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Designing technology to empower children to communicate with non-residential parents

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GRAPHICAL ABSTRACT

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ABSTRACT

This paper considers the role of technology in supporting parent–child communication in divorced families. Through formative interviews, we identified specific challenges to engaging the child in remote communication and managing the tension inherent in the communication practices of divorced households. To address some of these challenges, we designed the ShareTable system, a synchronous communication appliance that combines easy-to-use videochat with a shared projector–camera tabletop surface. We observed the use of this system in the field through a multi-case design case study where each case consisted of two divorced households and the ShareTable as a mediating technology. The two families had very different experiences with the system, which we interpret through the lens of empowerment theory. This paper makes two major contributions to Child–Computer Interaction. First, it contributes a presentation of the formative interviews and field deployment of the ShareTable focused specifically on the role and perspective of the child. Second, it contributes a discussion of empowerment theory as a potential interpretive lens for Child–Computer Interaction and applies it to understanding the findings and providing implications for design in the context of communication technologies for children.

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1. Introduction

Parent–child separation due to divorce is an emotionally charged topic that is highly salient to today's families. The 2008 US Census found that 26% of children live with just their mother or just their father, with partner separation being the primary reason [1]. A synthesis of psychology and sociology literature on divorced families shows that both the parents and children in separated families tend to score lower on multiple measures of wellbeing and adjustment [2]. However, the findings also suggest that when the remote parent and child maintain meaningful contact many of the negative consequences of separation are mitigated [3]. Unfortunately, contact with the remote parent drops

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precipitously after the first year of separation, often due to geographic mobility [4].

Increasingly, families are seeking out alternative forms of synchronous and asynchronous communication to provide contact between visits. Successful attempts at leveraging tools like videochat and instant messaging for remote parenting have drawn attention from the news media. The *New York Times* has had several articles about videoconferencing with children [5,6]. A number of recent family law publications have featured articles on *virtual visitation*—using communication technologies to augment face-to-face time between parents and children in divorced families (e.g., [7]). There are efforts to incorporate virtual visitation into family law in almost every state, with six states already having added provisions for virtual visitation to custody case law [8]. Remote parenting is a relevant issue to families, lawmakers, and technology designers, but it has not been investigated from the point of view of Child–Computer Interaction. Most of these discussions focus on the rights of the parent and the role of the state in protecting the interests of the child, however the role of the child as an active participant in communication and the sociotechnical arrangements that may serve to empower or disempower the child in this process have not been explored.

This paper makes two major contributions to Child–Computer Interaction. First, we present the formative design and field deployment of a novel prototype for supporting remote synchronous parent–child communication in divorced families, focusing specifically on the role and perspective of the child. There have been very few evaluations of novel synchronous communication technologies in the wild with children and this paper helps address this gap. Second, we use empowerment theory as a lens for understanding the findings, suggesting how other researchers may also leverage this construct, and elaborating on implications for design of sociotechnical systems that help empower children to communicate.

We begin with a related work review discussing novel technical approaches in this domain, describing some of the unique challenges of empowering children to initiate remote interaction, and presenting the background on empowerment theory as it relates to this work. We present formative work in this space that allowed us to develop an understanding of the domain through in-depth interviews with parents and children. We describe the implementation of the resulting technology and the findings of two month-long deployments of the system as a multi-case design case study investigating two sociotechnical systems, each consisting of two households mediated by our system. We focus specifically on the observations and perspectives of children throughout this process. Finally, we discuss the design implications gathered through this deployment and the role that empowerment theory may play in understanding our results and guiding future work.

2. Related work

In this section, we begin by reviewing relevant novel technical approaches to helping families communicate, followed by a review of the challenges of motivating children to participate in remote communication, and finally providing an overview of empowerment theory as a theoretical lens for Child–Computer Interaction.

2.1. Novel technical approaches to remote family communication

Many have approached the design of technologies for remote family communication. A large class of such designs focuses on helping families maintain awareness of each others' activities through clever visualizations of location [9], collaborative calendaring (e.g., [10,11]), communicating household activity through augmented appliances [12], messaging and drawing together (e.g., [13,14]), and sharing photographs regularly (e.g., [15,14]). Most of these projects did not explicitly consider the child's role or perspective on being an active participant in the use of such asynchronous systems.

Other technologies focused specifically on the child and supporting remote play, such as by implementing an asynchronous hide-and-seek game in the child's environment [16], by augmenting children's toys with communication capabilities (e.g. [17–19]), or by leveraging videochat as a play channel (e.g., [20–23]). The idea of interactive projector–camera tabletops (which originally initiated as an office collaboration technology [24–26]) was also explored with children concurrently but independently from this work [27]. However, most of these projects presented proof-of-concept systems where children interacted with communication technologies when prompted by a researcher. While these projects show the potential for engaging children in a remote *communication session*, they do not shed light on how to engage children in a remote *communication practice* in the course of their everyday life.

Thus, the most relevant previous and concurrent work to the project described here focuses on field deployments of family communication systems in the home. One such project supported children and grandparents reading together through a video-mediated electronic book system [28]. However, despite the title of the paper ("Hello, is Grandma there?"), parents were the ones responsible for initiating the connection and gatekeeping interaction with remote parties. The second relevant thread in research was in the development and deployment of family media spaces that supported easy messaging, drawing, and sharing images (e.g., [13]), which highlight that adding simple playful features increases children's use of the system. Finally, a series of projects investigated always-on media spaces as potential technologies for connecting multi-household families and deployed such systems in 2-household [29] and 3-household families [30]. Each of these field trials contributed to our collective understanding of how families engage in remote communication practice with novel technologies. However, all of these systems relied on families that are collaborative and low-conflict in order to support children's engagement and continued use of the system—this project the first to approach such a deployment in a high-conflict setting where children may need to be empowered to develop their own motivation and exercise their own rights for continued communication.

2.2. Remote communication with young children

Empirical findings from previous work help situate expectations in remote communication where children drive the contact. We know that children have a hard time engaging in conversations; in fact, time studies of US children show that they spend less than 45 mins per week on average participating in "household conversations" [31]. In remote communication, this issue is considerably exacerbated. For example, while adults can generally build relationships through phone conversation [32], young children have significant trouble with the same form of mediated communication [33]. While videochat may alleviate some problems of audio-only interaction, it introduces other challenges like complicated setup [34], framing the view [23], and understanding what the other person sees [23].

While many communication technologies target families with children (e.g., [9]) and children become participants in interactions initiated by adults (e.g., [34,30]), children's role in initiating interaction with remote family members has largely remained unexplored. In parent–child relationships, intimacy is not expected to be explicitly reciprocated by the child, and children are less likely to reflect upon the relationship with their parents [35]. Indeed, at times, initiating remote contact may actually run counter to children's strategies for dealing with temporary separation which