Pushing the Boundaries of Participatory Design with Children

Pushing the Boundaries of Participatory Design with Children with Special Needs

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ABSTRACT

Despite its inherent challenges, participatory design (PD) has unique benefits when designing technology for children, especially children with special needs. Researchers have developed a multitude of PD approaches to accommodate specific populations. However, a lack of understanding of the appropriateness of existing approaches across contexts presents a challenge for PD researchers. This workshop will provide an opportunity for PD researchers to exchange and reflect on their experiences of designing with children with special needs. We aim to identify, synthesize and collate PD best practices across contexts and participant groups.

CCS CONCEPTS

• **Human-centered computing** → **Participatory design**; • **Social and professional topics** → *People with disabilities*; *Cultural characteristics*; *Children*;

KEYWORDS

Participatory Design; PD; co-design; methodology; best practice; children; special needs; reflection

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BACKGROUND

Initially focused on workplace democratisation [6], participatory design (PD) has been used to design technology for and with children [4, 7], including children with special needs. PD provides unique benefits in designing technology with children with special needs, including a deeper understanding of users and context of use, leading to a product which better fits its purpose [7, 10] and increased ownership of technology [5]. PD also creates opportunities for children, including children with special needs, to develop increased self-esteem and confidence as well as collaboration, communication, and problem-solving skills [12, 14]. When designing PD activities for children with special needs, researchers should take into account the dimensions of capability, suitability and empowerment [16] (see the left side bar).

Dimensions of PD with children with special needs

Three dimensions should be considered when designing and evaluating PD activities for children with special needs: capability, suitability and empowerment [16]. *Capability* is defined as the extent to which the PD activities can positively impact the design results. *Suitability* describes the capacity of PD activities to engage and inspire children to become active participants in the PD process. *Empowerment* has been defined in terms of meaningfulness (the extent to which children care about what they are doing) and feelings of competence (children's perception about the relevance and importance of their contributions) [16]. One distinct aspect which should be considered within empowerment is PD's capacity to provide opportunities for developing new skills [2].

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PD approaches have been utilized, altered, and created considerably within the IDC community and beyond to meet children's needs and to accommodate children with special needs. PD with each group of children with unique needs brings specific challenges [9], and general advice recommends tailoring design activities, approaches and methods to the needs of individual children, and involving children in PD at a level appropriate to their needs and the support available [11] to empower them to express their ideas [8, 17] and maximize their contribution to design [1, 11, 18]. A number of approaches and strategies have been developed to support children with specific needs, including neurodiverse children [17], children with motor impairments [13], Deaf[1] children [15], and children with communication difficulties [3]. The proliferation of methods and strategies designed for use with particular groups of children with special needs comes at a cost: a lack of understanding of the appropriateness of existing tools across contexts and user groups. This is symptomatic of one of the major challenges faced by PD researchers, that identifying best practice of PD across multiple contexts is under-explored [3, 19, 20].

This workshop will focus on two broad themes: 1) identification, synthesis and collation of best PD practices with varied groups of children with special needs; and 2) researchers' experience in conducting PD with children with special needs. The following topics may inspire position papers and discussions:

(1) PD approaches and techniques developed for children with special needs;
(2) principles and guidelines for PD with general and specific groups of children with special needs;
(3) experiences in transferring PD approaches and activities between groups with different needs;
(4) using technology to support PD with children with special needs;
(5) extracting actionable information from PD sessions and translating children's ideas (which are sometimes impractical or unrealistic from a technology perspective) into design possibilities;
(6) challenges and failures encountered during PD with specific groups of children, and potential remedies; and
(7) perceived and evidence-based benefits experienced by PD participants from specific groups, including evidence of acquired/developed skills through PD activities (e.g. communication, self-efficacy).

We expect to provoke debate and discussion around PD aspects related to children with special needs, to create a space for reflection, and to foster collaboration within a new interdisciplinary community of PD experts. Participants will have the opportunity to exchange and compare their experiences of working with children with special needs; and to discuss similarities and differences between the needs of specific groups of children with special needs, and the design approaches which are required to accommodate them. This workshop will bring benefits to the IDC community: We expect to create a community of PD researchers that promotes the inclusion of children with special

[1]Capitalized "Deaf" refers to people who identify as culturally Deaf, belonging to the Deaf community and usually using a sign language to communicate.

PD Challenges

Vines et al. [20] identified five key challenges to be addressed by PD researchers. Our workshop will be focused on two of these challenges:

- "Working as a community to identify the aspects of diverse participatory processes... that can support 'best practice' across multiple domains and contexts."
- "Providing greater emphasis in literature to participant experience and researcher self-reflection...." (p. 5)

We aim to address these challenges through reflective discussion of successes and failures of existing PD approaches with particular groups of children with special needs, and comparisons of researchers' PD experiences with particular groups.

needs as design partners in the creation of technology for them. This will provide researchers with an opportunity to share their experiences, and enable cross-pollination of ideas relevant to different groups of children with special needs. Inexperienced PD researchers in particular may benefit from reflection on the 'untold' aspects of PD, which are not usually available in research papers, but which influence the success or failure of PD with children with special needs.

Organizers' Experience

Most of the organizers have prior experience in organising workshops, including at IDC, CHI, and other related conferences.

ORGANIZERS

Aurora Constantin (Co-chair) is a University Teacher and postdoctoral researcher at the University of Edinburgh School of Informatics, UK. Her research focuses on designing technology for individuals with Autism Spectrum Disorder (ASD), PD, User-Centred Design (UCD), and Action Research (AR) with various stakeholders. Currently she is working on designing a technology-based tool to support children with ASD to express their creativity during PD. She leads the CISA HCI group.

Jessica Korte is a Postdoctoral Academic at The University of Queensland's Co-Innovation Group in Queensland, Australia. She is passionate about PD's potential to empower children. She developed a PD approach for designing with young Deaf children. She hopes to work with Deaf and Indigenous communities to design language resources, language robots, and learning activities.

Jerry Alan Fails is an Associate Professor in the Computer Science Department at Boise State University in Idaho, USA. He has designed technologies with and for children using PD methods for 15 years. His primary area of research is HCI, with a focus on technologies that engage children with one another, get them active, and encourage them to explore the world around them.

Judith Good is Professor of Interaction Design and Inclusion in the Department of Informatics, University of Sussex, UK. Her research interests focus on PD of new technologies for children, with and without disabilities. She is also interested in developing new participatory methodologies for typically marginalised populations to have greater involvement in design and evaluation of new technologies.

Cristina Adriana Alexandru (Co-chair) is a Research Associate and University Teacher at the University of Edinburgh School of Informatics, UK. She specialises in UCD, development, and usability evaluation of healthcare systems and tools to cater for the needs of different healthcare practitioners. She has special interests in PD and consideration of the viewpoints of very different user groups. She is also interested in automating usability evaluation of user interfaces in healthcare.

Mihaela Dragomir is a Doctoral student (PhD) at the University of Edinburgh School of Informatics, UK. Her research looks at designing technology to facilitate cognitive aspects of pretend play in children with an Autism Spectrum Disorder (ASD) diagnosis.

Helen Pain is Professor of Interactive Learning Environments at the University of Edinburgh School of Informatics/Design Informatics. Her research in Interaction Design uses PD approaches to develop support for learning and communication (particularly social communication and affect) in children with special needs, using technology to support play and exploration.

Juan Pablo Hourcade is an Associate Professor at the University of Iowa's Department of Computer Science, USA. He has performed extensive research in the development of technologies for diverse user groups, including children, people with ASD and older adults. He is the author of the first comprehensive book on the topic of child-computer interaction, and is on the Editorial Board of the International Journal of Child-Computer Interaction.

Eva Eriksson is an Assistant Professor at the School of Communication and Culture, Department of Information Studies at Aarhus University, Denmark, and a senior lecturer at Chalmers University of Technology, Sweden. Her research focus is interaction design in public knowledge institutions, specializing in PD with developmentally diverse children.

Annalu Waller is a Personal Chair in Human Communication Technologies. She directs the Dundee Augmentative and Alternative Communication Research Group. Her primary research areas are HCI, natural language processing, personal narrative and assistive technology. In particular, she focuses on empowering end users, including disabled adults and children, by involving them in the design and use of technology.

Franca Garzotto is Professor of Information Engineering at Politecnico di Milano, Italy, where she leads the Innovative Interactive Interfaces Laboratory (i3lab). The lab focuses on advanced interactive technologies (Wearable Virtual and Augmented Reality, Social Robots, Smart Objects and Smart Spaces, Emotional Conversational Agents) for people with cognitive disability, particularly children, and works in strong collaboration with specialized therapeutic and educational institutions in Italy and Europe. Together with these persons and their caregivers, she co-designs and creates innovative tools and services that aim at providing new forms of interventions at school, home, and care centres.

Website

We will use the workshop website to publish the call for participation, submission instructions, news and updates:
www.pushing-boundaries-pd.inf.ed.ac.uk

PRE-WORKSHOP PLANS

Multiple recruitment approaches will be used to attract participants who have experience with PD with children with special needs. First, the organizers will use professional networks to contact researchers who may be interested in participating in this workshop. As organizers have experience with PD, we are confident we will be able to attract potential participants via word-of-mouth. Second, several organizers have access to research and professional email lists (including University of Edinburgh's CISA HCI group, PDworld and NordiCHI, CHI, CHI-Kids) which will be used to advertise the workshop and recruit participants. Third, we will use also social media channels (e.g. Twitter, Academic Facebook groups) to announce the workshop. Finally, we have created a website that will be used to attract researchers' and PD participants' attention to our workshop.

The organizers will discuss with an HCI journal (e.g. TOCHI or International Journal for Human-Computer Studies) the possibility of a special issue on 'Pushing the Boundaries of Participatory Design with Children with Special Needs', which will include extended articles of participants' submissions.

Schedule

8:30	Registration and Icebreakers
9:00	Welcome and Introduction
9:10	Opening Keynote
9:45	Paper Presentations
11:00	Coffee and Networking
11:30	Group Activity Session 1
12:30	Discussion of Group Activity Session 1
13:00	Lunch
14:00	Group Activity Session 2
15:00	Discussion of Group Activity Session 2
15:30	Coffee and Networking
16:00	Reflection
16:30	Conclusion and Wrap-Up
17:00	Reception

Resources

This workshop will need room to accommodate up to 30 people (expected maximums: 15 participants + 10 observers + 5 organizers and student volunteers). We will need at least 4-5 movable tables to allow small group activities. Flip charts, sticky notes and coloured markers will be used for group activities. Facilities for projecting presentations (i.e. computer, projector) are required. If special technology is needed for participants to make a demo, this should be requested when they submit their position paper, for the organizers to be able to accommodate their needs.

WORKSHOP STRUCTURE

We propose a full-day workshop for up to 15 participants (who have experience with PD with children with special needs) and up to 10 observers (who lack experience but are interested in PD with children with special needs).

In the morning, participants and observers will have the chance to meet and share their experiences and interests through icebreakers during registration. The 'Welcome and Introduction' will reiterate the workshop aims: sharing current research in PD with general and specific groups of children with special needs, identifying trends as well as challenges and gaps in this area, and establishing research directions for addressing the challenges and gaps through identifying commonalities and best practices between different groups. This will be followed by a keynote. Participants will have 3-5 minute slots to present their position papers and/or to contextualise their experience, leading into a coffee break, to encourage networking and informal discussion of position papers.

Two periods of interactive small-group activities will make up the bulk of the day. Key topics will be selected from the participants' position papers, as is fitting for a workshop on PD. Participants and observers will be invited to form small groups to share their experiences and, as a group, identify key lessons, barriers and/or successes they have encountered in PD with particular groups of children with special needs, and the commonalities and differences between working with different groups. For example, if a number of participants identify an interest in using technology to support PD with children with special needs, a small-group activity will be themed around discussing their experiences using technology, which groups of children they used technology with, what challenges were encountered, how difficulties were overcome, and what commonalities or differences there are between their experiences. Particular attention will be drawn to situations where approaches which work with a particular group of children could assist in ameliorating difficulties experienced with another group of children. Each small group discussion will be facilitated by one of the organizers, and documented with flip charts and/or sticky notes by the participants and observers, as appropriate. At the end of the group activities, group conclusions will be presented to the workshop as a whole. If judged by organizers and participants to be productive for the range of group topics, plenary debates will be facilitated on the topics as part of the whole-group discussions.

In the final stage of the day, participants and observers will undertake reflection activities to identify key learnings and future research directions from the group activities and whole-group discussions. Emphasis will be given to identifying "what works" and "what doesn't work" with populations considered throughout the workshop, as well as identifying commonalities and differences between key groups; reflections will be shared and recorded in the 'Conclusion and Wrap-Up' phase. Observers will be asked to identify their key learnings. The day will end with a reception to celebrate achievements and promote further networking.

POST-WORKSHOP PLANS

The organizers will write a report on the main insights and ideas from the workshop, to be included in the journal special issue, mentioned in 'Pre-Workshop Plans'. Participants will be invited to extend their position papers for inclusion in the special issue.

CALL FOR PARTICIPATION

This full-day workshop aims to bring together researchers with experience in Participatory Design (PD) with children with special needs

Participants are invited to prepare a four-page position paper following the CHI Extended Abstract Format describing their experiences with PD. Paper topics may refer to PD methods and techniques they have used with specific groups of children (including technology-based methods), experiences of children with special needs during PD, challenges encountered while working with specific groups, or failures and lessons learned. All potential participants are asked to highlight discussion topics which are of interest to them; these will inform the design of the workshop. Participants are asked to identify if they are able to bring data from PD projects to the conference to share and discuss during group activities.

Applications will be evaluated based on their relevance to the workshop theme and topics, quality of presentation and potential to encourage debate. Authors of accepted position papers will be invited to extend their position papers to submit to a special issue of a Human Computer Interaction-related journal.

The workshop organizers also invite observers who are interested in learning more about PD with children with special needs. Observers are asked to explain why they want to attend the workshop, areas of interest, and what they hope to get out of it. Observers will be invited based on synergy with participants attending the workshop.

All attendees must register for both the workshop and the IDC conference.

For applying and more information please consult: www.pushing-boundaries-pd.inf.ed.ac.uk.

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