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Provocation

Provocation: Is there an assumed need for participatory design with children?

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Abstract

This paper reflects on participatory design practices within the child–computer interaction (CCI) community, which has a long tradition of advocating the inclusion of children in the design process. The benefits of involving children are widely cited in the CCI literature. However, through a critical analysis of children's current technology usage, research and industry practice, this paper offers three provocations relating to participatory design and children. The first focuses on what constitutes participatory design, suggesting that the use of children in a single design activity to generate ideas is very distant from traditional participatory design (PD) and thus should not be referred to as PD. the second is that there needs to be a shift toward researching and developing methods to enable children to participate in design activities that align with industry timelines. The final provocation suggests that unless there are some tangible benefits of including children in PD of technology or impact can be demonstrated from the work, then an ethical debate is needed about their role and inclusion. These three provocations are designed to question and stimulate the debate around the benefits and values of including children in the design process. Without a critical reflection on current practices and processes, current trends may continue and design practices within the industry may not evolve.

RESEARCH HIGHLIGHT

- The paper critically reflects on the use of participatory design with children questioning its use.
- Through examining the literature and reflecting on research practices three provocations are presented:
  - The use of the term PD needs to be reserved for instances that align with the origins of involving users in the design of technology they will ultimately use.
  - There needs to be a shift toward researching and developing methods to enable children to participate in design activities that align with industry timelines.
  - Unless there are some tangible benefits of including children in PD of technology or impact can be demonstrated in the work, then an ethical debate is needed about their role and contribution.

Keywords: *Children; Participatory design; Ethics*

1 INTRODUCTION

The child–computer interaction (CCI) community has a long tradition of advocating the use of participatory design (PD) and related co-design methods with children (Scaife et al., 1997; Read et al., 2002; Dindler et al., 2010). Children as defined by the United Nations Convention on the Rights of the Child are anyone under the age of eighteen. Within CCI, the use of PD in a research context has tended to focus on school-aged children. PD is a broad term covering a range of approaches that typically have 'end-users', in this case, children, engaging with development teams or researchers to specify and ideate the technology they will use. PD has its roots in Scandinavian research, emerging in the late 1970s and 1980s, when computers were starting to change working practices (Bødker and Kyng, 2018). An early example was the Utopia project whereby labor unions and researchers examined new technologies for newspaper production, developing new design methods, tools, and techniques (Kraft and Bansler, 1994).

There are numerous methods for engaging end-users in the design process, including co-design, user-centered design, contextual design, and participatory design. An attribute of participatory design is the notion of mutual learning, whereby designers learn about the users and context, and users continuously learn about technology design and designers (Kensing and Blomberg, 1998; Bødker et al., 2022). It has been suggested that the objectives of design should not only focus solely on the final deliverable, which may be an interactive system, but also on how end users develop new insights, design abilities, critical and reflective skills toward technology (Iversen et al., 2017). To achieve this, end-users would need to participate in the entire design lifecycle which is aligned to the Scandinavian tradition of PD. A critique of existing participatory design research involving children is that they are often involved in the early ideation stages and are omitted from other aspects of the design process (Landoni et al., 2016), thus their acquisition of knowledge of design practices may be limited.

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Children's involvement in PD emerged over the last two decades (Scaife et al., 1997; Guha et al., 2005) and has been a focus of the CCI community. Research has examined the different approaches and techniques for including children in the design process, for example, children with special needs (Malinverni et al., 2014) and group dynamics (Van Mechelen et al., 2014).

1.1 Provocation one: Defining participatory design with children

PD with school-aged children takes many different forms which are often dictated by factors including the nature of the intended product being developed, the timescale of the project, and the ease and constraints around access to children. This has resulted in researchers in CCI taking different approaches when considering how to enable children to participate in design, thus there are variants of PD. Read et al. (2016) categorized PD based on the role of the children within the design process, with the term 'reduced PD' intended to describe studies in which children are engaged in a single isolated event and are out of the decision-making process, whereby in "full PD," the children are involved in the entire lifecycle and decision making. Other research has focused on how the PD sessions are facilitated, including distributed PD where the children are geographically dispersed from the design team (Constantin et al., 2021).

Full PD has often focused on designing with a small group of children over an extended period of time (Allen et al., 2021), during these sessions, the argument is that children learn design skills in a collaborative incremental process that leads ideas into a single design brief (Yip et al., 2013; DiSalvo et al., 2017). The children are creating the products that they and their peers will interact with. This approach has a long tradition in CCI with Druin establishing Kids Teams at the University of Maryland in the late 1990s to work on long-term projects (Druin, 1999), and this approach has continued within academia for example in institutes in Denmark (Iversen et al., 2018) and Austria (Spiel et al., 2017). A potential downside of this approach is that children sometimes only attend for one or two sessions rather than the full duration and therefore have little chance to develop the same level of design skills or knowledge as those engaged in the full development life cycle (Kam et al., 2006; Roussou et al., 2007). In contrast, in reduced PD, children can take on the role of informants contributing to different aspects of the design process (Scaife and Rogers, 1999). For example, the practice of designing for just a single day has been adopted and can engage large numbers of children in short bursts (Read et al., 2022a) in the ideation stage. The aim in such cases is to generate many ideas that can then be examined by a design team or researchers, this may enable a representation of ideas from the children to be obtained. This focus on including children in the early ideation phase of design has been criticized within the literature (Landoni et al., 2016), recognizing the need for children to contribute to other aspects of the design or for prolonged periods of time (Barendregt et al., 2016). It has been noted that PD methods do not tend to be practical in industry due to short development times (Antle and Hourcade, 2022), and it may be that engaging children in a process that expands or prolongs the development period is not viable in many instances.

In more recent years, driven by the COVID pandemic, there has been a trend to examine methods for distributed PD, where children who are geographically dispersed are contributing to the design process (Constantin et al., 2021). This approach can be facilitated via technology, such as Microsoft Teams, or the use of teachers or facilitators to run the study on behalf of others (Read et al., 2022a). The experience of those facilitating the study is critical, as it has been argued that many studies fail because adults are far removed from children in terms of understanding their vocabulary, abilities, context, and motivations, resulting in a bad experience or at worst damaging for the child participants (Read, 2015). Therefore, it could be argued there is a need for formal training of facilitators to ensure a positive experience for the child participants. The value of these distributed methods has yet to be fully evaluated or measured, but the facilitator can have a serious influence on the outcomes positively or negatively.

Within the CCI literature, the value of PD with children is widely discussed (Hussain, 2010; Yarosh and Schueller, 2017; Schepers et al., 2018). Authors have cited benefits to children that include developing skills in design thinking, computational thinking, having fun, becoming empowered, gaining education in the topics being designed, and having opportunities for collaborative working along with engaging with academics. For example, in a study by Sim et al. (2017) claims were made pertaining to the education of children about other cultures, yet there was very little evidence of this new knowledge being applied to their designs and no educational assessment occurred to validate such claims. The viability of current PD approaches to the reality of children's relationship with technology has been questioned (Antle and Hourcade, 2022), and this paper extends this debate by questioning its appropriateness. Reflecting on current practices this leads to the first provocation:

Provocation One: The use of the term PD needs to be reserved for instances that align with the origins of involving users in the design of technology they will ultimately use. It could be suggested that children are acting as informants within the design process, but it is questionable whether it is PD. There is a need for the CCI community to clearly articulate the boundaries of what constitutes PD as it appears to be an umbrella term to describe any design session involving children.

1.2 Provocation two: Value of PD methods with children

Over recent years, especially for older children, technology use has been dominated by interacting with screen-based devices. In 2014 in the US, the average screen time for children was 7.38 hours per day (Magee et al., 2014). In the UK in 2018 children aged between 12 and 15 years were spending on average 9.2 hours per day on screens, which included TV, the Internet, gaming, and mobiles (Guttman, 2019). In 2023, Ofcom reported that children's behavior continues to evolve with a decline in viewing TV, whilst there is a significant rise in viewing video-sharing platforms including YouTube (Ofcom, 2023). There are many rationales for including children in PD, one being that children are required because they are far removed from adults who are designing technology for them, and they should be empowered to design technology that they will ultimately use. However, are children consuming and using technology that has been designed in this way? Teenage children are appropriating technology such as YouTube, Social Media Platforms and communication technology that are unlikely to have involved children in the design process. Thus, it is conjectured that companies are having commercial success and children are becoming consumers of their technologies without the need for full PD. However, companies do not always disseminate their research and development methods, thus claims relating to industry practices are often inferred by academics. Some organizations, such as Lego and the BBC, do involve children in aspects of product development such as evaluating the accessibility of their online games to help inform the redesign (Read et al., 2018). Organizations have partnered with academics who use

PD, for example, the Joan Ganz Cooney Centre which is a non-profit research lab within Sesame Workshop has worked with the University of Washington and academics from the University of Maryland (Tare and Guha, 2023). These collaborations need to be mutually beneficial as the goals of industry are often different from academia, driven by commercial pressures to make a profit rather than the research and innovation that is aligned with academia.

The role of children in the development process has been examined within CCI over the years, with Druin suggesting that children can have different roles in the design of technology, being participants, informants, testers or users (Druin, 2002). While specific to PD, participatory power imbalances are discussed by Read, who delineated participatory design activities with children along an axis from informant through balanced to facilitated design (Read et al., 2002). Children have adopted different roles within the design of technology, however, there still lacks strong evidence PD methods are commercially viable, and reflecting on the 20 years of CCI research, has the use of PD improved the technology that children are using?

Children spend a large proportion of their free time playing online games and this has been one of the widely researched areas in CCI. In a systematic literature review of the design methods in CCI (Lehnert et al., 2022), of the 272 papers examined, the most common products designed were interactive games accounting for 25.4% of the papers. The video games industry has successfully produced commercial games, designed for children without the apparent need for the use of full PD methods. Games concepts are initiated by the publisher or the development studio and prototypes are evaluated before moving to production (McAllister and White, 2015). Children may be involved as informants in playtesting and providing feedback on initial prototypes. Games such as Fortnite are popular with children aged 10 to 12 years, with the social aspect of the game a prominent reason for its success (Livingstone and Pothong, 2021). Fortnite took several years to develop, and within that timeframe, it is unlikely that you could sustain full PD with groups of children for that duration. Academics have started to examine how to sustain children in long-term PD processes (Schepers et al., 2022). As previously noted, children have usually contributed to the design of new technology in isolated, short-term design sessions (Barendregt et al., 2016; Landoni et al., 2016). Whether these practices are appropriate in all contexts, including the video game industry, is still unknown. Researchers have suggested that the benefits versus the drawbacks of using PD with children in a commercial context arise out of the lack of trust in the opinions of the untrained children versus those of the design professional (Nesset and Large, 2004). The CCI community has tried to bridge the gap between those working in the industry through workshops at conferences (Read et al., 2019), and the creation of Playbooks (Sim et al., 2021), which are step-by-step guides designed for organizations to be able to adopt CCI methods within their organization. Despite industry and academic collaborations, there are still considerable gaps and barriers for industry to justify the inclusion of children and the use of full PD in a commercial time-constraint project may not be desirable.

Were academics have been involved in designing games, reduced PD practices are used with children who are often brought into the ideation stage, and games may be prototyped around these ideas and evaluated (Moser, 2013). In a study by Sim et al. (2014), children in the UK designed a serious game relating to hand washing for children in Uganda. A single design session was conducted in the UK, the children were briefly educated about life in Uganda and from the analysis of the children's ideas a game was developed. The game was subsequently taken to a children's orphanage in Uganda to be evaluated. It is debatable whether children in the UK would have had the cultural understanding of life in Uganda and the differences in access to soap and water. On completion of the project, the team left the tablets, game and solar charging panels with the school who subsequently sold them. Reflecting on the value of the PD process to the children in the UK, they contributed to the design of a game that was built for children in another country and the evaluation demonstrated that it was fun to play. Whether this is sufficient to claim that the children in the UK successfully contributed to the design of a game for children in Uganda is debatable. Only a small group of children in Uganda played the game, and it is unlikely to have had a meaningful impact on them or changed handwashing behaviors within the population. Other researchers have developed new methods for children to ideate around game narrative acknowledging the fact that industry could benefit from the contributions of children's imagination (Uğraş et al., 2022). Despite these claims, the games industry does not appear to be embracing full PD with children and therefore does academia need to change tact or evolve the focus of its research to have a meaningful impact within the sector? This leads to the ethical debate around the inclusion of children in PD sessions and the research value beyond academia.

Provocation Two: There needs to be a shift toward researching and developing methods to enable children to participate in design activities that align with industry timelines. Over the years, research outputs have included schemas to structure design sessions and activities to improve the design process (Churchman, 1968; Druin, 1999; Scaife et al., 1997; Jason Yip et al., 2013) but it is unclear how these meet industry needs. Without methods being developed to solve industry design problems, then the work is likely to have minimal immediate impact. There may be little justification for the inclusion of children in PD sessions focusing on methodological improvements unless there is some mechanism for the outcomes to be applied in practice or contributing to advancing the field.

1.3 Provocation three: Ethics of PD with children

There is a sense that the inclusion of children in the design process is beneficial for those who have long-term engagement in projects (Bossen et al., 2010). To aid the ethical justification for including children in the design**,** research tools, such as CHECk, have been developed to ensure researchers critique their methods and justify their inclusion (Read et al., 2013). CHECk consists of two checklists that encourage researchers to critically review the reasons for including children in the research project, and to examine how to describe the activities in a child friendly way so that children can assent to participate. Ethics goes beyond consent, and when designing studies ethical considerations need to include children's well-being before, during and after they have participated in the study (Frauenberger et al., 2018). PD with children has taken place in a wide range of settings including, schools, universities, clubs and societies (Lehnert et al., 2022). There is considerable work from the CCI community that has taken place in schools and within this environment, it could be argued that researchers are taking time away from teaching activities. There are claims that the sessions are educational, teach children about design processes, and raise aspiration or empowerment (Schepers et al., 2022) but these all need to be measured in a rigorous way to ensure the claims are valid. Researchers have attempted to evaluate the benefits to children, but the evaluation of long-term

benefits to children is scarce (Bossen et al., 2010). Apart from the benefits of children participating being purely educational, three desirable characteristics have been identified for working with young children: being developmentally appropriate, inherently beneficial to children, and being enjoyable to participate (Pantoja et al., 2020). These three criteria may apply to all research with children and defining the benefits should be an important part of the ethical process.

In addition, if children's contributions are being discarded following a design session, not being developed into commercial or accessible technologies for children, then is there a clear ethical argument for their inclusion? Methods have been developed to ensure all children's ideas can be considered (Read et al., 2014) and ideas can be traced back to individuals whilst designing technologies for children (Read et al., 2016), but there is little understanding or published evidence of this technique being required or appropriated by industry. Ethical review panels are approving PD research under the notion of the work advancing PD methodologies to help in the design of technology for children, yet there is limited evidence of the success of academics evolving industry practice within the context of full PD and children. Perhaps, there needs to be a greater emphasis and critical reflection on the real value of children's participation when conducting the ethics review and how impact can be derived through methodological advancement.

PD involving children could be rigorously critiqued during the initial project planning and research design phase to understand the justification for the inclusion of children. To aid study design and ethical processes, research protocols have been designed (Constantin et al., 2022) which include factors such as the expected outcomes of the study. In addition, methods have been created focusing on how to report back to children, in an accessible way, about their contribution to a research project (Read et al., 2022b). This concept of reporting back suggests ways results can be packaged in a child friendly way, to aid children in understanding how their participation has contributed to the research outcomes. For example, PD with children can often focus on societal challenges including climate change, health, etc. If the PD session is aimed at tackling societal issues, and the researchers are using what is referred to as reduced PD (Schepers et al., 2022), whereby children are exposed to limited short-term design sessions, it could be conjectured that the contributions from these sessions are unlikely to result in technology that will have societal change. Thus, the reporting back may need to explain how their contribution may aid future development. As part of the ethics process, for studies like this, it may be useful for researchers to disseminate the pathway to impact, making it explicit how the societal changes will be achieved. This would require additional ethical considerations relating to how the PD session will develop technology that will be transformative and how change will be measured. In the study involving UK children designing a hand washing game for children in Uganda (Sim et al., 2014), it is unlikely that the researchers would have improved hygiene practices and the health of children in Uganda if these were the motivation for the work. The CCI community has tried to partially address this challenge, as Frauenberger et al. (2015) synthesized a methodological framework to critique PD projects. They highlighted that PD projects need to be evaluated on not only the tangible outcomes, which may be academic papers, but also the learning gains, the values of the project and grounding epistemological perspectives.

There is concern that technology may be harmful to children. Therefore, if the focus of PD is to encourage the design of technology, that children will consume, should the benefits outweigh any potential negative consequences? There has been research examining how children can become addicted to technology, for example playing games such as Fortnite (Carter et al., 2020) and using mobile devices (Hadlington et al., 2019). In addition, research has shown the negative impact screen time can have on children's sleep (Zhang et al., 2017) and there is evidence that increased technology use may impact children's mental health (Girela-Serrano et al., 2024). When evaluating the outcomes of using PD to design technology with children, the potential negative consequence of increased technology use may need to be factored into the ethical debate. The benefits of this may need to outweigh any potential negative effects. For example, the benefits may be educational, promote healthy lifestyles or keep them safe online. It has been suggested that there is a need to help children build healthy media consumption habits, facilitating their transition away from the screen (Samaha and Hawi, 2017). There are societal and parental concerns about the increase in screen usage by children, evident from the statistics presented earlier and research (Hiniker et al., 2016). Researchers may need to examine ways of engaging children in activities away from the screen including visiting cultural heritage sites (Iversen et al., 2012), which may incorporate technology such as augmented reality to complement the artifacts (Shin and Gweon, 2020) and participate in physical exercise (Watkins et al., 2024). More research is required to understand the ethical justification for the inclusion of children in PD sessions and the role they play in designing the technology they will use. Based on a full PD ideology, CCI researchers could be striving for child-initiated research problems and shared decision making with adults based on Hart's Ladder of Children's Participation (Hart, 2008). The ladder has eight rungs, with the lower three being described as 'non-participation' and the next five representing different 'degrees of participation'. At the top of the ladder children have shared decision making with adults and the lowest level is manipulation. This is where adults use children's ideas and voices for their own gains. The notion of shared decision making may be challenging within PD due to potential power imbalances. Children especially within a school context usually conform to the teacher's instruction and empowering children within this environment may be difficult. There needs to be a move away from the non-participation rungs, including the third rung of the ladder, whereby children have a tokenistic contribution towards the design. This leads to the final provocation:

Provocation Three: Unless there are some tangible benefits of including children in PD of technology or impact can be demonstrated in the work, then an ethical debate is needed about their role and contribution. Impact could be societal related improving children's engagement with culture (Iversen et al., 2012), and solving societal or industry problems (Björgvinsson et al., 2010). It is questionable whether reduced PD that solely generates ideas without the capabilities to implement these into a product is appropriate. There would need to be alternative reasons for the use of reduced PD that may relate to advancing theory, inform education or standards. Without these benefits what is the ethical justification for inclusion of children in research and development studies?

2 CONCLUSIONS

This critique of PD with children has raised three provocations. The first focuses on the term PD with children and the lack of any clearly defined parameters of what constitutes PD with children.

Therefore, the first provocation is that the use of children in a single design activity to generate ideas or evaluate technology is very distant from traditional PD and thus should not be referred to as PD. It could be suggested that children are acting as informants within the design process or fulfilling other roles, but it is questionable whether it is PD.

The CCI community has examined the efficacy and effectiveness of PD practices in terms of generating ideas, learning gains, and inspirations from children that are useful to developers. Despite the vast amount of research, there is little documented evidence that CCI using PD has significantly influenced industry design practices. Children are continuing to consume media and technology that they have rarely contributed to or aided the design process. This raises the question of the value of PD with children when the objective is methodological advancement of PD. It should be noted that these advancements may take time to filter through to industry and immediate impact may be minimal. Thus the second provocation from this critique of methods is that there needs to be a move toward research on developing methods to enable children to participate in design activities that fit industry timelines. If these tools are not appropriated by industry what is the value of the research? It has been noted in workshops on industry and academic collaborations (Read et al., 2019) that industry practitioners rarely read academic journals, thus they may not have exposure to new methods.

The final provocation suggests that unless there are some tangible benefits of including children in PD or impact can be demonstrated in the work, then there is an ethical debate that is needed about their role and contribution. This may require further research into how to measure the impact or the tangible benefits of including children in the design process. These benefits may be educational to the children, but this may need to be demonstrated within the context of the research study. Overall the inclusion of children in PD sessions needs to be questioned through a critical lens to ascertain who the beneficiaries of the outputs of the work are. If the main beneficiary of the work is likely to be the academic, through publication of the results, then there may be, no ethical justification for their inclusion.

Further research is required to deconstruct PD with children, to be able to justify their inclusion, develop ways of measuring the outcomes, and this should consider the longitudinal impact of the work. There is concern in the literature about the negative consequences of technology use through prolonged exposure to screens, and this may be considered when looking at the impact of PD with children. The short-term benefits of the studies are often cited as including the development of skills in design thinking, education in the topics being designed around, opportunities for collaborative working, and engagement with research/design teams. These benefits may just be short-term, especially if they are from a single design session, and diminish over time, thus the benefits may still be questioned. Finally, it may be worth considering how the three provocations proposed in this article apply to other populations and not just the use of PD with children.

Data Availability

No data was used.

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