
How Can Technology Bring Families Together: Exploring User Needs and Design Qualities

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Abstract

Increasing usage of digital technology such as social media or individual entertainment may lead to less communication between family members and weakening of the bonds between family members. It is important to not only focus on how mobile and social media technology can be used to connect remote people together, but also how it could reconnect co-located family members. In this paper we present our study of family members' needs and motivations of spending time physically together, and their feedback to scenarios of embodied family interaction. Our focus is on how to motivate families with teenagers to spend more time with each other. We also present the resulting design qualities for the concept of *embodied family history*.

Keywords

Family communication, scenarios, user study, embodied interaction.

ACM Classification Keywords

H5.3. Information interfaces and presentation, Group and organizational interfaces: Collaborative computing.

General Terms

Design, Human Factors.

Introduction

Technology has invaded our lives. It is everywhere around us, including our homes. People use this technology in many ways, including staying in touch with remote friends or family such as MSN or Skype, and also for individual entertainment such as PlayStation® Portable, Nintendo DS, or just an mp3 player. As people take advantage of the technology, they may become so engaged in it that they forget about things that are going on around them [13]. Co-located people may end up being ignored. Similar effect of the decrease in physical social involvement can be seen in the introduction of television; people tended to have less engagement in face-to-face social participation [3] [9].

Children, especially teenagers tend to use technology to connect with their friends or as means to pass time when they have nothing to do. This technology is not often used for intergeneration purposes or with people who share same space. As a result people in the same space are less connected.

There are many commercial and research applications utilizing mobile communication technologies to connect people who are separated and make them feel close together ,for example The Family Window [8], ASTRA and Awareness System [11]. However, very few focus on facilitating activity with co-located people. One such attempt is presented in [14], where a system called Squeeze incorporates picture sharing controls in furniture of a family home.

Our goal is not to stop people from using technology to communicate with remote people or to entertain themselves, but rather to diminish the distance it may

have created between co-located people. Our starting point was that technology could also strengthen co-located relationships. In other words, we are trying to use technology to bring people back to spending time together physically and having good shared experiences in a common space. We also wanted to explore *embodied interaction* as means to support shared experiences, i.e. design a system which would involve bodily interactions through tangible devices in a social setting [4] [6]. This, we believe, would make the experience more engaging and satisfying.

Related Work

Even though remote family communication has been investigated extensively, co-located interaction has gained less attention.

Collective Interaction has been defined as a design space that focuses on co-experience among co-located people [10]. The focus is on socialization and negotiation that users will experience with each other by the support of the system. Squeeze [14] is a photo viewing system built based on the Collective Interaction concept. The aim is to increase activities between co-located people in home. The design idea is constructed upon a shared interest of a family, i.e. the history around home. Viewing digital photos taken around the house is the core concept of Squeeze. The system is implemented with beanbag-type sofa which would add the attraction of family members to come and sit together. The control of Squeeze is positioned in the way that makes it harder for single-person manipulation. Squeeze would show pictures of things or events happened around the house. The more parts of the beanbag are touched, the more pictures are displayed at the same time.



a) Visualization to represent how much time family members spend with each other.



b) Proximity sensors between family members give feedback about their closeness.

Scenario 1: Family awareness and proximity.

Creating and sharing family history has been a focus of many studies. Family history is based around topics that are always talked about when a family gets together. Serendipitous Family Stories [1] presents an approach to experience family history even when family members are separated. Past stories would be presented to the children on their mobile devices when they go close to the story location, and thus create a form of storytelling from their relatives. It is another way to play around with family history when some family members are remote.

The Memory Box [5] is another project that used family history as a design driver. It focuses on physical family mementos. The Memory Box adopted the idea of jewelry box. Every time a memento is taken out the Box would tell a story about that memento. This story is recordable by the owner of the Box. This Memory Box is intended as a gift that a mother passes to her child as a heritage. Going through family mementos is one way for family members to reminisce the family history. These mementos are categorized into two types: physical and digital mementos.

One of our aims was to explore applying embodied interaction in family communication. Paul Dourish (2001) stated that Embodied interaction systems “are manifest in our environment and are incorporated in our everyday activities”. Höök (2008) has emphasized that “integration of bodily, cognitive and social/cultural interactions into a design is key when dealing with design for emotional interaction”. This is different from traditional GUI-based user interaction and aims at natural interaction activities where users can act pleasantly and in a multisensory manner with their interactive surroundings.

Kurio [15] is a system with embodied interaction used in guiding a small group of visitor throughout museums with a vision that social interaction would help visitors experience more than what they will do individually. One of the system goals is to decrease social space between visitors in small a group especially between family members. Traditional guidance in museums is based on a headphone, and this totally separates a person from one another. Embodied interaction with multiple tangible interfaces and a game-like strategy in Kurio, motivates users to participate and creates opportunities of socialization and collaboration between group members. Natural interaction such as grasping makes the usage open for everybody. Embodied interaction also allows users to go back and forth between using technology and not using technology seamlessly and this leaves some space for users to interact between each other rather than being all the time blocked with technology.

Three Scenarios for Reconnecting Families

To explore the design space of embodied family communication, we built three scenarios targeted at families with at least one child in teenage. We chose to focus on families with teenagers because family members spend a lot of time in the same space called “home”, but often the teenagers disappear to their own technology-mediated worlds. In a family where members are of different ages and there is a high likelihood of having different interests, family members have more chances to turn to something that is more interesting and engaging to them [2] [13]. We see this as an opportunity to not only to bring people who are engaged to something else back together and strengthen their relationships in co-located family, but also motivate them to spend more time together.



a) Family members share a past experience.



b) Sharing an experience with a help of shared display

Scenario 2: Encourage sharing and experiences to trigger conversation.



a) Notification of a family member's availability.



b) Enriched walking experience with nice sounds.

Scenario 3: Family member availability and enriched walking experience.

We developed three scenarios based on the main idea of bringing family physically together. The first scenario is about awareness and persuasive technology [7] [12] combined with a visualization to motivate family members to spend time together. The idea behind this is that if a family member sees how much time they actually spend with other family members, it might motivate one to spend more time with his family (see Scenario 1a). In addition, the system would support embodied interaction at home, as family members become in proximity with each other and this proximity is used to indicate how much time they spend together (see Scenario 1b). The second scenario is about sharing experiences based on where each family member has been to (Scenario 2a). They share pictures and discuss about places together in front of a big screen display technology in order to enhance and trigger conversation between family members (Scenario 2b). The third scenario focuses on triggering the family members about each other's' availability (Scenario 3a) and the following experience of the family members when going out for a walk together. Embedded technology is used to enrich the shared walking experience with embodied feedback or location-based sounds (Scenario 3b), and thus motivate them to do it again.

Our User Study

We conducted four user study sessions to understand families' habits of spending time together, and to evaluate the scenarios. The first two sessions were group discussions with students (2+3) in a meeting room. The last two sessions were done with two families at their homes. The first family has parents and two teenage girls (aged 16 and 18 years), and the second family has parents and a teenage boy (15

years). Video and audio recording were used during the sessions. During each session the participants were interviewed with open semi-structured questions about how they spend time together as a family. Then we showed the users the three scenarios and asked for their feedback.

There are both similarities and differences in the results between the groups. Based on the results, family activities can be categorized into two types: in-house activities and outside activities. Common in-house activities are watching television or movies, talking, and eating meals together. However, the frequency is different in each family. One family often shares family pictures and interesting videos from the internet in their living room where they sit in front of a big television screen. Common outside activities are travelling together or going to visit friends or relatives. If family members have same hobbies, they are more likely to spend more time together. We also found that driving and talking between family members are common activities in families with a child in teenage who still cannot drive. They have never thought of it as a family activity, but it is an opportune time when family members actually share things and talk about issues together.

With regards to the feedback about the scenarios, the first scenario (family awareness and motivating people to move in a shared space) was criticized on two issues. The first criticism goes towards the accurateness of the amount of the time spent between family members. Participants defined the time that they actually spend and have good time with their family as "valuable time". They system which only measures the absolute amount of time spent together by the

proximity of family members does not make sense to the participants. They suggested that an “emotion factor” should be added to this measurement since there are times when family members are close together but they are actually fighting and not having good time together. Another issue raised was the privacy of family members. One participant reported that he would feel really uncomfortable if there is a system that would track the amount of time he spends with his family. He interpreted the metaphor as if guarding a prisoner. Some other participants also found the representation unattractive to them.

The second scenario (sharing photos of earlier experiences) got the most positive feedback in term of its potential and possibility of practical use. Participants commented that conversations between family members sometimes get stuck. Technology could be used here to enhance, trigger, and prolong topics of conversation. Moreover, the idea simulates and enriches what actually happens in a family.

The walking activity in the third scenario did not seem to fit to the family lifestyles. They do not go out for a walk together, but if they do, the purpose of walking is not primarily to be connected with the environment, but rather to have a conversation between the one who is walking with them.

In summary, the following aspects of the scenarios were found to be central for technology-based concept development. The family routine, behavior, and hierarchy need to be taken into consideration in design. As can be seen from the feedback, if a novel technology is pushed into a family without supporting family structure and behavior, like the first and the third

scenario, it will not gain the users’ acceptance. Additionally, technology should support the original purpose of the activities rather than creating activities which are totally new. Designing right representations and suitable metaphors affect the willingness of users to be engaged with the technology. We believe this is especially sensitive to people’s personal life at home.

Design Qualities for Embodied Family History

According to the user study results and related work, we can conclude key design qualities of a novel system that aims to bring family members closer to each other. The system should not only provide better technology for family members to *have activities together*, but also motivate them to *come together more often*. The system should be *simple and easy for wide age ranges of users* as well as *easily blend into family’s routine lifestyle*. The main focus of the system should be based on the *mutual interests of every family member*. The system should be *engaging enough* to make users want to come back again after using it once. In order to increase co-located socialization between family members, the system should *create a situation where collaboration between users is required* and could *trigger conversations* between them. We hope that these characteristic or “design qualities” could create good user experience while users are using the system and lead to closer feeling between family members.

Based on these characteristic, we are currently developing a concept which would enable embodied interaction with *shared family history*. We chose family history as our base concept because it is what every family member is probably interested in. We also believe that getting to know the history of the parents

would strengthen the relationship between parents and children. Families have many physical and digital mementos that are full of family history, and many of them are forgotten or hidden in a closet or deep in computer directory. This is where ubiquitous technology can come in to remind, motivate, and encourage sharing those resources and associated stories between the family members. With the embodied interaction approach, we believe that we can develop a system that is easy to manipulate and at the same time create interesting and playful experience which could engage users for repeated use of the system.

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