

The Family Window: Perceived Usage and Privacy Concerns

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Abstract. Families have a strong need to connect with their loved ones over distance. However, most technologies do not provide the same feelings of connectedness that one feels from seeing remote family members. Hence our goal was to understand if a video connection, in the form of a media space, could help families feel more connected. To answer this, we designed a video media space called the Family Window and, using a video of the system as a design probe, interviewed 16 individuals to understand their perceived usage patterns and privacy concerns.

Keywords: Media spaces, domestic, families, privacy, awareness, video, Family Window.

1 Introduction

Families have a strong need and desire to stay connected and aware of one another when they become separated by distance [10, 12, 13]. Typically distance-separated families gather this awareness using technology such as phones, email, or instant messaging, for example, to learn about one another's activities and health. In addition to this, we now see that many people turn to video conferencing systems as a communication and awareness tool. This is evidenced by the increasing number of instant messaging systems that support video calling (e.g., Skype, Google Talk, Windows/MSN Messenger).

Despite this usage, there are few investigations of the use of video conferencing in the home. Instead, most research has focused on supporting domestic awareness (e.g., activities, health) using abstracted representations [9, 14]. The challenge is that abstracted awareness information does not typically provide the same feeling of connectedness that one gets from actually seeing a remote family member [12].

Given this, we were interested to know how we could expand the ways in which family members are able to maintain an awareness of one another, feel connected and communicate over distance by actually seeing each other. Media spaces attempted to do this and showed relative success in the workplace [5]. For this reason, we chose to investigate media space usage within the domestic realm. We wanted to understand in what ways families would use a media space. Would it be used for real time communication and awareness (akin to workplace media spaces), or for altogether different purposes?

We took a largely design-oriented approach to answer these questions. First, we constructed a media space for the home called the Family Window [11] and deployed it in the homes of six families for a period of five weeks to eight months to gather feedback and reiterate on the design. Findings from this study are reported in [8]. To gain a broader demographical perspective, we also interviewed an additional 16 participants about the system after providing a video demonstration. This report discusses the results of this interview study. Together, these investigations provide a rich understanding of the ways in which media spaces can be used in the home and the privacy concerns that follow the usage of a media space in the home.

2 Related Work

2.1 Media Space

Workplace Media Spaces. Media spaces have been investigated as a means to connect distance-separated co-workers for over twenty years [5]. The first media space connected two Xerox PARC labs and, since then, media spaces have taken on many incarnations within a variety of research and academic institutions (see [5] for an extensive review). In most cases, video (and sometimes audio) was left always-on to simulate the idea of a shared physical space. In general, researchers found that these media spaces allowed co-workers to gain an understanding of each other's comings and goings along with knowledge of availability for conversation. In turn, this informal awareness increased one's ability to easily move into casual interactions and informal encounters with others. Thus, the crucial design factor for workplace media spaces was the support of both awareness and interaction, plus the ease at which one could move between the two.

Domestic Communication. Numerous research prototypes have been designed to provide families with awareness information over distance. These systems range from providing *abstracted representations* of awareness to concepts that provide *direct awareness* information. For example, abstracted awareness information is provided by awareness appliances such as the Remote Presence Lamp [14] or Digital Family Portraits [9]. In the latter, lights and icons change around the border of a digital picture frame to show the activity levels of an elderly family member in her remote home. While beneficial for monitoring activities, such abstract awareness information does not typically provide sufficient feelings of connectedness [12].

On the other hand, some systems provide direct awareness information through messages, photo sharing, or the combination [2, 6, 12]. This means that the awareness

information is not abstract. People can see what has happened (e.g., in a photo or video), or be told about it directly. This can enhance feelings of connectedness. However, these systems are still limited in terms of timeliness and interaction: The information being shared is typically from the past and sharing may require explicit interaction with the system (e.g., pushing a button or writing a message). In contrast, media spaces do not require users to perform any additional acts for awareness information to be sent, except that the system is on and that people appear reasonably frequently in front of it.

Domestic Media Spaces. Media spaces have made their way into the home in several cases, although none address the research questions that interest us. Hindus et al. [6] designed RoomLink, an audio-only media space, yet it did not incorporate video nor was it evaluated for its ability to support awareness or feelings of connectedness. VideoProbe captured images of activity in front of a display and transmitted these to a remote family's display [3]. Families enjoyed the ability to share images and would routinely try to capture themselves in front of it. Yet at times, privacy was still an issue and families sometimes turned the camera to face a wall. Lastly, Gaver's Video Window [4] transmitted outdoor images to a display inside the home. This is certainly a domestic media space, but it does not attempt to connect distance-separated families.

As can be seen, there is a large body of media space research for the workplace along with many efforts to understand and design for awareness in the home. We have only shown a small sampling of these. Despite the amount of research in this space, no one has specifically looked at the role that always-on video can play for connecting distance-separated families.

2.2 Privacy

We know that workplace media spaces were not used without their issues. Unsurprisingly, many users expressed privacy concerns from broadcasting live video [1]. Here privacy relates to three control modalities: solitude, confidentiality, and autonomy [1]. First, *solitude* involves the control over one's interactions [1] and can be violated if someone interrupts another over a media space at an inappropriate time. In many ways, media spaces helped preserve solitude by allowing others to judge one's availability for interaction. Second, *confidentiality* relates to control over what people know about oneself [1]. Media spaces can affect confidentiality by showing more than one may wish to reveal. And lastly, *autonomy* is control over how one acts and interacts [1]. Choosing when and how to participate in a media space is control over one's autonomy.

3 The Family Window

Our first step to understand how a media space could be used in the home was to design our own system that we could test and iterate on as needed. We called this prototype the Family Window (FW), shown in Figure 1. A full description of the



Figure 1. The Family Window.

system can be found in [8] and an accompanying video further illustrates the design and use of the Family Window [11].

4 Methodology

To gather a broad reaction to the FW, we conducted interviews with 16 individuals (8 female, 8 male) from 12 different households. We interviewed them about their existing usage of video conferencing systems (results described in [7]), showed them a video describing the FW, and then asked questions about it. Each household received a gift card for participating. All interviews were audio recorded and handwritten notes were taken to aid analysis. We again used open coding to analyze the data. Participants ranged from 22 to 62 years old and fell into four groups: single with no children (3), couples with no children (2), couples with children (7), and grandparents (4). All participants currently used video conferencing to communicate with distant family and/or friends.

4 Results

Of the 16 participants, 6 said they would use the FW as an always-on video media space to connect to distant family members. Two of these participants were grandparents, three were couples with children (all under the age of 10) and one was a wife in a long-distance marriage. None of these six participants were concerned about their privacy, in particular, confidentiality, and what remote households would see. They told us they would not use blinds as it would raise questions from the remote family or even hurt their feelings. Instead, they preferred to place the FW in a

different position if they wanted privacy. This would regulate their autonomy thereby controlling when they participated in the “shared” space.

An additional 6 of 16 participants (4 parents with children, 2 grandparents) said they would use the FW, but not in an always-on fashion. Two grandparents felt like they would be invading the space of their children/grandchildren if it was always-on. One father thought that his parents may be overly critical if they were able to see all aspects of his home life and might not agree with the way he was bringing up his children. Two stay-at-home mothers did not want their parents or in-laws watching them all the time and a husband did not see the value in sharing all aspects of his home life. All six participants said they would use the FW akin to the manner in which they video conferenced: They would turn the FW on/off at various points in time, rather than using it as an always-on device. As a result, they valued the ease at which one could turn on/off the FW as well as its mobility. These factors made the FW more attractive than their current video conferencing systems.

The remaining 4 of 16 participants said they would not use the FW in their home at all as they found always-on video to be intrusive and the additional features did not provide enough new functionality beyond their existing video conferencing systems. All four participants were single and sought independence from their parents. They also did not want to use the FW with any close friends.

All participants thought that the FW should provide an audio connection that could be easily turned on/off as needed. They felt this would be less intrusive than always-on audio. Despite this, participants liked the two substitutes to audio, namely knocking and writing. They saw these as mechanisms for easily initiating interactions as well as leaving short messages without having to pick up the phone or send email. All participants also commented that the activity timeline, as designed, was not useful. Several said that families, especially with children, might have different schedules depending on the day or week. Hence knowing yesterday’s activity pattern was not necessarily going to help predict today’s activity. Time shift was greeted with mixed reactions. Everyone liked the idea of saving video but wanted to be able to save video and watch it on demand. They imagined this feature working similarly to voicemail where video clips could be recorded and shared.

6 Conclusion

We started our work wanting to understand the ways families would use a media space in their home. To answer this question, we interviewed 16 participants. We acknowledge the limitation of this study as participants were asked to hypothesize about a system they have never used. With this limitation in mind, we were still able to learn about each participant’s perceived use of the Family Window and their privacy concerns. Participants also provided valuable feedback about the system. This investigation has provided a rich understanding of the ways in which media spaces can be used in the home and the privacy concerns that follow the usage of a media space in the home. This will enable us to better design the Family Window to support use in the home and to alleviate privacy concerns.

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