Opinions of Rural Stakeholders on the Ethics of Extended Reality Technologies for Children

Rural Stakeholders on the Ethics of XR Tech for Children

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Extended reality technologies have yet to be broadly used by children, making them an emerging technology for this population. We have begun a project exploring stakeholder perceptions of the ethics of these technologies when used by children. In this position paper, we outline our goals and provide some early results of our activities with rural stakeholders, including parents and teachers.

CCS CONCEPTS •Human-centered computing~Human computer interaction (HCI) •Social and professional topics~User characteristics~Age~Children

Additional Keywords and Phrases: children, ethics, emerging technologies, participatory methods.

1 WHY DO WE WANT TO PARTICIPATE?

In 2017, Common Sense Media found that while only 21% of parents of 8-15-year-olds in the U.S. owned a virtual reality (VR) headset, 70% of children were interested in VR and 62% of parents believed VR would provide educational experiences for their children [5]. Children's ownership of VR headsets have not increased in the U.S. since 2017, in part because these headsets are not designed for children and come with privacy and security concerns [6]. However, the growing emphasis on extended reality (XR) technologies applied to virtual worlds as part of the metaverse, coupled with the popularity of virtual worlds like Roblox among children, has caused concern about the potential for unique risks to children at the intersection of technologies such as realistic, embodied experiences of violence, or extra convincing misinformation via deepfakes [7].

At the same time, researchers have documented the potential for immersive and engaging VR [3] and augmented reality (AR) [4] technologies to support children's education, although the relationships between specific design features and learning outcomes are unclear. Turcanu et al. proposed that AR technologies could motivate children at high risk of absenteeism, such as children living in rural areas, to attend school [2]. Given this context, it is important for Child-Computer Interaction researchers to explore the ethics of emerging extended reality technologies for children.

Brey emphasized the importance of using participatory approaches with relevant stakeholders in forecast analysis for emerging technologies [1]. In line with this, we have recently begun conducting research sessions with adult stakeholders (parents and professionals working with children) in rural Iowa as part of a forecast analysis on emerging XR technologies for children. At this workshop, we would like to share methods and results from our early sessions with stakeholders and learn more about other participatory approaches to explore the ethics of emerging technologies. Because we are in the early stages of our own investigation, the discussion at this workshop could greatly impact the shape of our future research.

2 WHAT CAN WE CONTRIBUTE?

We have conducted one session with stakeholders as of the writing of this position paper. The six stakeholders were all adults working or living in towns of less than 2,500 people. Five were female and one was male. All stakeholders had children aged 2-12 years old. One stakeholder worked with children in this age range, while two others worked with high-school-age children. Almost all stakeholders had little to no previous experience with extended reality devices, though one did own a virtual reality headset for their child's use.

For this first session, we followed a technology immersion approach enabling the stakeholders to become familiar with commercial extended reality technology. More specifically they took turns using a Meta Quest Pro virtual reality set and a Microsoft HoloLens. As the participants used each system, they provided feedback, as we asked them to imagine their children or the children they work with using the systems. Below, we provide a summary of stakeholder reactions on the stakeholders' views on the appropriateness of these technologies for children.

One area of concern frequently commented on by stakeholders was monitoring capabilities or parental controls for extended reality devices. While these comments were primarily critiques on current features or suggestions for future devices, there were multiple positive comments regarding the ability to screen mirror the Meta Quest Pro to a smartphone display for monitoring purposes. Filtering out inappropriate language, parent-enabled time limits, and the ability to monitor device audio were commonly mentioned by stakeholders as desired parental controls.

As most of the stakeholders had rarely used extended reality devices, we received lots of feedback on general usability. Most feedback expressed frustration with navigating the devices, though stakeholders suggested that these difficulties may be more applicable to adult users than children. One comment regarding children's usability concerns was whether the Meta Quest Pro headset was too heavy for younger children. Stakeholders favored the idea of hand-tracking controls, as implemented with the Microsoft HoloLens, but found actual usage to be challenging.

Some other concerns with use that our stakeholders discussed included the potential impact of extended reality on children's emotional health. In particular, stakeholders worried that younger kids may confuse reality and virtual reality experiences. Stakeholders also questioned whether any long-term studies existed on extended reality devices' effects on vision and dizziness. Other mentioned concerns included sleep disruption, general physical side effects, and negative effects on social interaction.

Despite these concerns, stakeholders also recognized potential positive uses of extended reality devices. For instance, these devices could serve as valuable learning tools in schools, particularly for non-verbal children who may struggle to communicate effectively. As some of the stakeholders were teachers, many comments highlighted the potential to enhance educational experiences for students.

By the time of the workshop, we will have conducted more sessions with stakeholders using personas, scenarios, and other prompts to spark and build on discussions.

3 WHAT DO WE WANT TO GET OUT OF THE WORKSHOP?

We are students in the early stages of a two-year-long project, so there is an opportunity for several of our future research sessions with stakeholders to be influenced by this workshop. We are excited to learn more about recent, ongoing, and planned future research in the area of children and emerging technologies. Learning about other future-oriented participatory methods would be useful to us in the short term as we work on this project and the long term as we continue to work in Child-Computer Interaction. We would also appreciate getting specific feedback on ideas for prompts and activities for future sessions. Currently, we are only working with adult stakeholders, so it would be interesting for us to hear more from other groups doing anticipatory participatory work directly with children.

4 CONCLUSION

We are students working on a project exploring rural stakeholders' perspectives on emerging applications of extended reality technologies with children. Because of this, we could contribute to and benefit from a discussion of participatory methods to explore broader emerging technologies and the ethical implications they may have for children.

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