

Toys Keeping in Touch: Technologies for Distance Play

Natalie Freed

Arizona State University

Natalie.Freed@asu.edu

ABSTRACT

Collaborative pretend play is significant in the emotional and social development of young children yet traditional remote communication systems do not support this type of interaction. This paper introduces a remote communication system designed to facilitate imaginative play using the novel approach of a tangible interface specifically for character toys. A dollhouse enhanced with tangible electronic objects that allow the toy inhabitants of the house to communicate with the inhabitants of a remote dollhouse was constructed and evaluated in a pilot study.

Author Keywords

Children, remote play, storytelling, tangible interfaces, user interfaces for toys.

ACM Classification Keywords

H.5.2 User Interfaces.

General Terms

Design, Human Factors

INTRODUCTION

An increasing number of children are becoming proficient with communication technology such as cell phones and video chat. However, these focus on adult modes of communication and do not support play interactions. They also are not easy for young children to use and do not support physical or spatial interactions.

For young children (approximately aged 6 to 10) pretend play, in which children make symbolic use of objects and language in role-play and storytelling, plays a powerful role in emotional and social development. Particularly for younger children, toys play an important part in this process. The physical objects can act as “mediators of play,” [1] essentially drawing in and then anchoring children to the story.

This work seeks to explore tangible communication systems that support pretend play. The approach taken is the idea of “user interfaces for toys,” where the technology enabling the augmented interaction—in this case remote communication—is built into objects that can be interacted with directly by the story characters.

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RELATED WORK

Recent work has explored tangible and unconventional interfaces for remote communication between children and their families, including remote-hugging pajamas [6], asynchronous multimedia messaging centers [4], enhanced digital picture frames, and other innovative indicators of presence. Some systems for child-to-child communication, such as Message Bubbles, [7] have explored video recording and manipulation designed for children to operate, but not imaginative play specifically. PlayPals [2] investigated the use of multiple communication channels connected with character toys for remote communication and play between children. Dollhouses have been explored in play research in support of storytelling play, including in the creation of SAM, the virtual storytelling peer. [5] Picture This! [8] leveraged toy gestures and object manipulation used during play.

THE SYSTEM

The pilot system consists of dollhouses connected over the internet by two communication channels: a telephone (real-time voice) and a mail system (asynchronous text and images). The voice channel is controlled by a doll-sized telephone receiver. The mail system consists of a scanner for small drawings and letters and a small photo printer that ejects letters received from the other house through the front door mail slot.



Figure 1: Dollhouse 1 of 2

Building on the idea of toys as mediators of play, the system was designed as a “user interface for toys.” The computationally-enhanced objects are made to be interacted with by the characters within the story being created during play.

Several approaches were taken to implement the idea of interfaces for toys. In one dollhouse but not the other, Velcro is attached to several of the objects (phone, pencils) and to the bears’ (the dollhouse characters) paws. This makes it easier for the bears to hold objects. We

were interested in discovering if this encouraged the children to engage in more pretend play because it indicated that the objects were meant for their characters. Again in one dollhouse but not the other, a “mailbox” is included resembling the blue United States Postal Service mailboxes often seen in public areas. The mechanism for sending a letter involves placing the letter in the mailbox. In contrast, the other house includes a scanning area above which a webcam is suspended. This was intended to explore the hypothesis that play objects that “make sense” (have a real-life counterpart) are more easily incorporated into pretend play.

USER TRIALS

A pilot test was conducted with nine children total, ages nine through twelve, all girls. The children chose their play partners and one or two children interacted with each of the two dollhouses at a time.

Imaginative Play

We observed pretend play among most of the children, including discussion of what the characters were doing, moving toys around the house and using them to manipulate objects, multivocality (using different voices to indicate a character is speaking), and metacommunication (discussion of the play from an outside perspective). However, creation of longer narratives or stories was not observed. Based on the children’s feedback, a factor in this may have been that there were not enough materials in the houses to play with other than the characters and communication objects.

User Interface for Toys

It was observed that the children who most used the bears to manipulate objects were also the most vocal and inventive about the character’s actions. However, these did not correspond to the children who used the house with the Velcro. The Velcro appeared to be helpful in manipulating the objects, but did not appear to have any impact on the children who were not as engaged in play with the system.

In addition to pretending that the bears were speaking to each other, the children engaged in a mixed form of play in which bears and girls both participated as characters. For instance, one girl would have her bear make a call and ask in turn to speak to both the other bear and then her friend in the other dollhouse. This observation adds the design consideration that the children might also use the communication objects directly.

One user group discovered that the scanner-area interface was flexible enough to scan more than just letters, and used it to “teleport” a doll pillow from one house to the other. Despite the hypothesis that a mailbox would “make more sense” in play than a scanner-area, the more flexible

interface was preferred and enabled an interesting play interaction.

FUTURE WORK

Based on results of the pilot study, future research will include designing a more robust system to enable leaving the installation in homes for a longer-term study. We plan to compare children’s dollhouse play with and without the augmented interaction, and across several age groups and genders. We will also take into consideration our insights about flexible interfaces and interfaces designed for both toys and children to interact with each other.

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