

Investigating Adolescent Online Safety and Privacy Interventions for Social Virtual Reality

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Social VR presents exciting opportunities for teens to participate in immersive user experiences and novel forms of online social interaction. Yet, teens can also be exposed to online risks (e.g., harassment, cyberbullying). To gain a comprehensive understanding of the current literature on adolescent online risks and privacy concerns in social VR, we began a systematic literature review. We plan to use the findings of this research to develop more effective safety and privacy interventions for youth in social VR platforms.

CCS Concepts: • **Human-centered computing** → **Social Virtual Reality, Adolescents Privacy and Online Risks.**

Additional Key Words and Phrases: social virtual reality, online safety, privacy, adolescents, metaverse

1 INTRODUCTION

Over the last 5 years, there has been a paradigm shift from social media to 3D immersive virtual social spaces, resulting in the rise of social virtual reality (social VR). With a user base of over 171 million global users [7], social VR presents a unique opportunity to examine the impact of immersive 3D environments on human interaction, connection, and communication. Previous research on social VR [1, 9] shows that these immersive and interactive experiences allow users to experiment with their identities, embody their avatars, and engage in real-time anonymous interactions. Yet, these interactions also pose several online risks and privacy concerns for users [4, 9]. Given the potential for rich social engagement and interaction, social VR has witnessed an influx of minors in online virtual worlds [5, 9, 10]. A recent Wall Street Journal report revealed Meta’s new plan to permit teens aged 13-17 to fill the audience vacuum of Horizon world [14]

While the SIGCHI community has provided rich literature on teen technology use and adolescent online privacy and safety [2, 3, 11, 13], it is mostly focused on studying social network platforms. Furthermore, most of the recent literature on social VR has been conducted from the perspective of young adults and adults, not directly with youth. Our research aims to explore potential solutions and practices for safeguarding the privacy and safety of adolescents in social VR. By attending the PIE workshop, we will be able to network with leading expert privacy scholars and discuss prevailing trends and challenges in the domain of adolescent privacy and safety. We will also be able to receive feedback on our ongoing systematic literature review and the design of our future research studies. In the following sections, we provide our motivation for this research and a summary of the current state of our work.

2 ADOLESCENT ONLINE SAFETY FOR SOCIAL VIRTUAL REALITY

Research has uncovered several key strategies aimed at promoting adolescent online privacy and safety, including the implementation of parental mediation [8], the development of trust through open communication [6], the promotion of teen resilience [16], and the encouragement of self-regulation [15]. Although these approaches have proven to be effective in some contexts, research has shown that their applicability varies depending on the unique experiences and challenges of adolescents. For example, Badillo et al. [3] found that teens in foster care situations face higher susceptibility to online risks despite their foster parent’s mediation strategies. They also found that foster parents faced their own challenges in implementing effective mediation strategies. Hence, investigating whether parental mediation strategies (among other online safety interventions) could be generalizable and effective in social VR is important.

Previous research by Maloney et al. [9, 10] has focused on understanding the growing presence of minors within social VR spaces (e.g., AltspaceVR, Recroom, etc.) as well as their emerging safety and privacy concerns. For instance, they observed the social tensions between minors and adults and the widespread incidents of online harassment and cyberbullying among minors in social VR. Other researchers [4, 5, 12] have also tried to understand the implications of affordances provided by social VR in exposing adolescents to online and offline risks such as toxic and anti-social behaviors (e.g., sexual harassment, microaggression, etc.). Guided by these previous studies on adolescents' online privacy and risks, we are currently undertaking a literature review to understand the current body of knowledge concerning the privacy and safety of youth within the context of social VR.

3 ONGOING LITERATURE REVIEW

To understand the current landscape of work at the intersection of online safety, privacy, and social VR, we are conducting a systematic literature review. This review aimed to synthesize and consolidate the existing knowledge on two key themes: (1) the implications of Social Virtual Reality (VR) on adolescents' online privacy, and (2) the general online safety of youth in social VR.

To thoroughly examine relevant research across multiple disciplines, we adopted a comprehensive search strategy that included a combination of keywords to search the ACM Digital Library for computing/technology-related research and Google Scholar for multidisciplinary technology research. We identified relevant keywords across four main categories: 1) Social VR, 2) Adolescents, 3) Online Privacy, and 4) Online Risks. In line with this focus, the following keywords were incorporated into our search criteria:

- **Adolescents:** "Teens", "Young adults", "Youth", "Teenagers", "Minors", "Kids", etc.
- **Social Virtual Reality:** "metaverse", "Virtual world", "MMORPG", "Extended reality", "Immersive technology", "Avatars", "Multiplayer games", etc.
- **Online Privacy:** "Anonymity", "Data protection", "Cybersecurity", "Information security", "Personal data", "Cookie tracking", "surveillance", etc.
- **Online Risks:** "Toxicity", "Cyberbullying", "Sexual harassment", "Microaggression", "Internet safety", "Online harassment", etc.

In our search, we targeted peer-reviewed articles published between 2010 and 2023. Our search strategy involved utilizing keyword combinations, such as "**Social VR**" AND "**adolescents**" AND "**toxicity**". To ensure the relevance of the articles to our research, we initially screened the articles by reading through the titles and abstracts. We excluded those not directly relevant to our research objectives. We currently have a total of 73 articles. We plan to conduct a backward referencing search to identify additional relevant articles that may have been missed in our initial searches. We also hope the conversations and feedback received at the CHI PIE Workshop could help us shape our research.

4 FUTURE WORK

We aim to systematize the existing work and pave a roadmap for future research related to adolescent online safety and privacy in social VR. As the next step, we are particularly interested in designing, implementing, and evaluating safety and privacy interventions and designs to ensure a safe and healthy VR environment for adolescents. We are looking to investigate: 1) how do adolescents' self-representation in social VR lead to safety and privacy risks? 2) How do other stakeholders, such as parents and bystanders, perceive and manage adolescents' safety and privacy risks in social VR and help to shape the social VR environment?

5 ABOUT THE AUTHORS

Ozioma Collins Oguine is a first-year Ph.D. student in the Department of Computer Science and Engineering at the University of Notre Dame, advised by Dr. Karla Badillo-Urquiola. His research interests lie at the intersection of Human-Computer Interaction, Social Virtual Reality (VR/XR), Accessibility, and Online Safety. Through his work, he aims to promote diversity, equity, and inclusion (DEI) in computing and develop interventions that promote the safety and well-being of vulnerable populations, such as teens and people with disabilities.

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