Participants indicated four areas of benefits that social VR provides for social interaction that other social applications like online games or social media do not (see Figure 2).

The most frequently mentioned benefit is the *immersive experience* that social VR offers. This benefit category is based on the increased communicative expressiveness and interactivity with the virtual environment and others due to motion and position tracking and the degree of spatial and social presence that modern immersive VR technology induces (feeling like actually being there together).

The second most frequently mentioned advantage of social VR is an overall *better quality of the social experience*, which participants often referred to as being more authentic and natural in terms of, for example, others' behavior. Further, answers associated with this benefit category characterize the social encounters in social VR as more meaningful, intimate, and memorable. Furthermore, participants referring to the social experience perceive the social interaction atmosphere as healthier, more joyful, more effective, and more positive.

31 participants referred to *application-specific features* as beneficial for social interaction in social VR and thus did not directly refer to general social VR characteristics. For example, these participants emphasized that social VR applications are often specifically tailored and focused around social interactions and do not require them to engage in other goal-oriented activities, like online multiplayer games (More details are included in the supplemental material of this paper).

Another main category of perceived benefits is a perceived *increased accessibility and inclusiveness* that social VR grants to certain user groups. For example, these answers relate to the non-verbal communication capabilities of VR technology, which allow people to engage with others without relying on voice or text input. Another aspect that some participants highlighted was the combination of anonymity and realistic social interaction to establish a secure social interaction space for people who may suffer from social anxiety.

4.5 Wanted Features for Social VR

Participants indicated seven areas of features that they would like to be improved or implemented into social VR in the future (Figure 2). With mentions in over 20% of all responses, features related to the *Immersion*, the *Social experience*, and *Basic User Experience* are the most requested.

To increase *Immersion* the users wish to support more affordable and more extensive tracking technologies (e.g., face, eyes, hands) and the integration of more senses into the experience, particularly the development and support of haptic in and output devices.

The desired *Social* features relate to communication versatility (e.g., improvement of group conversation, direct messaging in and out VR, emoticons), convenient contact management (e.g., filtered user groups), diversification of group activities (e.g., friend & family features, more concurrent users) and implementation of security & safety mechanics (e.g., social moderation).

Social VR should also be improved in terms of the *Basic User Experience*. In particular, the participants refer to fundamentally functional aspects such as better performance (e.g., networking, fewer bugs) and usability issues with the user interface (e.g., limited or no customization of UI) and locomotion in VR. Overall, participants want social VR to be a way more seamless experience.

Another area of requested improvements relates to *Content Creation* features, which participants want to be more adaptable and easily accessible in general and best built into their favorite social VR application. They also mentioned particular features that would support content creation like integrating 3D volumetric live capturing of real-world objects.

Concerning *Avatars*, there seems to be a desire for more versatile design possibilities. For example, designing virtual clothes, non-human avatars, or expressiveness features were mentioned. Further, cross-platform avatars or avatars congruent to one's physical appearance are desired features.

Few participants would like to see easier and broader *Access* to VR technology in general (e.g., lower prices, more users) but also better user *Onboarding* within specific social VR applications by improving user onboarding processes and platform documentation.

Some participants expressed a desire for *Cross-Technology* integration features (e.g., communication between AR, VR, and non-immersive platforms) that would allow connecting with even more people. There should also be more versatile possibilities to transfer content from social VR to other applications and vice versa. Similarly, social VR applications should be integrated with the real world to blur the boundaries between virtual and real world.

Additionally, we identified 25 answers that could not be assigned to a unifying parent category and are clustered as *Diverse*.

5 DISCUSSION

Based on the provocative statement that VR will be the most social platform ever, we have explored what social VR users mainly do on their favorite platforms, what benefits they get from it, what advantages they see in this new type of application, and which aspects should be improved in the future. Our online survey results indicate that social VR is used mostly for social interactions and thus also explicitly has a social benefit for the users, i.e., it satisfies their social needs. In this respect, social VR seems to give access to social experiences that many users tend not to experience on other digital social platforms or even the real world. Also, for many users, social VR is a means for entertainment, i.e., it serves, for example, to pastime, explore user-generated content, or distract from everyday life, which for some users was limited by the COVID-19 measures in 2020. In addition to the social and entertainment benefits, social VR is also a resource for personal well-being, such as expressing oneself freely and features that allow individual users to practice social interactions and overcome fears. These self-related usage motives illustrate the personal value some users assign to their social VR activities. Functional benefits, such as language learning, seem to motivate social VR involvement, but in principle, they are less reflected in the form of specific learning or work activities. The answer to the "Why" behind social VR engagement can also be inferred from the UMI results. These allow the conclusion that most users are intrinsically motivated and that the use and the associated benefits are of high personal relevance. This also allows the conclusion that social VR engagement seems to be sustainable for our participants. Social VR seems to be less simply an alternative to other social applications but seems to have a real added value [7]. This seems to lie mainly in the increased immersion and expressiveness due to technological aspects that, in consequence, creates a superior social experience, as the identified benefits emphasize. However, even if the better social experience, the social benefits, and the predominantly social activities show that social VR seems to be a very social platform due to its immersive nature and increased expressiveness, these aspects

also seem to be accompanied by growing demands for improvement of those aspects. For example, users desire more affordable and comprehensive tracking technologies, increased sensory immersion, and improvements in terms of concrete social features. Nevertheless, also fundamental aspects of the user experience seem to require improvement.

Our results are relevant for related work in several aspects. First of all, we can say that the aspects identified in previous interview studies with small samples are also reflected in our results that are based on a big sample. In summary, our results confirm that social VR seems to extend the social and experiential qualities of traditional shared virtual spaces due to its technological characteristics (i.e., benefits regarding immersion and social experience, perceived social closeness). Additionally, they provide further evidence that social VR seems to support general and intimate socializing [43], self-expression and identity exploration [11], self-improvement and mental health, and learning skills and cultures [22]. Thus, the activities, motives, and benefits we identified are related to the groups of meaningful activities identified only recently during the writing of this paper [22]. For example, the activities for mental self-improvement (e.g., improving social skills) [22] are tightly connected to the *Self* category we present here. The previously formulated design recommendations (improvement of social connectivity, integration of communication affordances in and out of VR, increasing realism and naturalness [22]) were also addressed by our participants.

Our second contribution is a general and comprehensive view on the user-perspective on social VR. Although our results may offer a lower level of detail on specific topics identified in this paper than the results of in-depth interview studies [22, 26, 43], they allow an assessment of the relative importance of individual aspects, since we present the identified topics in terms of their frequency. Thus, our work provides a complementary perspective that offers a general overview of the topics previous papers dealt with in detail. We would also like to emphasize that our results are based on the everyday experiences of VR users who tend to be experienced with the medium of social VR and VR technology. Therefore, they form a valuable complement to findings from laboratory studies, which still make up the bulk of research methods, as VR technology is not yet a widely established medium in private end-user contexts.

Our third contribution lies in adding the users' perspectives to the literature concerned with current social VR applications' design practices. Our participant's desire for improved tracking technology (e.g., eyes, face) are in line with recently identified challenges and opportunities for the design of non-verbal communication in social VR based on a comprehensive overview of current social VR applications [41]. As we indicated, the tracking capabilities seem to be tightly related to the superior social experience. Thus our results emphasize previous conclusions that the development of software strategies and tracking technologies that improve nonverbal communication in social VR is a valuable research area. In addition, our results contribute to related work by supporting previous conclusions and indicate that it is worthwhile to bring users, developers, and researchers more in touch with each other. For example, while a previously crafted taxonomy of social VR application design areas also defines a "Self" category, this category is more related to specific features of avatars in social VR (i.e., "appearance customization", "controller tracking", "teleport") [17]. Thus, this other "Self" category does not necessarily reflect the self-related benefits we identified in our survey; however, it is linked to individual aspects of it (e.g., avatar appearance for self-expression). However, some self-related benefits we identified are linked to other categories of this taxonomy (e.g., overcoming social anxiety is linked to "interaction with others"). Regarding the unused potential of individual aspects of social VR, we would like to point out that learning and working were not very well represented in our sample. However, aspects such as learning sign language or doing light work do moti-

vate social VR engagement in individual cases. Especially against the background of the COVID-19 pandemic in the year 2020, this is a potentially rewarding application area for social VR, which is not yet represented in the taxonomy mentioned above. Therefore, we recommend integrating user-relevant motives into future design taxonomies to get a holistic perspective on the design of social VR features and tailor the design and research of specific features even more towards the potential user outcomes in everyday life.

6 LIMITATIONS & FUTURE WORK

Our results have to be interpreted with the following limitations in mind. We asked the participants to refer to the social VR application they use most often in their answers. Nevertheless, we used the data to draw a comprehensive picture and did not perform a platform-specific analysis. In this respect, we emphasize that most participants indicated *VRChat* as their favorite platform, which makes our results particularly representative for this user group. A rough examination has shown that individual categories show slight differences in the frequency of their mentions depending on the platform, which would have to be confirmed by a balanced sample. Therefore, it makes sense to generate such a platform-specific balanced sample in follow-up surveys or to explicitly refer to only one platform or several that are similar in features. Further, as illustrated in the sample description, our recruitment procedure gave us access to a not very diverse user group in terms of age, gender, region of residence, and thus probably cultural background. Consequently, it may tend rather to represent the user demographics of *Reddit* and its respective subreddits, and less of social VR. In particular, while our sample may represent users from America and Europe, it does not allow us to make generalizing conclusions about users from Oceania, Asia, or Africa. Future studies that directly reach out to social VR users should use recruitment procedures that provide access to a demographically diverse sample or try to specifically access users that we could not include in our survey. Besides, we have not yet conducted any analyses regarding the influence of individual characteristics such as personality or age. This must also be taken into account when interpreting our results. Therefore, we cannot assume that the categories and their relative importance derived by us apply equally to each user group. In summary, our results only allow us to make conclusions about social VR as a genre and users from different demographic groups, according to these limitations.

Methodologically, one limitation, in particular, should be mentioned. We decided to ask open questions and, in the sense of the UGT framework, we gave the participants the ability to reflect on their usage behavior. However, the variety of detail in the answers we received shows that not every participant wants to or can articulate themselves equally profoundly in such a kind of study. This is also shown by the high dropout rate, which led to the fact that we used different numbers of partial data sets for the individual analyses. Among these, there were detailed as well as concise and superficial answers. Of course, this is a direct disadvantage compared to in-depth interviews of individual users, but related to our study's goal, it is a limitation to be accepted. For follow-up studies in the topic areas we identified, we propose using predefined items and question domains but applying them so that participants can respond as unbiased as possible.

Besides the implications of the limitations above, we think it would be worthwhile to apply our methodological approach to less broad questions in social VR, such as the topics covered in the previous interview studies. Thus, prior knowledge on particular topics based on few users could be confirmed or extended by more extensive data sets. In doing so, however, we would fall back on the application of already predefined questions and assume this would lead to less fragmented datasets.

7 CONCLUSION

We investigated the "What" and "Why" of social VR usage and found, in line with previous work, that social VR extends the social and experiential qualities of traditional shared virtual spaces for a majority of users. Besides socializing with others, or the fun of playing in such virtual social worlds, users have also given us very personal information about the personal value they assign to social VR. So some find access to foreign cultures or best friends who live far away whereas others find access to social life in the first place by using such applications. As already noted by other researchers in this field, a thorough look at what users value about social VR eventually helps identify research and development opportunities by indicating what features of social VR are currently crucial for users but may be improved in the future. We identified a desire for better and affordable tracking technology, increased sensory immersion, and further improvement concerning social features. Our results indicate that, in everyday life, as well as times of limited opportunities for real-world social interaction (as in the ongoing COVID-19 pandemic), social VR's promise is the access to authentic and meaningful social interactions over distance for people who are physically separated from each other.

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