Methods for Family-Centered Design: Bridging the Gap Between Research and Practice

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ABSTRACT

Technology is pervasive in family life. Family-centered design can enable the creation of technological solutions that align with the diverse needs of and dynamics within families. Yet, designing meaningful interactive technologies that are useful for and desired by families remains a complex and evolving challenge. Furthermore, there are limited resources in the HCI community examining theoretical, methodological, and practical processes for designing and testing technology supporting family life (e.g., interactions among parents, children, siblings, older adults). This workshop aims to bridge this gap by bringing together researchers and practitioners from interdisciplinary areas to discuss practical approaches in applying effective methods, theories, and tools for designing technology *for and with* families. The main goal of this workshop is to collaborate on creating a knowledge base for family-centered design. The workshop will aim to provide valuable opportunities for researchers and practitioners to grow a community, exchange insights, and share best practices.

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CCS CONCEPTS

• **Human-centered computing** → **Interaction design**; *User centered design.*

KEYWORDS

child-computer interaction, family-centered design

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1 INTRODUCTION

Families increasingly use technologies in the home for different purposes such as communication [2, 4], interactions [10–12, 30], developing routines and tracking health behaviors [26–28, 33], entertainment [18, 23, 32] and learning [19, 22, 31, 38]. Technologies for young children, such as parental-controlled tablets and smart toys, often require parental supervision [36] but may overlook children's perspectives and input. Family-oriented technologies like voice assistants [2–4, 29, 37], domestic robots[9], and other emerging technologies [15, 34] permeate children's lives. However, limited

research examines the complex needs, conflicts, and tensions from family technology use [2, 4, 5, 29, 34]. For instance, parents' desire to monitor their home with an entryway camera may clash with their teenage children's privacy and autonomy needs [35]. Additionally, for technologies that support communication between siblings with large age gaps, parents and older siblings may face tension on their communication priorities [16]. Specifically, parents prefer technologies that emphasize instrumental sibling communication, while older siblings value relational aspects. For shared family health information systems, family members reported conflicting needs and tensions for how technology should collect, monitor, and share health data. [14, 28]. Overall, technologies should be designed to support the negotiations between family members' various values, needs, and preferences while scaffolding family cooperation in the use [30]. Deep understanding and investigation of social dynamics and situated experiences around technologies in family lives are needed to design for families in the digital age [24]. These insights motivate the *need to design technological solutions with families in mind, beyond individuals' needs and preferences.*

Over the past decade, CHI workshops and SIGs have addressed challenges such as designing technology for families [8, 25] and their diverse structures [20], highlighting: (1) limited technologies designed and tailored for families as a whole, (2) limited knowledge of practical methods for studying families that address logistical and privacy issues, and (3) limited representation of families' dynamic and diverse structures (i.e., divorced, co-parenting, same-sex parents, grieving families, families separated by distance). More recently, the inclusion of the *"Learning, Education, and Families"* subcommittee within CHI shows increased commitment to this area. This subcommittee encourages *"contributions that extend the design and understanding of how children, parents, and families interact with technology."* An iteration of this workshop was held at the 2023 ACM Interaction Design and Children (IDC) conference [6], titled *"From Child-Centered to Family-Centered Interaction Design."* The discussions at the workshop echoed past CHI workshops' findings: (1) current HCI and CCI approaches are limited in addressing family dynamics, diverse family structures, and evolving technology landscapes; and (2) early career scholars lack resources and shared knowledge on family-centered design approaches and methods, theories, and tools.

We are inspired by existing resources and toolkits supporting similar research areas, such as the "CORE" knowledge base website, tailored for children's and young people's experiences online [21] and the "Family Engagement Playbook" by the Global Family Research Project [7]. Since previous research and workshops highlight the need for a family-centered approach, despite limited practical knowledge on *how to* design and study technology *for and with* families, this CHI 2024 workshop aims to discuss ways to bridge the gap between family-centered research and practice, addressing pressing issues and challenges. Workshop participants will share experiences on *research methods, theories, and tools* for studying and designing for families in HCI, including resources, toolkits, and best practices. **The outcome of this workshop will be a collaboratively curated knowledge base tailored for family-centered design in HCI**.

2 WORKSHOP GOALS

By bringing together insights from key stakeholders in family-centered design, the main workshop goal is to investigate practical considerations for family-centered approaches in HCI. To achieve this goal, we will first engage workshop participants in discussions to share their **experiences and approaches in designing and studying family-focused technology**. Discussions may cover various family context, methods, theories, and tools used for family-centered design. Second, we will discuss **practical aspects for studying families** in *real-world* settings. For example, challenges in recruitment and sustaining engagement, traveling to and setting up resources at study locations such as homes, museums, or libraries, and broadening participation of diverse families and family structures. Third, we aim to foster community-building by **publishing a collaborative report on family-centered design knowledge**. We will discuss approaches for sharing findings with families, researchers, and non-academic audiences.

The workshop will be structured around **interdisciplinary research topics** such as child-computer interaction, privacy, health informatics, education, AI, smart home devices, virtual and mixed reality, and human-robot interaction. Below, we share a list of guiding questions related to the goals of this workshop:

Guiding Theories and Approaches

- What are the guiding theories and approaches for family-centered design?
- What methods should I apply when involving families in designing and conducting my research?
- How should I design certain activities or practices to interact with different family members or types?

Considerations to Studying Families

- Why should I include multiple family members in my research? How, when, and where should I involve them?
- What preparation is needed for real-world family studies?
- What obstacles may discourage or challenge families from participating or sustaining long-term participation?
- How will participating in the research help families, and how can I minimize risks?
- What ethical and privacy concerns arise when researching families in real-world environments?
- How can I broaden the participation of families from diverse backgrounds, cultures, and socioeconomic statuses?

Communicating and Disseminating Findings

- How can I communicate the research results in a way that is understandable and valuable to families?
- How can I engage and inform families, academic and non-academic audiences?
- How can I institutionalize family-centered design in my research?
- How can I advance family-centered design knowledge?
- How can I contribute to a feedback loop to continually improve the family-centered approach?

3 WORKSHOP PLANS AND ACTIVITIES

This full-day hybrid workshop will facilitate discussions around the approaches, considerations, and challenges for conducting family-centered research in HCI.

3.1 Pre-Workshop Activities

Recruitment. We invite researchers and practitioners interested in *family-centered design* via mailing lists (CHI mailing list), social media (e.g., Twitter, CCI and HCI Facebook groups, LinkedIn), and conferences to respond to the call for participation. We share workshop information including its focus, goals, format, and requirements for submitting position papers.

Website. Our website[1] on Google Sites contains the call for participation, workshop goals and details, tentative program, organizers' contact, submission page, and relevant dates.

Call for Participation. We invite position papers on topics that include (1) current or past family-centered design research in HCI, focusing on methods, theories, and tools, or (2) questions about family-centered design practices and desired guidance from the workshop. We will use an online submission system to collect submissions and have at least two reviewers provide feedback. Authors will be accepted to the workshop based on the quality and relevance of submissions. Accepted papers on selected topics will be invited to present on workshop day.

Community Building. Participants will be invited to a Discord server two weeks before the workshop to introduce themselves and connect with other participants. On the workshop day, participants will create an introduction slide on a shared Google Slides document. At the workshop, participants will present one-slide lightning talks to introduce themselves and discuss their position papers. We will survey workshop attendees' preferences on interdisciplinary topics to assign break-out groups on workshop day. The organizers will post a summary of position paper insights on the server before the workshop, allowing participants to share their insights with others. On this server, participants will have access to asynchronous online materials, such as the Miro board and Google Drive.

3.2 Workshop Plans

Workshop Format. We will facilitate remote and synchronous participation in the workshop using Zoom and Miro[2]. Organizers will lead online group activities and prioritize online participant questions and presentations. Both in-person and remote participants can communicate via a dedicated Discord server or the video conferencing platform. For the final share out, workshop organizers will share photos of the content from in-person attendees on the shared online repository, and create a physical version of the online participants' content for in-person attendees to engage with.

Planned Activities. An overview of planned workshop activities are described in Table 1. The workshop contains a mix of discussion and presentation sessions. The workshop will open with participants presenting an one-slide introduction of themselves and briefly summarize their position paper and family-centered design practices. Next, selected position paper authors will give a 5-10 minute presentation with Q&A. Next, organizers will lead four breakout sessions for in-depth discussions, with iterative activities and contextualize them with guiding questions from Section 2, each lasting 30-60 minutes. We will assign topics to breakout groups based on participants' pre-workshop survey preferences to ensure diverse contexts and trending research themes. Each group (4-6 participants) will have organizer with relevant experience to lead discussions. Online participants will have Zoom break-out rooms. Opportunities to change groups throughout the day will be pre-planned to promote exposure to different perspectives and networking. More details of these sessions are below:

3.2.1 Activity 1: Reflect on Known Methods, Theories, and Tools. Participants will reflect on the family-centered design practices shared in the introductions and position paper presentations, and share their past experiences in family-centered design methods, theories, and tools with others. Participants will be assigned to groups for light activities to contextualize their research around the family-centered mental space, such as design thinking activities including empathy mapping [13] or 5W1H questions [17]). In this activity, participants will have the flexibility to switch between groups to join ongoing conversations.

Towards the end, each group would have a **visualization of known methods, theories, and tools in the format of a mind-map, affinity diagram, or poster.** These outcome artifacts will be presented to the big group as each group will take a few minutes to share their collective reflections. Participants could continue to revise the diagram throughout the workshop.

3.2.2 Activity 2: Discuss Practical Considerations to Studying Families in the Real World. Participants will delve deeper into specific practical considerations for studying families in the real world. They will choose a specific topic of interest and be assigned to a round-table. The topics include, but are not limited to, smart home, health informatics, education, AR/VR/MR, and human-robot interaction.

The discussions in this activity will be guided by semi-structured prompts, similar to the guiding questions in section Section 2. For example: How to prepare for real-world studies; How to include family members in research; What obstacles may discourage or challenge family participation; What ethical and privacy concerns arise in studying families? Participants will continue documenting their insights in written and visual forms, such as creating a representative family ecological model [1] illustrating their target population, technology, research goals, approaches to studying families in this context, and other ecological factors of consideration for family-centered design in HCI. The outcome of this activity will be **a list of practical considerations to studying families in HCI**. Each group will present their takeaways to the broader group in the last 10 minutes of the activity.

3.2.3 Activity 3: Design Content and Recommendations for a Knowledge Base. This activity will serve as the main contribution of the workshop that allows participants to consolidate and synthesize insights from the workshop and **design a knowledge base prototype** as a final deliverable. This knowledge base will be tailored as

[1] https://sites.google.com/view/familycentereddesignchi2024
[2] Zoom https://zoom.us and Miro https://miro.com

an informative resource serving as *research and community guidelines* that consists of key recommendations for family-centered approaches in HCI. Organizers will provide participants with prompts and templates as examples to guide each group in structuring and thematically organizing these takeaways into practical recommendations for family-centered design.

Format of the Knowledge Base. The secondary goal of this knowledge base prototype is to practice different formats for communicating and disseminating information. Participants are flexible to work as a group or individually for this activity based on their preferences. Participants could choose to design their knowledge base in various physical or digital formats (e.g. wiki page, short video, blog post, pictorial, hand out, and booklet etc.). The organizers will share examples demonstrating different design formats, and provide craft materials (e.g., papers, scissors, arts and crafts supplies). Participants could continue to work on their designs after the workshop and have the option to publish their finalized design as part of a non-archival repository associated with the workshop.

3.2.4 Activity 4: Share-Out Community Guidelines. Each group will share their design outcome of the family centered knowledge base, in their preferred format, with the broader group to engage more in-depth discussions.Through the cross-group shareout process, the organizers would identify and summarize the major themes, leading to the final wrap up of the workshop.

3.3 Post-Workshop Plans

Given workshop goals described in Section 2, we anticipate three post-workshop outcomes.

3.3.1 Workshop Report. We will compile a report summarizing the workshop discussions, presentations, and activities. The report will include a summary of the key points, insights, and findings from the workshop, as well as a list of the participants and their contributions. The report will be made available online to the participants and other interested individuals, and will provide a record of the workshop and its outcomes. Participants will have the option to publish their papers associated with a workshop report on ArXiv[3].

3.3.2 Knowledge Base and Toolkit for Family-Centered Design. The main outcome of this workshop will be a collaboratively curated resource that can serve as an initial knowledge base that captures methods, theories, and tools for applying a family-centered design approach in HCI. We will analyze participants' position papers and outcomes from the workshop discussions to synthesize actionable guidelines that can support research practices in the field. We will publish this knowledge base as an online resource associated with the website and in a Medium[4] blog post.

3.3.3 Community Building. We aim to grow a community of practitioners and early career scholars in the field of family-centered design. The Discord server will act as a first step toward this goal. Before publishing the workshop report, we intend to share it with the participants, allowing them to review and collaborate on the report. We will also encourage participants to continue posting relevant scholarly events and insights on the channel.

[3]https://arxiv.org
[4]https://medium.com

4 ORGANIZERS

Our organizing committee includes scholars from a diverse set of disciplines and expertise with a common interest around family-centered design. Their backgrounds include research topics such as: education, privacy, family health informatics, human-robot interaction, child-computer interaction, AI, AR/VR/MR, and smart-home.

Bengisu Cagiltay (Main Contact) is a fourth-year Ph.D. candidate in the University of Wisconsin-Madison Computer Sciences program with a Ph.D. minor in Human Development and Family Studies. Her research focuses on designing social companion robots tailored to the needs and preferences of children and families. She explores how these technologies can be used to improve families' lives, facilitate their routines, and support connections.

Hui-Ru Ho is a fifth-year Ph.D. student in the Department of Educational Psychology at the University of Wisconsin–Madison, with a second Master degree in Computer Sciences. Her research focuses on designing social robots that collaborate with parents or caregivers to enrich learning experience for children.

Kaiwen Sun is a fifth-year Ph.D. Candidate at the University of Michigan, School of Information. Her research focuses on understanding and supporting children's privacy and safety needs in the context of smart home technologies through a family-centered approach balancing parental control and child agency. She received Meta Research Ph.D. Fellowship Award in 2022 for the Privacy and Data Use research area.

Zhaoyuan Su is a fifth-year Ph.D. Candidate in the Informatics department at the University of California, Irvine. They conduct research in the fields of Human-Computer Interaction, Computer-supported Cooperative Work, and Health Informatics. Their research explores the interactions of healthcare participants—including children, caregivers, and healthcare providers—with health information systems and health data through a socio-technical lens. Their work has published in ACM CHI, CSCW, Interaction Design and Children, Foundations and Trends® in Human-Computer Interaction, Journal of American Medical Informatics, and American Medical Informatic Annual Symposium.

Yuxing Wu is a fifth-year Ph.D. Candidate at Indiana University Bloomington, Luddy School of Informatics, Computing, and Engineering, with a Ph.D. minor in Family HCI. Her research examines the routines, roles, and tensions in shared everyday family experiences to support the dynamic, changing health, social, and educational goals of parents and children in domestic technology design.

Olivia Richards is a fifth-year Ph.D. Candidate at the University of Michigan School of Information. Her research in family informatics examines the tensions between children's health and well-being in technology design. Her work has been published in the Journal of American Medical Informatics (JAMIA), ACM SIGCHI, CSCW, and DIS.

Qiao (Georgie) Jin is a fifth-year Computer Science Ph.D. candidate from Grouplens Research Center at the University of Minnesota. Her research is centered around leveraging AR/VR/MR technologies to enhance remote education, foster collaboration, and facilitate social connections, particularly for children. She has published in CHI, IDC, and CSCW.

Table 1: Planned workshop activities and structure. Time is in the local time zone.

Time	Session
9:00am - 10:00am	Workshop opening, ice breaker, and brief introductions
10:00am - 11:15am	Selected position paper presentations
11:15am - 11:30am	*Coffee Break*
11:30am - 12:00pm	Activity 1: Reflect on Known Methods, Theories, and Tools
12:00pm - 1:30pm	*Lunch Break*
1:30pm - 2:30pm	Activity 2: Discuss Practical Considerations to Studying Families in the Real World
2:30pm - 3:45pm	Activity 3: Design Content and Recommendations for the Knowledge Base
3:45pm - 4:00pm	*Coffee Break*
4:00pm - 5:00pm	Activity 4: Share Out Activity 3 Design Outcome
5:00pm - 5:30pm	Wrap-up and closing
6:00pm - 7:00pm	*Networking Dinner (Optional)*

Junnan Yu is an Assistant Professor in the School of Design at The Hong Kong Polytechnic University. Residing at the intersection of HCI, Learning Sciences, and Design, his research focuses on studying and designing creative technology-mediated learning experiences for children, investigating the roles that social context plays in supporting such learning, and innovating design research in educational contexts. His current projects include promoting computing education to young children in playful ways, designing gender-inclusive and culturally responsive STEM learning media, as well as understanding and facilitating productive family joint media engagement. Some of his research and design practices also go beyond learning contexts and extend to broader CCI and HCI research, such as reflecting on HCI research methodologies and addressing emergent technology-related challenges in people's everyday lives.

Jerry Alan Fails is a Professor in the Computer Science Department at Boise State University. He enjoys helping students learn the fundamentals of computer programming and user-centered design. His general area of research is Human-Computer Interaction, with a focus on designing technology with and for children. He has designed technologies with and for children using participatory design methods for the last 20 years. As part of his research he directs an intergenerational design team called Kidsteam. The team consists of young children (ages 6-11) and adults who work together as partners to improve and design new technologies. He cares deeply about the ethical concerns surrounding children's involvement in the design process and how data collected about children is utilized. His current projects focus on seeking to support children as they search for information online, understanding privacy and fear within family contexts, supporting children's privacy and security needs online, expanding methods of designing technologies with and for children (and families) to online, hybrid, and in-person modalities at the local and global scale.

Jason Yip is an Associate Professor at the Information School and an adjunct assistant professor in the Department of Human-Centered Design and Engineering at the University of Washington. His research examines how technologies can support parents and children learning together. He is a co-principal investigator on a National Science Foundation Cyberlearning project on designing social media technologies to support neighborhoods learning science together. He is the director of KidsTeam UW, an intergenerational group of children (ages 7 – 11) and researchers co-designing new technologies and learning activities for children, with children. Dr. Yip is the principal investigator of a Google Faculty Research Award project that examines how Latino children search and broker online information for their English-language learning parents. He is a senior research fellow at the Joan Ganz Cooney Center at Sesame Workshop.

Jodi Forlizzi is the Herbert A. Simon Professor of Computer Science and Human-Computer Interaction in the School of Computer Science at Carnegie Mellon University and the Associate Dean of Diversity, Equity, and Inclusion in the School of Computer Science. She is responsible for establishing design research as a legitimate form of research in HCI that is different from, but equally as important as, scientific and human science research. Jodi has advocated for design research in all forms, mentoring peers, colleagues, and students in its structure and execution, and today it is an important part of the HCI community. Her current research interests include designing human-robot interaction as a service and human-AI collaboration in eldercare, accessibility, service work and labor, and overall wellbeing.

5 CALL FOR PARTICIPATION

This full-day hybrid workshop will explore practical approaches and considerations for family-centered design in HCI. Through presentations and interactive discussions, participants will explore research practices for designing technology for –and with– families. The outcome of this workshop will be a collaboratively curated knowledge base that captures theories, methods, and tools for applying a family-centered design approach. We invite interested participants from any background, including academics, early career researchers, educators, policymakers, or industry practitioners.

Participants are expected to submit a short position paper (1 to 3 pages excluding references), in one of the two categories: (1) Reports highlighting family-centered design practices from current or past research. (2) A summary of questions for family-centered design practices (research questions, methods, challenges), and what guidance participants would like to receive from the workshop. Based on the relevance and quality of the papers, a subset of submissions will be selected and will be invited to present at a dedicated session

during the workshop. Participants will be assigned to discussion groups based on the topics discussed in their position papers.

Submissions should be in single-column PDF format, following ACM SIGCHI Paper Format. Submissions should not be anonymized. Papers submitted before February 26 will be reviewed by organizers and will receive feedback. Participants will have an option to publish proceedings on a non-archival report associated with the workshop. At least one author of each accepted paper must register and attend the workshop and main conference.

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