
Designing Mobile Interfaces and Interactions for Children using Cooperative Inquiry

Jerry Alan Fails

University of Maryland, HCIL
2117A Hornbake Building South
College Park, MD 20742 USA
fails@cs.umd.edu

Allison Druin

University of Maryland, HCIL
2117H Hornbake Building South
College Park, MD 20742 USA
allisond@umiacs.umd.edu

Mona Leigh Guha

University of Maryland, HCIL
2117 Hornbake Building South
College Park, MD 20742 USA
mona@cs.umd.edu

Abstract

When designing mobile interfaces and interactions for children, we feel it is important to include children in the process. We discuss how we have designed mobile interfaces with children using the *cooperative inquiry* method of design.

Keywords

Design, mobile devices, children, cooperative inquiry

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Introduction

When designing interactions for a specific user group, designers must keep those users in mind. We believe in going beyond just keeping users in mind, but including them in the design process, along the lines of user-centered and participatory design. We employ *cooperative inquiry* design techniques which we have developed and refined over the last decade for designing with children.

Cooperative Inquiry

Cooperative inquiry [1] gives children a voice in the design process. Children's voices are so important

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because regardless of the fact that adult designers have been children, and that some may understand the literature describing the development of children, adults have never been children in the context of the current social, economical, societal, and technological world. This being said, we feel it is imperative that children have a voice in the design of their technologies, both now and in the future. As children and adults work as co-designers, they are each full-fledged design partners. Each contribute and elaborate on each other's ideas to develop concepts and technologies that otherwise would be difficult, if not impossible, to create.

Over the last decade, techniques in the cooperative inquiry method have been employed and refined while working with young children as design partners [1, 2, 5, 7]. These methods have been used to give children ages 4-13 a voice in the design process. Cooperative inquiry grows out of participatory design and is tailored to suit specific needs of young children [3].

Some of the techniques used in cooperative inquiry are bags of stuff, sticky notes, journals, peer-observations, etc [1, 3]. Bags of stuff is a brainstorming activity where children and adults use art supplies to sketch or model their thoughts. In this technique, the created artifact is not just an end, but a means to a discussion about a topic of interest (some examples are briefly discussed in next section on Mobile Stories). Sticky notes is an evaluative technique where children use a prototype and as they do so, they write things they like, dislike or would change. Each idea is put on a separate sticky note and adult partners group the notes performing an informal, but informative frequency and cluster analysis. Children also use journals and other documentation practices used by researchers such as

recording sessions with video cameras; however, they are tailored to young children [1, 5].

Mobile Stories

Children are mobile beings. They are frequently on the move, they sit on floors, they climb on chairs, and even when "sitting still" they contort into positions that adults might find uncomfortable. Children also are physically smaller than adults. Laptops are often too heavy for children, whereas a mobile device may offer a more appropriate weight and size for a child. With some design adjustments mobile devices can address children's other unique needs, such as larger buttons (both in hardware and software) [6] to accommodate different sized and shaped hands. Children use mobile devices and could use them more especially if they were designed with children's needs in mind. Children also have social and collaborative needs that are not only often natural for children, but are essential for their social and cognitive development [8]. Mobile devices offer a platform for supporting these needs.

While mobile devices are primarily designed for adults, children have much to offer not only as a user-base but also as designers. Adults and children have many differences. Designing for mobile devices using cooperative inquiry addresses these salient differences between children and adults not only for the final product, but throughout the design process.

Mobile Stories was developed using cooperative inquiry and in-the-field, contextual design sessions [4]. In Mobile Stories, children can read and create collaborative stories using mobile devices (see Figure 1).

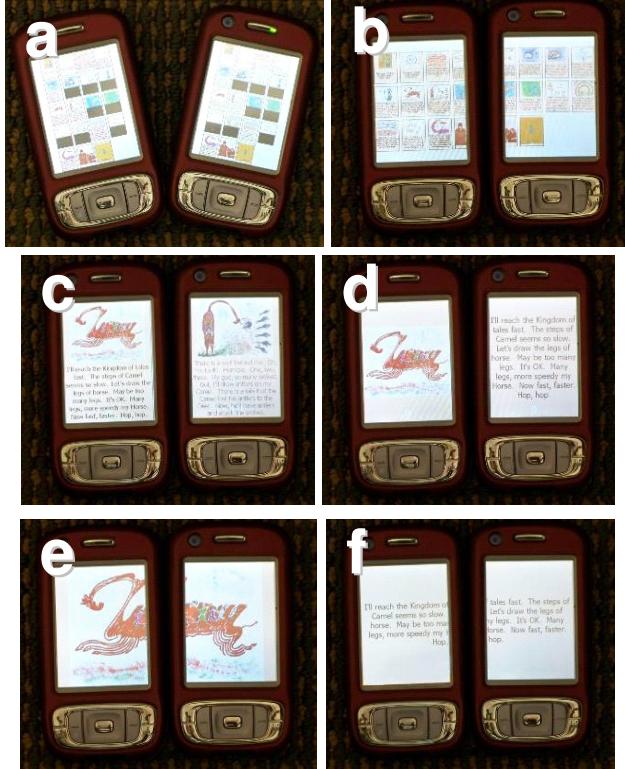


Figure 1 – Mobile Stories interface using the book *The camel with seven humps* by Jambyn Dashdondog, from www.childrenslibrary.org

a, disconnected, each device displays the full story independently; **b**, connected, the pages of the story are distributed across both devices; **c**, previous and next pages; **d**, *content splitting*, one device shows the picture, the other, the words of the same page; **e & f**, *space sharing*, showing just the picture and words of a page, respectively

In using cooperative inquiry methods with our child design partners, we used bags of stuff, sticky notes and journals to discuss creating shared stories on mobile

devices. During some design sessions, the children demonstrated the desire to synchronize the device while reading (see Figure 2). Another idea was to split the content (see Figure 2 right). In other sessions they illustrated the desire to be able to connect and synchronize with one another, while making the connection obvious via very close proximity or visual wires.



Figure 2 – Child design partners developed and expressed idea of: *left*, synchronized reading via scrolling or movement of pages (sticky notes and journals); *right*, and also role assignment or content splitting using images on one device and text on another (bags of stuff)

The children have also used working prototypes in non-laboratory settings, such as at Fort McHenry National Park, where they created a shared narrative of their experience at the park. During this experience the children were highly engaged, exploring, looking, and adding to a shared story. The interface appeared to support their exploration of and learning about the environment as well as encourage collaboration between children. The children collaborated and elaborated on their own and other's work. We also observed children coming together, at the same time and place (e.g. collocated) to collaborate (see Figure

3). When doing so, the children used only one device to view and interact with. This observation guided interface changes to better support collocated mobile collaboration so that both devices could be used in such situations and expand the interface and interaction space across both devices. This is implemented in the current design of Mobile Stories (as illustrated in Figure 1).



Figure 3 – Co-present collaboration on a shared story at Fort McHenry National Park in Baltimore, Maryland

Conclusion

Mobile devices not only enhance mobility for adult users, but, if designed properly, can address the über mobile world of children. By including children in the design process we have been able to better meet their needs and the overall technology has been improved. We strongly suggest giving children a voice in the design process. Also, because of the prevalence of mobile devices and their individual limitations,

collaborative interactions should be considered to expand the interface.

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