

# Children Initiating and Leading Cooperative Inquiry Sessions

Jason C. Yip, Elizabeth Foss, Elizabeth Bonsignore, Mona Leigh Guha, Leyla Norooz, Emily Rhodes, Brenna McNally, Panagis Papadatos, Evan Golub, & Allison Druin

University of Maryland – Human-Computer Interaction Lab, 2117 Hornbake South Wing, College Park, MD 20742

jasonyip@umd.edu, efoss@umd.edu, ebonsign@umd.edu, mona@cs.umd.edu, leylan@umd.edu,

eerrhodes@umd.edu, bmcnally@umd.edu, squawk@umd.edu, egolub@cs.umd.edu, allisond@umiacs.umd.edu

## ABSTRACT

Cooperative Inquiry is a Participatory Design method that involves children (typically 7-11 years old) as full partners with adults in the design of technologies intended for use by children. For many years, child designers have worked together with adults in Cooperative Inquiry approaches. However, in the past children have not typically initiated the design problems tackled by the intergenerational team, nor have they acted in leadership roles by conducting design sessions—until now. In this paper, we detail three case studies of Cooperative Inquiry in which children led the process of design, from initial problem formulation through one iteration of design review and elaboration. We frame our analysis from three perspectives on the design process: behaviors exhibited by child leaders and their fellow co-designers; supports required for child leaders; and views expressed by child leaders and their co-design cohort about the sessions that they led.

## Categories and Subject Descriptors

H.5.0 Information Interfaces and Presentation (e.g., HCI): General

H.5.2 [Information Interfaces and Presentation]: User Interfaces – User-centered design

## General Terms

Design, Human Factors.

## Keywords

Children, Cooperative Inquiry, co-design, design roles.

## 1. INTRODUCTION

Cooperative Inquiry (CI) is a method of involving children in an intergenerational team throughout the design process of technology [2]. In using CI to design technology with children for the past 15 years, it has been common practice for our intergenerational design team to work on problems initiated by adults surrounding the needs and wants of children. Once a design problem is established, adult and child co-designers work together to iterate designs using techniques that encourage idea elaboration [2]. We have not previously held any sessions in which the child co-designers initiated the design problem or acted as leaders by conducting the session. We now seek to expand the parameters for CI to include considerations for roles in leadership for children.

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*Interaction Design and Children '13*, June 24–27, 2013, New York City, New York, United States.

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In this paper, we describe three case studies of design sessions that addressed problems initiated by three child co-designers. The sessions originated when one child co-designer, outside of the design sessions, storyboarded an idea for a math game website. Encouraged by her father, she brought her rough design to a CI session and asked researchers if the team could work it. This event triggered other child co-designers to initiate their own design problems. In the examination of these cases, we ask three research questions. First, what behaviors do child leaders and co-designers exhibit when children initiate design sessions? Second, what supports and guidance are needed for children to become session initiators and leaders? Finally, what opinions do child leaders and co-designers hold about child-led sessions?

## 2. PREVIOUS LITERATURE

### 2.1 Participant-led Experiences

To explore how to approach our three cases, we draw conceptual parallels between child-initiated CI sessions and participant-led educational or other experiences. Role switching can facilitate helping behaviors in children [9] and can benefit student-led learning experiences [1]. UNICEF has called for an increased role of children in leadership, having identified that children rarely initiate projects that are also then joined and supported by adults [3]. In CI, children and adults work and design together as co-designers; however at least one adult fills a necessary leadership role during sessions. To have a child act in a leadership role could allow for a new way to co-design with children.

Bovill et al. [1] found that students who design their own pedagogical experiences gain a deeper understanding of the learning process in which they engage, and that both students and adults become more invested with the learning process. These benefits can also apply to child-initiated design sessions, as aiding child co-designers in understanding the design process, strengthening investment in design work, and understanding others' perspectives are aligned with the philosophies of CI.

### 2.2 Technique Choice

CI relies on design techniques to communicate ideas to others [8]. For all three sessions presented in this paper, the child initiators chose to use the technique of Stickies, in which co-designers provide feedback about a prototype by writing ideas on paper notes with a mild adhesive on the back. The ideas are categorized, generally by “likes,” “dislikes,” and “design ideas” about the prototype, and then clustered according to theme on a large board [8]. The Stickies technique is most often used to evaluate specific projects, and can be employed throughout the various stages of a project's design lifecycle.

## 3. METHOD

For this investigation, we employed the methods of an exploratory case study [10] of three different afterschool CI sessions led by

three different child leaders. The three child leaders include Lauren (girl, age 9), Max (boy, age 9), and Merida (girl, age 7) (all children in this study chose their own pseudonyms). We selected these CI session cases because each of these children specifically asked the adults to lead a session on a prototype design they created. Each of these children led one design session for his or her prototype.

### 3.1 Design Session Structure

In this context, design sessions are typically broken up into four sections. First, the children come together for *snack time* (1). The team spends roughly 20 minutes relaxing, eating snack. Snack time allows a transition from school or work earlier in the day to coming together as a team to focus on design work. After snack time, design team members gather together, sitting on the floor for *circle time* (2) to discuss the upcoming design session. To get everyone thinking about the theme of the design session, a *question of the day* is asked, relevant to the design topic of the day, and every member answers it. Next, the children and adults transition to the *design activity* (3). Various CI techniques are used during this segment of the design session, such as Stickies (described in Section 2.2), or Bags of Stuff, a low-tech prototyping technique using arts-and-crafts supplies [8]. Technique selection depends on factors such as the design problem, the level of experience of the design team members, and the design stage of the project [8]. Depending on the total number of design team members present, the larger group is also divided into smaller sub-teams. During the *big ideas group meeting* (4) all adults and children regroup to review the overarching common or unique themes among the sub-teams' ideas, examine new elaborations that may arise, and plan for the next steps for design.

### 3.2 Context and Data Collection

For this study, we explored three design sessions that occurred in the same month. Lauren, Max, and Merida each led one session to review their prototypes. Four other children (ages 7-11, two boys named Eric and Jason, two girls named Snowdrop and Cruz) and nine adults (undergraduate and graduate students and research faculty) participated. The children in this study attend local public or independent schools; one child is homeschooled. The authors of this study are participant observers [6], as we both facilitated and made observations of the sessions. We collected videos, field notes, photos, and sticky note artifacts. We also conducted brief semi-structured interviews with all child participants and child leaders on their thoughts on the child-led sessions.

### 3.3 Analysis

We conducted data analysis through a comparison of videos, interviews, artifacts, and field notes to explore evidence related to our research questions on child-led CI sessions. Because the unit of analysis was the child-led sessions, we coded for instances of behaviors in all children and their decisions, what children thought about the child-led sessions, and what supports children needed for child-led design sessions. We also examined behaviors the child participants exhibited during these three sessions. We triangulated the data to make sure that all pieces of evidence supported the cases [6]. All the data was placed into a secure online database in which the field notes, photos, sticky note artifacts, and videos could be independently reviewed by each author [10]. We built a chain of evidence connecting the various data to the questions we had on child-led CI sessions. To strengthen validity, each author reviewed the cases independently. Once the cases were thoroughly established, we did a cross-case analysis to examine what similarities and differences existed in

each sub case. We also conducted member checks with all seven children to confirm the cases [6] by allowing the children to examine our conclusions and provide clarification.

## 4. FINDINGS

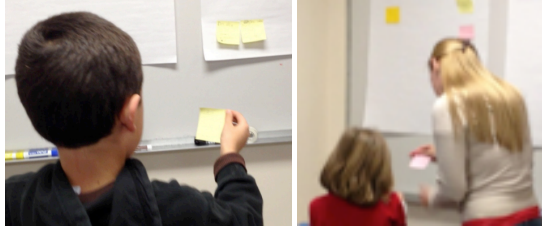
We begin each case with a description of the design session that each child led. We then analyze the sessions to better understand the implications for CI when children lead design sessions.

### 4.1 Lauren and the Math Paper Prototype

For this first child-led session, Lauren wanted support to create a website dedicated to math games. Originally, we asked Lauren if she would want to split her session with Max. However, Lauren chose to have an entire session devoted to her math games paper prototype. During circle time, Lauren asked her own question of the day to the group: "What do you think of math?" Each child and adult shared their own ideas and perspectives on math in school. After priming everyone to think about math, Lauren showed the group paper drawings from her portfolio of a math website she conceived. She had developed several paper prototypes of a math game she envisioned for children. Lauren divided all the children and adults into groups (two children, one adult) by herself to run the Stickies evaluation of her prototype design. Overall, a total of three child-adult groups participated in this first child-led session.

Lauren gave each small group a portion of her paper prototypes for the Stickies evaluation. After five minutes of examination and evaluation, the prototypes rotated between the groups. Initially, the small groups gave more design ideas for Lauren's website. The groups did not give likes and dislikes until the middle of the session. Concurrently, Lauren slowly transitioned from gathering the sticky notes to attempting to group the notes on the whiteboard herself (Figure 1). However, Lauren realized this was not an easy task and exclaimed, "This is hard!" As a result, Lauren worked with two adults to develop the groupings. For this evaluation, Lauren received 51 design ideas, 10 likes, and 5 dislikes. To give Lauren time to group the large number of sticky notes, the adults asked the child co-designers to write or draw in their journals about designing a math game. For design ideas, Lauren developed themes such as the ability to customize the appearance of the math site, the option to choose certain math levels for the game, and integrating audio and video media into the site. These small groups liked the prototype's colors and the ability to get help in the math game. However, some of the groups wrote that the game felt limited and perhaps was too feminine.

In the big ideas group meeting, Lauren spent a lot of the time reading off the main themes with her back towards the audience. During Lauren's first time leading, the children acted very respectfully towards her. They asked her a lot of questions and overall, seemed engaged in helping to improve her prototype. However, Lauren seemed defensive at some of the critiques. For example, one critique of her design was that the website was "too girly." Lauren retorted, "But I have something to say to *that person*. It is not always girly. It's just girly because this person has chosen to be a girl. It is *not always girly*." When we asked Lauren what she thought of leading, Lauren liked that she did not have to be in a small design group and that the team gave her a lot of design ideas. She did express that leading was overwhelming, in particular, she found managing the 51 design ideas and arranging them by theme to be a challenge.



**Figure 1. Lauren (top), Max (bottom left), and Merida (bottom right) led and manage the sticky notes with adults.**

## 4.2 Max and the Video Game Website

When Max heard that Lauren wanted to lead a design team session for her math game prototype, Max was also inspired. He had designed his own personal Google Sites™-based website, in which he develops ratings and reviews for video games. For this session, the team visited his website on computers in our lab and provided him feedback on the site using Stickies. Unlike Lauren, he asked for one of the adults to divide the children and adults into groups for the design session he led. At circle time, he provided his own question of the day, “What’s your favorite game?” With everyone thinking about games, one of the adults divided everyone into groups of two children and one to two adults. A total of three child-adult groups used the Stickies technique to evaluate Max’s game website.

During the session, Max felt comfortable taking the lead to organize the sticky notes, often running back and forth between groups to grab sticky notes and put them on the board. The child-adult groups provided Max with 7 notes for likes, 3 dislikes, and 24 design ideas. Since fewer notes were generated than in Lauren’s session, he was able to take time grouping the notes on his own, with only one adult to help (Figure 1). Many design ideas leaned towards pragmatic suggestions, such as providing links for the reviewed video games, a blog section with more recent entries, a way to include comments, and pictures, text, and contact information. All groups liked his simple interface and the jokes he put into the site, but disliked that he did not provide the name of his website and URLs to games he rated. In the big ideas group meeting, Max appeared quite laid back. Later, Max confided to us he was quite nervous, but felt more comfortable as the session progressed. In contrast to Lauren, he was not defensive about receiving dislikes. However, he also had very few questions for the group about their comments and ideas. When asked what he thought about leading a session, Max liked being able to choose a design idea to present and that the games’ website prototype was something that he had initiated.

## 4.3 Merida and the Dog Paper Prototype

After seeing Lauren and Max lead the group, Merida also became interested in leading. She had revealed to one adult that she wanted to lead a session to evaluate a prototype of her own. Prior to the session, she was very secretive about her website design. For two design sessions, Merida carried a folder with her designs, but would only show a few select people what was inside. Merida even kept the circle time question of the day a secret. On the day

of her design session, she had already pre-planned the groups for the children, but needed help assigning the adults to groups. During circle time, Merida finally announced her question, “Do you like dogs? Why or why not?” After the group answered the question, Merida organized the children into two groups with the adults. She passed out two phases of her black and white paper prototype of the dog website: introduction screens and activities. Similar to Lauren’s session, the groups would evaluate one set of the prototypes and later rotate the designs. Merida immediately wanted to group the sticky notes and aggregate them (Figure 1). Like the other two child-led sessions, more design ideas were proposed than likes and dislikes. Merida received 56 design ideas, 9 dislikes, and 17 likes from the two groups.

Merida wanted to direct the session and rotate the paper prototypes in the group. However, Merida is quite soft-spoken. When she called time to make the transition, she did not speak loudly enough to tell everyone to pause and switch. She also became a little shy when she had to assert herself. Two of the adults who helped her to organize the notes also helped her to get the groups to rotate the prototypes. Merida was very particular about placing the notes. To ensure that every note was visible, she bent the empty corners, folding the blank parts of the notes to make sure no overlaps occurred. Overall, the children gave her ideas on how she could improve both the interface and interaction design, and the login and registration process of her dog site. The groups liked that Merida’s site gave options and customization and that it was child-friendly. The dislikes ranged from concerns about a cumbersome login to requests for more color (the prototype was in pencil and white paper). Although Merida is soft spoken, she did become slightly defensive toward some critiques. For example, she stated, “So, it seems like everybody wanted a person and something to do with the dog.... So you should be able to have a character and you can do stuff with the dog, which you can *already do*.”

Her desire to give equal time to each contribution was reflected in the way she read every note in the big ideas meeting. Merida held her folder the entire time and, with her back facing the audience, she read almost every single note on the board. The children appeared a bit distracted during this lengthy read. Overall, Merida stated that she liked leading the group because of the numerous ideas that the team generated. However, like Lauren, Merida expressed that organizing sticky notes was the hardest part of leading.

## 5. DISCUSSION

Based on comparisons among our three cases, we offer several themes that were pervasive in all the child-led sessions. These themes are framed by our research questions, and include our analysis of: behaviors in child-led sessions, supports needed for child-led sessions, and views of child-led sessions.

### 5.1 Behaviors in Child-led Sessions

First, we observed that children tended to give many more design ideas compared to likes and dislikes during the child-led sessions. During each child-led session, children and adults did not start with the likes and dislikes; rather, they began with design ideas. Some adults had to prompt the children for a like or dislike. One possibility is that the children did not want to explicitly voice their dislike. For example, Merida noticed in her design session that the design ideas the other children suggested correlated with dislikes (e.g., dislike of “limiting animals to dogs” prompted a design suggestion for “more animal types, like cats”). The children may have turned their dislikes into design ideas to soften criticism.

Likes may have also been difficult to express because the prototypes were very low-fidelity and hard to interact with authentically. Second, child co-design leaders showed moments of defensiveness when addressing criticism of their prototypes. Both Lauren and Merida addressed the group directly, staunchly defending their ideas as they received comments on their prototypes. Third, all of the children who led the session chose Stickies as a design technique. All three had either a paper or digital prototype of their project. We suggest that the Stickies technique may be a low-barrier technique for interpretation. Although we use other design techniques (e.g., Bags of Stuff [8]), in Stickies, grouping notes based on common patterns might be an easier task for the children to lead. Stickies is also an evaluation technique that could allow children to design their own prototypes. All three children developed their own projects. In using an evaluation technique, the children could present their design ideas and then lead the evaluation.

## 5.2 Supports Needed for Child-leaders

We observed that all child leaders needed support in some way. The most apparent support needed was organizing the notes. Lauren and Merida both concluded that notes were coming in too fast and too frequently for them to quickly interpret and categorize. Children also wanted help organizing the small groups. Max did not want to assign the children and adults into groups; he preferred help in this logistical aspect. Merida's voice and personality were quiet so she needed the adults to help her rotate the dog website prototypes between the different groups and help her organize the session. She later expressed that she felt it was difficult to put people in the "right" groups. Lastly, all three children needed some sort of assistance summarizing the themes. Lauren and Merida mainly read the notes off the board with their backs facing the audience. Max did not have questions for the group; he just read the notes off the board.

## 5.3 Children's Opinions of Child-led Sessions

The children had both positive and negative feedback about child-led sessions. The children, including Cruz (age 7, female), expressed that having the child peers lead was "fun" and "cool." Eric (age 11, male) stated this was a way to help him learn about what other children's interests were. Max said that it was a good experience to design and evaluate something another child they knew made. Snowdrop (age 9, female) mentioned, "It made me want to lead. It made me want to do a website even more. My dad did one for me, but I want to update it now that I've seen this." On the more negative end, children expressed that child-led sessions were difficult to understand and that adults could explain the themes easier. Because the child leaders developed the initial paper and digital prototypes, the artifacts were not in a polished form. Therefore, some children had a difficult time interpreting the prototypes. One child expressed that it was hard to understand what to do with the prototypes. Jason (age 7, male) stated that it was frustrating not being able to click and interact directly with a more final format.

## 6. IMPLICATIONS AND FUTURE WORK

Our exploratory study takes a first step in understanding the role children can play as leaders in CI sessions. We speculate that as our technology-infused culture transitions from user/consumer to participatory producer [4], child design partners may develop further interest in being the leaders of their own personal projects or the projects of others. Specifically, the changing nature of how children interact and participate with technology may also prompt

design researchers involved in CI to think about the roles children play in the co-design process. We have shown that children can lead co-design sessions, but that supports are needed to help them manage, interpret, organize, and direct the sessions. In the future, we suggest researchers examine the possibility of children leading a series of design sessions from idea inception to a more finalized product. Prior work in the IDC community has emphasized children designing their own projects, such as in e-Textiles [5] and Scratch [7]. Enabling children to lead CI sessions could complement their independent development of technology projects. We also suggest researchers investigate whether children can lead a CI session for projects that are not their own personal creations. Finally, researchers may want to consider the role of design techniques for child-led sessions. Specifically, the children in our cases chose to use the Stickies design technique. Future studies could evaluate other design techniques and the supports needed for children to lead these sessions.

## 7. ACKNOWLEDGMENTS

We want to say thank you to our Kidsteam child partners: Lauren, Max, Merida, Eric, Jason, Cruz, and Snowdrop. Here is your "button".



## 8. REFERENCES

- [1] Bovill, C. et al. 2011. Students as co-creators of teaching approaches, course design, and curricula: implications for academic developers. *International Journal for Academic Development*. 16, 2 (2011), 133–145.
- [2] Guha, M.L. et al. 2012. Cooperative inquiry revisited: Reflections of the past and guidelines for the future of intergenerational co-design. *International Journal of Child-Computer Interaction*. 1, 1 (2012), 14–23.
- [3] Hart, R.A. 1992. *Children's participation: From tokenism to citizenship*. Technical Report #inness92/6. UNICEF Innocenti Research Centre.
- [4] Jenkins, H. et al. 2006. *Confronting the challenges of participatory culture: Media education for the 21st century*. MacArthur Foundation.
- [5] Kafai, Y. et al. 2012. Making technology visible: Connecting the learning of crafts, circuitry and coding in youth e-Textile designs. *Proceedings of the Tenth International Conference of the Learning Sciences (ICLS)* (Mahwah, NJ, USA, 2012), 188–195.
- [6] Merriam, S.B. 2009. *Qualitative research: A guide to design and implementation*. John Wiley and Sons.
- [7] Resnick, M. et al. 2009. Scratch: Programming for all. *Communications of the ACM*. 52, 11 (2009), 60–67.
- [8] Walsh, G. et al. 2013. FACIT PD: Framework for analysis and creation of intergenerational techniques for participatory design. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '13)* (New York, NY, 2013).
- [9] Webb, N.M. and Mastergeorge, A.M. 2003. The development of students' helping behavior and learning in peer-directed small groups. *Cognition and Instruction*. 21, 4 (2003), 361–428.
- [10] Yin, R.K. 2003. *Case study research: Design and methods*. SAGE.