



Conducting Ethical Research on Emerging Technologies for Children

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Abstract

This SIG will provide child-computer interaction researchers and practitioners, as well as other interested CHI attendees, an opportunity to discuss topics related to conducting ethical research on emerging technologies for children. While the community has extensively debated on ethical issues, we have not had ample discussion of how to ethically manage research on emerging technologies, often designed for adults, that may also be used by children or affect children. More specifically, we would like to discuss ethical aspects related to motivations for research, how research is conducted, and how it is reported. We hope these discussions will go well beyond legal requirements from ethics boards and help provide

foundational guidance for research on emerging technologies with children, but also inform similar research with other vulnerable communities.

CCS Concepts

• **Human-centered computing** → Human computer interaction (HCI); • **Social and professional topics** → User characteristics; Age; Children.

Keywords

children, ethics, emerging technologies, research methods

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1 Introduction

The past decade has seen an increase in the interest of the child-computer interaction community on ethics. There have been more publications (e.g., [2, 7, 12, 16, 20]) and meetings, including special interest group meetings (SIG) at CHI 2017 [8], 2018 [9], and 2023 [6]. These meetings discussed the impact of the increasingly ubiquitous presence of technology in children's lives and their ethical implications, as well as how to involve children and other stakeholders in evaluating the ethics of uses of these ubiquitous technologies [6, 8, 9].

One aspect of ethics that has yet to be discussed in depth by the child-computer interaction community is how to ethically conduct research involving children and emerging technologies. We are particularly interested in aspects that go beyond legal requirements enforced by ethics boards and that address the lack of knowledge and uncertainty surrounding emerging technologies. Our objective during this SIG is to enable the child-computer interaction community and the larger CHI community to discuss ethical issues with respect to motivations, methods, and reporting of results for research involving emerging technologies and children.

2 Ethics and Computing

There is broad agreement on high-level ethical principles as presented in documents, such as the Belmont Report [19] and the Declaration of Helsinki [4]. They call for beneficence, non-maleficence, respect for persons, and justice [4, 19]. Ethics boards follow practices that attempt to implement these high level principles [10]. Within computing, ethics codes from the likes of ACM and IEEE apply these high level principles to computing and engineering [1, 21]. A 2016 survey of ethical issues brought up in the computing literature found the most common ones to be privacy, professionalism, autonomy/agency (of humans), trust, consent, and inclusion/digital divides [17]. One of the ethical themes receiving the least attention was children and adolescent rights [17], which also happened to be receiving the least amount of attention according to a recent survey of artificial intelligence ethics guidelines [5]. This gap can be impactful as there is increasing evidence that it can be difficult to apply high-level ethical principles to specific children's technologies [12]. In other words, there is a need to discuss computing ethics with respect to children as specifically as possible.

3 Ethics During the Research Process

Ethics boards focus on issues such as informed consent, participant safety, minimization of risks (e.g., confidentiality), and risk assessments (i.e., benefits outweighing costs) [14]. They provide basic safeguards for research conducted in institutions subject to their jurisdiction [10]. Research with children typically includes additional protections, such as requiring informed consent from guardians, and if developmentally appropriate, assent from children [13].

Investigators make ethical choices throughout the research process. The first set of choices has to do with motivations. For example, is the research aiming to find a solution to an unsolved problem that the emergent technology may address? Or is it just trying to use the technology because it is novel? Is the goal of the research considered ethical by stakeholders? Other interesting questions can

surface when considering methods. For example: How is informed consent managed (e.g., can children and/or guardians try out a technology before agreeing to participate)? Are stakeholders consulted on the research methods? Can children and guardians understand the data being collected and how it will be used and protected? How are potential risks managed? Finally, when reporting results, there are choices to be made on what to report. For example, if investigators are invested in the success of an emerging technology, do they report on associated risks?

4 The difficulty of emerging technologies

Emerging technologies add a layer of complexity to ethical issues. This difficulty has to do with multiple factors, such as lack of knowledge about emerging technologies, uncertainty as to how they may be used and the impacts they may have, and the fact that they are typically designed with adults in mind.

With respect to lack of knowledge about emerging technologies, it can affect multiple parties. First, child participants and their guardians may know little or have a limited understanding of emerging technologies. They may have heard of them in the media or could have some sense of what they could do from movies or television shows. However, their limited (and possibly inaccurate) understanding could affect their ability to provide informed consent/assent. Likewise, ethics boards may not have staff or members who are knowledgeable about emerging technologies such that they would be able to understand potential risks and benefits and ensure adequate safeguards are in place.

Uncertainty about emerging technologies is a related factor that can affect child participants, their guardians, ethics board members, and even the investigators running the research. This uncertainty can be with respect to how the technologies may be used and appropriated, and what positive and negative impacts they may cause. In other words, the likelihood of something unexpected happening during a research study is much higher in studies involving emerging than well-established technologies.

Another factor contributing to difficulty is that most emerging technologies are designed with adults in mind. The potential benefits and risks with respect to children are not likely to have been considered. For example, with all the current attention on generative artificial intelligence, little attention has been paid to how these systems could affect children's cognitive development. This lack of attention to children could increase uncertainty, but also lead to potentially risky assumptions that risks and benefits identified for adults will simply transfer to children.

4.1 Example: Extended Reality Technologies

Extended reality (XR) technologies are an example of a current emerging technology for children. Considering headsets and glasses enabling virtual, augmented, or mixed reality experiences, these are technologies that have been designed for adults and have been commercially available for several years. However, major manufacturers do not recommend their use by children younger than 10 years old [22].

While adults and children may have a sense of what these systems do and some risks and benefits associated with them, they may not be aware of all. For example, the recently discontinued

Apple Vision Pro had a broad range of cameras to capture user movements, eye-tracking capabilities, and the option of creating a virtual three-dimensional version of the user that could be incorporated in social interactions with others [3]. Even someone who is a regular user of other XR devices may not be aware of all these device capabilities, which could be used for data collection in a way that could affect consent and assent decisions, as well as ethics review considerations.

We also do not know how the longitudinal use of XR technologies could affect children. What would be their impact on children's cognitive development? For example, augmented reality applications with highly realistic graphics could affect young children's developing ability to tell what is real from what is not [15]. On the other hand, highly immersive educational applications could perhaps give children the unprecedented opportunity to experience the equivalent of traveling across time and space (e.g., visiting ancient cities, or another planet).

For adults, XR technologies are mainly used for entertainment [23] with risks involving motion sickness [11] and accidentally tripping or running into something [18]. It could well be that the main risks and benefits could be different for children; we do not know yet.

5 Conclusion

Emerging technologies are an important aspect of human-computer interaction research. However, conducting research involving emerging technologies and children brings about a unique set of ethical concerns. We hope this SIG will be an opportunity for the child-computer interaction community and other CHI attendees to discuss these ethical issues and develop ideas that go beyond legal requirements implemented by ethics boards.

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