StoryPlace.me: The Path From Studying Elder Communication to a Public Location-Based Video Service

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CHI'12, May 5–10, 2012, Austin, Texas, USA.

Abstract
We describe our research path that took us from studying communication needs across distance and generations, to a small-scale study of a person-to-person location-based video service, and finally to a public beta of StoryPlace.me which extends this service to support public video sharing and historical content. The process was not a clear, linear design path, but one of an unexpected change in focus that resulted in the current service which goes beyond the original vision of tools for inter-generational communication. We will describe our research methods as well as key findings from each step of our journey and conclude with implications for similar product concept generation activities.

Keywords
Mobile; video; storytelling; family; communication; design process; location-based services

ACM Classification Keywords
H5.m. [Information interfaces and presentation (e.g., HCI)]: Miscellaneous

General Terms
Design, Human Factors

Introduction

The CHI literature is filled with examples of individual steps along the design process. However, less commonly reported are examples of work that has been taken from start to finish, from generative research through prototyping, to the public release of a product or service. This paper seeks to add to this smaller body of literature in providing the case study of the creation of the StoryPlace.me system, an asynchronous, location-based video sharing platform for Android smartphones.

We began our work with no particular interest in location-based video sharing, but in systems to support communication between generations over a distance. We started by investigating current practices of communication over a distance in order to better understand the opportunity space as well as to be inspired to create new systems with a grounding in actual practices.

America's population is aging as baby boomers grow older. The US Census Bureau estimates that by 2030 one in five Americans will be over the age of 65 [10]. This trend is also occurring globally, with Europe's mean age increasing at an even faster rate due to declining birth rates [7]. In combination with these demographic trends is the growth of retirement destinations that are expanding even through the current recession. Additionally, a more mobile workforce has caused many adult children to move away from their hometowns. As of 1993, 43% of American adults lived more than an hour away from their parents [20] and this number is increasing as large retirement communities in Florida, Arizona, and Nevada are attracting hundreds of thousands of seniors. As these seniors and their children move apart, communication becomes less frequent [12]. We are interested in the ways that seniors can feel more connected to the people that they care about while living at a distance with the resulting decrease of in-person contact.

Connectedness is a complex concept to unpack. Social network theorists often define connections between individuals in terms of frequency, duration, and direction of communication [11]. Simplistically, cohesion in a group can be inferred by the amount of communication that occurs [2]. However, all communication does not hold an equal weight. Doing even a short activity together is often seen as more memorable and more conducive to relationship building than a similar length phone call. We are interested in the specifics of interactions that are more impactful and memorable than others, and how we can create these types of situations over a distance.

As measurements, metrics, and methodologies for establishing connectedness are not well established [26], we embarked on a mixed-methods study focused on understanding current communication practices and needs of seniors living approximately 1,000 miles (1600 km) from their adult children. We then used findings from this study to inspire the design of new communications applications and services to help these relationships stay strong despite the factor of distance. We created a rapid functional prototype of one of the design ideas, tested it in the field and then created a public beta system based on extensions to this basic concept.

This pattern of research, ideation, rapid prototyping, and field-testing of new concepts has been used successfully in previous projects in our lab (e.g. [5]). The remainder of this paper will discuss each of these phases and will conclude with implications for the design process based on our experience.

Related Work

Related work on intergenerational communication and mobile systems to support awareness and communication span several disciplines and many decades of research.

Study of Intergenerational Communication

Formal study of family communication emerged in anthropology and gerontology and has led to a large amount of quantitative data and many theories on communication practices. Treas' study in the U.S. in 1975 explored a concept he termed "intimacy at a distance" in that older adults preferred to keep their own homes and have specific scheduled times of interaction with their adult children. He found that married children keep in touch with their parents more often than unmarried children and that daughters communicate with parents more than sons. [23] Townsend found that in 1968, 2/3 of older adults in the U.S., U.K., and Denmark had communicated with one of their children in the past day and that one half of seniors in the U.S. reported helping their adult child with a task recently. [20]

Most previous ethnographic-style studies have focused on communication between grandparents and grandchildren. One example that focused on the parent/adult-child relationship was the work of Miller-Day [15]. She explored how communication is used to expand the sense of self for the older generations. In the highly enmeshed relationships in her study, she observed frequent communication in which mothers lived through the details of their daughters' lives and where strong pressure existed to follow communication patterns and lifestyle choices that agreed with the elder. This work only addressed the mother-daughter relationship and did not look at the role of a variety of communications technologies in maintaining the relationship, both areas that we are interested in.

Ballagas et al have been investigating communication between grandparents and very young children [1]. They observed how children are often confused by phone communication, but can communicate effectively through video chat where they can see the other person. One of their main findings was that video supports play in ways that voice-only communication does not, and that play is the main way that adults engage children (not normally through "conversation"). Family Story Play [16] is the first concept that they generated that seeks to connect generations through video that is integrated with a book.

Ubiquitous Computing Systems for Awareness

Throughout the past decade, many systems have been created to assist communication between generations. We will focus on a subset here that is more directly related to our research interests. An early example of a senior-awareness device is Digital Family Portraits, created by Mynatt et al at Georgia Tech in 2001 [17]. This system allowed for adult children to monitor their aging parents at a distance through icons that represented activities of the parent. In a trial in daily life [18], seniors saw the device as useful when they got to a point in their aging where they needed it, but

saw the device as infringing on their independence and privacy when they could manage many tasks (e.g. eating/sleeping) on their own. Ultimately, they felt comfortable with close family members monitoring them if it meant that they could continue to live in their own home for a longer time.

The Whereabouts Clock provided a means to see where family members were currently located at a glance through a clock-like display in the home. [6] Tollmar et al used a lamp to connect families including parents and children. [22] After using the system in their homes for several weeks, participants reported feeling more connected to their family at a distance and thinking about them more.

Saslis-Lagoudakis et al created the Hermes@Home system to connect houses together with a shared digital "whiteboard" on a touch screen computer. [21] The system fit well into the lives of their participants and was used for both textual and drawn messages, many of which had inside meaning in the family.

Morris et al explored the use of social network diagrams to visualize the social health of older adults. [16] Seniors could look at their display and reflect on why certain relationships were literally becoming more distant and what they could do to help maintain the strong relationships that they desire.

The ToTell system was a tool for capturing photos or short notes throughout the day and sharing them with family at a distance. [14] These photos and notes then prompted further communication at later and convenient times. Treas et al created a lightweight communication system, Gustbowl, for parents to stay connected to adult children at a distance. [24] This device consisted of a bowl kept in the home with a camera in the bottom that captured and shared a photo when an object was placed in the bowl (including the people above it).

Each of these systems and studies explored important aspects of communication over a distance or between generations. However, information was still lacking from the literature on exactly how families communicated between generations today and the specific interactions that were seen as most valuable. With this background, we set out to design our own study to address these questions and provide inspiration for new concepts for intergenerational communication over a distance.

Study of Intergenerational Distance Communication

We set out with several broad research questions. This study's main purpose was to develop a rapid understanding of a wide variety of communication patterns between generations across distance to inspire the design of new solutions in this space. Therefore, we wanted to understand all aspects of current intergenerational communications practices. We were interested in the tools that families used to plan and initiate communication and the places where they did so. We wanted to know about the communications that stood out as memorable as well as any tensions or issues our participants had in communicating with each other. We wanted to know how the families communicated when they got together. Finally, we were interested in what prompted family members to think about each other and why they choose to communicate (or not) when this happens.

Methods

In total, ten households participated in the study. We recruited five families from central Florida through an email to a large population of seniors with ties to Chicago and by using a professional recruiting firm. Each senior family in our study (age 55 to 75) had at least one adult child (age 30 to 55) living in the greater Chicagoland area (approximately 1,000 miles away) and we recruited this adult child as another participant in the study. The goal in recruiting was to find families that had diverse communication patterns. By selecting a broad variety of family communication practices (both type and number), we were more easily able to see the breadth of communication practices that are currently employed. Our primary participants consisted of eight women and two men, however some spouses also participated in interviews.

Because our research questions were quite broad, we used a variety of methods to uncover the answers. The study consisted of initial in-home interviews with the senior family and in the following days with their adult child's family. In this interview, we toured their homes and the places where they communicate today as well as observed the artifacts around their home relating to their child/parent. For the next three weeks, participants logged all communication with each other, noting among other data the purpose of the communication and the medium used for communication. Participants called into our voicemail system after each communication or at the end of the day to share details of their recent interactions while it was still fresh in their minds. Finally, at the end of the three weeks, we met again with both sets of families and reviewed the data that was collected, asking questions where ambiguities were present.

We conducted the study in February and March of 2010. From our interviews and voicemails from the participants, we transcribed 1,168 direct quotes onto sticky notes along with 72 photos captured during the home tours and final interviews that would serve as our items for analysis. We then performed a grounded theory-based affinity [13] to find patterns in the data that were used to inspire design. These themes were then used to create design guidelines and concepts based directly from the data.

Findings

In this section we will explore some of the most interesting themes. The following section will explore the design implications derived from this work.

CONCEPT OF THE FAMILY IS IMPORTANT IN COMMUNICATION

By far the most enjoyable and memorable communication that the families in our study engaged in was centered on the concept of the family. Some of this communication and reminiscing involved remembering past "ideal" moments in the family's history while others were focused on doing things together or on reinforcing family roles. For our participants, family created a feeling of order and calm that they worked hard to recreate in daily life.

For many of our participants, the thought of family brought about feelings of reassurance. They engineered their environments to create memories of family and thus calm. C2 displayed a large photo of her mother in her room. "I'm very close to my family. So they're up there and so sometimes if I glance up at that picture I'm like, 'ah, calm.'" She also has letters from her mother taped to her mirror "so whenever I'm getting ready in the morning it makes me think of them." P5

figure 1. A photo C3 took of herself at a new job to show her dad that she was working again.

keeps cards from family on display in her kitchen. Many participants also placed photos of family all around the house to surround themselves with their parents or children. When talking about his children, P4's husband anthropomorphized the photos in the house: "They're basically in every room almost. The dining room doesn't have anybody in there." A few participants had photos right next to their bed. P1: "My other daughter gets a little jealous. I didn't realize this, but next to my bed I have an infant picture of [C1] on my nightstand." These photos and family artifacts served to bring about memories of family on a daily basis and re-create the feelings of reassurance and togetherness that family provides.

Places that the family visited also served to provide a remembrance of the family. C2 was passing by a theater in Chicago and took a picture and sent it to her mother. "My grandfather used to dance there, when he was in the army or whatever. And so I noted, and I put 'Where Pops used to dance' as the memo [subject line]." C3 took a picture of the clouds while landing on a trip to see her parents, and this photo reminds her of her family when she looks at it. Shared TV programs and church sermons, often experienced together as a family when in person, also connected our participants and they would talk about the show afterwards. C4 goes to a megachurch outside of Chicago that puts its sermons online. "If it's a hot subject she'll call up [P4]. 'Yeah, did you watch it?' … So they compare notes on this guy." This conversation and remembrance around shared location and shared media provides many opportunities for digital systems.

C3 remembered her father by events in nature: "One of the things that I love about spring coming is that the birds are coming back and you can hear all the birds. And we, my family, we always notice nature and things going on and we like to talk about oh, we saw this kind of animal."

Families in our study often had a mental image of the ideal family and ideal family moments. They tried to recreate these memories whenever possible. Often, this centered on photos that were kept in prominent places in the home. Parents would display wedding photos of their children to remember this special event and proud time in their lives. They would also have pictures from their children's lives when they were growing up, putting a lifetime of memories on display for easy access. P1 was showing us old photos of her daughter on a wall in her home: "That's her in the jacket. Oh, she hates that picture. That's her high school graduation." C4 showed us "another picture of the girls when they were young, just out of high school." Often, these photos included the whole family and reminded the older adults in our study of a time when the entire family lived and did things together regularly.

Family was an important concept for our participants. Whether they were creating family memories together, reliving past memories of the family or affirming their family roles, our participants continually demonstrated the importance of family. Family brought a sense of calm and togetherness that is important to recreate, enable and/or enhance via new communication tools.

COMMUNICATION NEEDS TO FIT INTO DAILY LIFE

One of the most interesting findings was how place and activity fit into communication. Participants communicated from a wide variety of places (tanning beds, treadmills, etc.) that allowed communication to fit

into their lives. For many, this communication had to be simple to initiate or it would not be utilized. We also saw interesting ways that our participants were using simple communication in personalized ways.

Our participants were often engaged in other activities while communicating. They communicated while cooking, eating, walking, exercising at the gym, getting nails done, tanning in a tanning bed, driving, doing dishes, taking the train, playing with kids in the yard, and shopping. Commuting was a common time for communicating. P2: "When I'm driving long distances I will make calls to all three of my kids just to touch base or to leave a voicemail even if they're not picking up." P4 made calls to her daughters while out for long walks. Public transit also served as a common location for more silent forms of communication. C3 wrote letters on the train and C2 often emailed or text messaged her parents and sisters from the train: "Good morning or I love you."

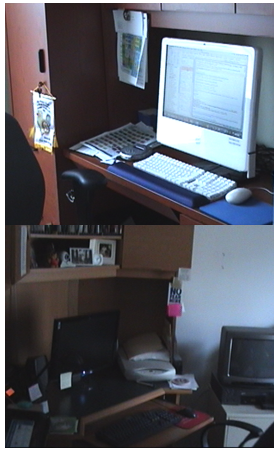

figure 2. Computers are often tucked away in spaces not frequently visited.

Often, the fixed location of a communication device limited communication to a particular location. In many homes of older adults, the "computer room" is tucked away in an unused bedroom out of sight. P1's computer is "upstairs in one of the bedrooms." Because of this, email is a less-frequent type of communication that requires going to a special place that is not in the standard living areas of the home. These participants often needed to be reminded over the phone by the rest of their family to go and check their email once something had been sent.

For many participants, communication had to be easy to initiate or it would often not occur. C4 "thought of [her mother] earlier in the day but just didn't get around to calling." P3 thought about his family, but then didn't take action: "I've probably thought about them other times too. But it's only so fleeting, you know. Those little thoughts; it just comes and goes." Being able to quickly turn a thought about a person into a communication was important for our participants.

When it became difficult to initiate a communication, often no communication occurred. Video conferencing was seen by many as too difficult to set up, even with Skype, and there was a social pressure to straighten up one's appearance before calling, adding to the barriers of starting a video call. Live video also lessened the ability to multi-task while communicating which was a common behavior of almost all participants.

However, the video communication itself was appreciated. Grandparents liked seeing their grandchildren since they grow up very quickly. C4: "We just brought the kids down there [to the office with the video camera]. 'Say hi to grandma. Grandma can see you then,' because they change so quickly. And she [grandma] just loved that!"

Our participants had many examples of communication tools that they were already using that met the criteria of quick and easy to initiate. This communication was very memorable and welcome, especially when it was personal, emotional, or timely. Several of our participants used text messaging as a simple way to share a quick thought or feeling. P2: "Monday morning I sent out a text to [C2] and my other two daughters just saying 'I love you and have a great day'" His daughter said, "That was really nice. It's not typical. That was nice! … I text messaged back 'I love you too.'" Short communication can also happen over the

figure 3. Photos help bring people into events across a distance. C5's new dog and C4's kids' birthday party were shared with family in Florida.

phone such as C5 and P5 sharing "good morning" or "good night."

Oftentimes, it's the content of the communication that makes it valuable. C2 sent a video clip to her dad from a festival of a bottle she thought he would like: "She said she was going to send me something I would find amusing and I was. I was amused!" C2's mom "wanted to know if I wanted a pair of shoes, so she took a picture of a pair of shoes and sent it to me on the phone. So I said OK, sure, I'll have them and I sent her a text message back." This simple communication showed that her mother was looking out for her and found something that she would like.

C2 frequently sends photos from her nights out in the city to her parents. "I knew my dad would get a kick out of the Alice in Wonderland-themed tea party. I mean who wouldn't? All girls and gay guys dressed up? So of course he was gonna think that was funny. Hopefully!" He did and "we had some communication about that for sure, yeah. We definitely got a good chuckle out of that both over phone and email." These quick, emotional conversations led to laughter and stronger memories for our participants.

Overall, our participants tried to fit communication into the patterns of their daily lives. For them, that often entailed communicating while doing other activities and fitting an appropriate amount of communication into their day. Sometimes there were problems around getting in touch with someone immediately or for a duration that everyone was happy with, but in general, communication that was easy to initiate and could generate some sort of emotional response was most appreciated by our participants.

Implications For Design

Through the analysis process, we created a set of design guidelines for the development of new communications systems that connect families over a distance.

EVOKE FAMILY HISTORY/SHARED MEMORIES

Communication that evoked memories of the family was seen as the most memorable and often brought about a feeling of calm and reassurance. Having services that display meaningful media from important moments in life can help people to relive important moments in the family.

Ubiquitous media also provide the opportunity to share family history and meaningful events within the family. Times spent together were remembered and cherished by our participants and places served to be important parts of family stories. Some places of family importance are known, but others can be discovered as a person goes about their daily life. C2 shared with her family that she was in a location where her grandfather used to listen to live music. These places of importance in the history of the family ought to be easy to discover. If a person revisits a place of family importance, that information could be shared with all who were involved in the original event that created the family memory. We hypothesize that sharing this rich, contextual family history can lead to stronger relationships between family members and a greater sense of shared history within the family.

COMMUNICATION SHOULD BE INTEGRATED INTO DAILY LIFE

Communication that needs to occur in places where people do not spend their time or requires extra steps to initiate is often unused or underused. Video

conferencing was underutilized because it needed to take place in less frequently used places in the home. P4 and C4 stopped using Skype because P4 could not figure out where to click to get Skype running and create/accept a video chat. It was quite interesting to us that for seniors in our study, even a simple password used to access a service was seen as too big of a barrier to communication. P1 forgot her Facebook and Craigslist passwords and because of that did not use either service for some time. However, C2 was able to integrate communication into daily activities and often talked to her dad while on treadmills or the train. Communication that can integrate into the places and activities where people spend time has a higher chance of being used regularly.

Communication tools should require little interaction to start communicating. Notifications that appear in-context can help people to be reminded of family members in daily settings. A mobile phone application could automatically display media from a particular person and enable communication with that person directly from the content when in a particular location. Communications can be left for people in places much like leaving a physical note or calling a person at a landline number in the past to reach them at home/work.

Communication should also be lightweight, allowing for quick responses such as "liking" a photo or communication. Having "like" buttons on various types of media can help enable simple communication between families that can then escalate to richer communication as described in our previous work on Social TV. [9]

Communication technologies should recreate feelings of being together

The families in our study had different types of interaction and communication when they were visiting in person with each other. They reported feeling more relaxed, having longer conversations, laughing more, sharing activities together, and communicating about more personal topics than they would over the phone or email at a distance. There is a rich opportunity to try to recreate some of these experiences from afar. Video is one way to add stronger feelings of co-location, but today's video solutions are often in fixed locations where the family needs to crowd around a computer in the basement or spare bedroom office. These environments are not as conducive to relaxed family conversations as the couch, backyard, or out in the city where many long family evenings are spent when in person. Mobile devices such as phones and tablets provide the opportunity to move communication from fixed places to more convenient locations.

The power of seeing video of a loved one often created a strong feeling of togetherness, even in cases where the video was asynchronously delivered (e.g. C2's video). Services that display personal video, even when delivered asynchronously can help to increase feelings of connection even when the recipient is thousands of miles away. Enabling easy conversation from this video can help to continue that communication.

Serendipitous Family Stories

Using themes derived from direct participant quotes and actions for our inspiration, we held team-based innovation sessions to invent new applications and services that can help seniors and their adult children to better maintain their relationships. In all, 79 design

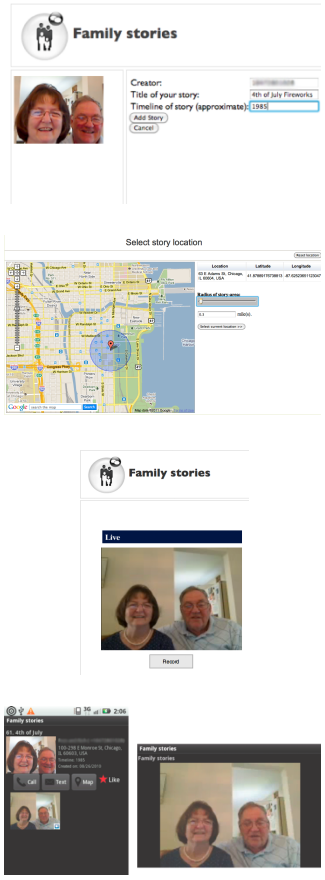

figure 4. The web and mobile interfaces of Serendipitous Family Stories. Only basic functionality was implemented to test the concept.

ideas were created which were then ranked. These concepts could be inspired by a single quote, a grouping, one of the major themes, or a combination of these. All ideas were accepted as long as they could be linked to a spot in the affinity. One of these concepts, Serendipitous Family Stories, was selected to be explored in more detail.

The concept for Serendipitous Family Stories [4] came from the example above where a participant was walking past an old theater in Chicago and sent a photo message to her mom saying "Where pops used to dance." This theater had great importance in the family and was a place where the participant's grandfather used to go dancing when on leave in the navy. This sparked a resulting conversation around that place and her grandfather. We saw an opportunity to create these place-based reminiscences as well as a way to learn more about family history as one walked about the city.

The system allows family members to place video "memories" at spots on a map for their family to discover as they are living their daily lives. These memories can be family stories from long ago or recent memories of the family together at a place. Older adults can use a website or their mobile devices to capture media and tell the story of a particular place. Their children can also do the same to leave memories for their parents, although this may not be as common. These historical memories can be explored serendipitously through vibration of the mobile phone as users come across these places in their daily life, or they can be actively explored in more detail on a web interface when wanting to spend more time learning about family history or watching the videos in a higher resolution.

This system follows directly from our design guidelines and provides a chance to share family history, increases opportunities for feeling togetherness through video of a remote family member that's suddenly brought into an unexpected context, and due to the asynchronous nature of the notifications integrates communication into daily life. This also minimizes the feeling that older adults are interrupting their children and grandchildren's busy lives since videos are received asynchronously throughout the city and can easily be ignored if one is busy.

Implementation

The Serendipitous Family Stories system was created as a rapid functional prototype following the guidelines in [3]. We wanted to quickly implement enough functionality to test the concept, but not get bogged down in a complicated design or all of the settings and features that would be necessary for a publicly available system.

Our initial prototype allowed for story creation only through a web interface. This website was designed with minimal functionality and only allowed for creation of stories, placing them on a map, and recording videos. It did not include any complex user management or the ability to share specific videos with specific people. All videos that a participant created would be shared with the one other person that they were linked to in the system. We utilized off the shelf components such as Flash Media Server for the video recording and Google Maps for setting the location and radius (how close the recipient had to get to the story location to view the video) for each story.

We also built a mobile component for the service. This would be given to the younger participants in the study to be installed on their Android-based smartphones. The mobile application monitored a user's location in the background and whenever the phone approached a story location fired a notification (with vibration) so that the user knew that they were getting close to a video. At this point, they could view a Google Map pointing to the exact location of the story as well as see the story title. Upon going within the radius of the story, another notification would fire and the user would be able to "unlock" the story and watch the video. Once a story was unlocked, its video could be viewed from any location via a screen in the mobile application.

As important as what the system did was what it did not. We had no support for importing friends or sending friend requests since participants would only be linked one-to-one in our study. We did not include the ability to edit a story once it was created since we'd only be meeting with older participants once and they could re-record any story that they did not like during the session. We did not include any sharing settings or the ability to share different stories with different people. And the interface was quite sparse and not visually designed. This follows with our principles for rapid prototyping of new concepts and only building what we need to test the experience.

Study

For our study, we met with older adults who had spent some part of their lives in Chicago and currently had younger relatives living in the city. We brought a computer with webcam to their homes and asked them to record between five and ten stories for their younger relative in Chicago. We then met with the younger relative and installed our mobile application on their own phones linked to the content from their older relative. Participants used the mobile application in their daily life for four weeks and called into a voicemail system whenever they discovered a new story as well as participated in a final interview. Full details of the study and findings can be found in [4].

Findings

FINDING STORIES

Each older adult that we recruited created between 5-10 stories for their younger relative to discover throughout the city. Some participants found all of their stories while others only found as few as two out of five. By the end of the study, our participants had discovered 83% of the stories that were created for them. Participants liked the fact that they stumbled upon stories serendipitously while they were out and about their everyday life in the city. One participant described it as "a cute little treat" (C3) and another as an experience "that will make you feel happy or bring a smile to your face" (P6). We found that stories were discovered fairly regularly for the first three weeks of the study compared to the final week where cold weather (high of -7 Celsius) restricted travel to non-essential places. Discovery of stories in unexpected places was also described as a memorable experience within our system. C2 was picking up a marriage certificate at the courthouse and found a story from his aunt at the mall across the street. "I was not intentionally going to the location to see the story but it was a surprise for me ... and then this thing [video story] was right there!" (C2). At other times, participants received notifications that they were close to a story, but not close enough to view the video. This required participants to change their intended course to

find the story. While this was not often possible, say during their morning commute to work, they did report opening up the map interface and finding the exact location whenever they had the flexibility to do so.

Receiving a story allowed participants to take a break from their daily routines for a minute or two and engage in receiving a communication from a family member. Participants could view the video right in the location or unlock it there to view at a later time from someplace else. The asynchronous nature helped to fit communication into daily activities instead of forcing a synchronous communication at a non-ideal time. Often, this asynchronous communication prompted text messages, calls, or emails to the older relatives immediately after receiving the story and we provided for this with buttons to call, text, or "like" the story on the story detail screen on the mobile device.

Changing perceptions about relatives

Participants reported how discovery of the stories allowed them to see their relatives in a different light. Recipients reported learning about aspects of their relatives' lives that they had not known before. C4 learned a lot about her grandmother's life growing up. "I didn't know that they didn't have a car. She never had a car growing up. So everything they did they took a bus or the train and things like that." Often, the lives of older relatives remain mostly unknown to younger generations. C3 talked about learning a lot about her aunt during this study despite them being very close with regular communication. The aunt said, "Yes, she said that she never realized that I worked at [a large department store]. And she said that she also didn't realize that I was pregnant when I worked there. She was so surprised to hear that. So she says, 'Were you married!?' ... And said that she didn't realize that I was a Junior Executive with [that store]. She thought I was just always just a little sales clerk." C7 learned a lot about his father-in-law's interests: "I didn't realize that so much [father's interest in architecture] … I didn't know he was so into the architecture of things. I talked to him about it. I talked to [my wife] about it too." This learning was not just one-way from the creator to the recipient. P3 reported learning a lot about her niece through using the system: "And she learned things about me that she didn't know too. We learned things about each other. And that's really cool, you know."

Through learning more about family members, we hope that future communication between our participants will be different and as one grandparent told us, now her granddaughter sees her as "human" after learning about her life as a teenager.

Changing perceptions about the city

The stories allowed our participants to engage with their city in new ways as well. Mundane everyday locations took on new meaning as participants learned about the significance of those places to their family members or learned about how places in the city have changed over the years. This caused participants to engage with their 'regular' places differently as they learned about the stories and other historical tidbits about their city.

Some stories were very 'visual' and gave their recipients a chance to visualize the experiences enjoyed by their older generations. P7 left a story about the times when the lights would go out at his office in the Sears Tower each evening. Upon discovering the story, the son-in-law said, "It was interesting to hear about

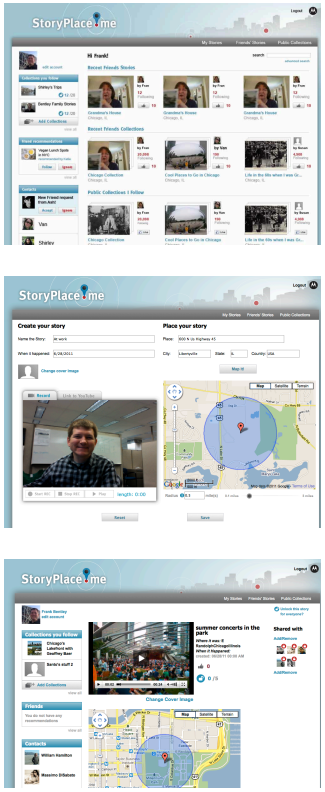

figure 5. The web interface for StoryPlace.me. The system now supported both public and private content as well as additional management features as well as look like a finished product.

[father's] office in that building and how when the lights went off the whole city lit up, otherwise you couldn't see anything. It was very dark up there. That was an interesting story." C4 commented on receiving the stories in the places that her grandmother used to frequent decades ago: "Just being other places that other people were is neat." C4 learned of an old amusement park where her grandmother used to go on dates. It was torn down in the 1960s and she drove past the site everyday. As she told us: "I had no idea there was even an amusement park there." C3 learned about an old TV dance show called Ray Reiner that used to be filmed in Chicago and that her aunt had participated in: "It was a story about her being on the dance show and how they took video and used to go on boat rides. I had never heard of Ray Reiner, but I guess everybody else has because when I talked about it with people from my office they all said that oh yes, Ray Reiner is very popular. … [My aunt and I] just talked about who Ray Reiner was and how he was kind of like a Dick Clark." Through these stories, our participants not only engaged with their family history, but they also learned about the city's past and the history of the places that they pass by each day.

Shortcomings/Opportunities

The findings from the study showed us the potential of the concept to change people's views of their city and their loved ones. However, while the mobile part of the study took place over a month, the story creation part was a bit contrived and only occurred in one session per participant. We were quite interested in types of stories that would be created were the system actually deployed in everyday life for both the story creators and the recipients. We were also quite interested in the types of content that would be created in such a system over a longer term and when anyone (not just older adults) could create stories. Our initial prototype and study could not help us to answer these questions.

We also uncovered new opportunities for the concept of location-based asynchronous video. Participants discussed a desire to create videos for loved ones when they are traveling so that they could receive videos from the family as they move around in another city. From the findings around seeing the city differently, we were excited by the opportunity to offer other historical content in the system that would be available to everyone. Being able to learn about how the place where one is standing has changed throughout the years was something that our initial participants were interested in, but again a feature that could not be supported by our very basic initial system.

StoryPlace.me

To explore these opportunities and move beyond the initial shortcomings of our first study, we created a public beta based on the Serendipitous Family Stories concept that we named StoryPlace.me. This is a much more fully featured system that is now open for anyone with an Android smartphone to use.

To create this system, we had to move beyond our initial rapid prototype concept and create a solution that was much more like a product than a prototype. As discussed by Schleicher et al in [22], releasing a public beta in an app store creates expectations of polish and functionality that are not present in a typical field study. We used a professional designer to create the layout and graphical assets for the system as well as added a wide feature set including Facebook and GMail friend import, explicit access control on each story, the

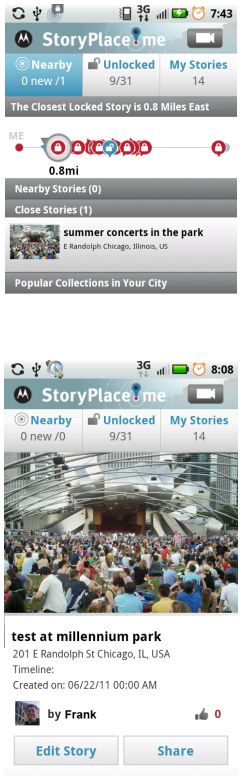

figure 6. The mobile interface for StoryPlace.me. The system had to not only support more content from a variety of sources, but look like a finished product.

ability to create public collections of stories, and the ability to follow particular collections. We also added the ability to record stories directly from the mobile device and improved the interface for explicitly hunting for nearby stories to include an interactive compass.

Now that we had the ability to include public collections, we sought out compelling professional content that could provide our users with a rich history of the places that they encountered in daily life. We partnered with WTTW, the Chicago public broadcasting station, to include a collection on the history of 21 locations along the Chicago Lakefront. We also partnered with the Chicago Office of Tourism and Culture to include clips on various parks, tourist sites, neighborhoods, and festivals. We are currently working on sourcing similar professional content for other cities.

Building this system required significantly more work than our initial system, which was created in a few weeks. However the learnings from our earlier study in understanding how the system should work and the functionality that should be included were critical in creating this more complete experience.

We currently have 572 users of the system without any public announcements. We hope to grow this number soon with some publicity, however we are already learning quite a bit about the use of the system. Currently we have only 30% more personal vs. professionally-produced stories (253 vs. 192), which is surprising, as we had expected a much larger number of personal stories. Interestingly, when it comes to story views, the same ratio appears with personal content having 30% more views (359 vs. 270). We are interested in seeing how this split between personal and professional content changes as the system becomes more widely adopted. We are also interested in the growth of the user base and the long-term potentials of running this service.

Implications

Through following this process from our initial interest in exploring inter-generational communication over a distance to the current public beta of StoryPlace.me, we've learned a lot about following a full design process from start to finish. Combined with our experiences in bringing other concepts to market (e.g. [5]), we will conclude with a few implications for the design process based on our efforts.

Most important is the use of initial rapid functional prototypes in exploring a design concept and understanding the potential directions a project can take. By building something quickly that can work in the daily lives of our participants, we were able to learn about the experience of uncovering stories and how it could change their perceptions of the city and of loved ones. This, along with suggestions from our participants on other types of people that they would like to share stories with, helped us to see the broader potential for location-based asynchronous video that we later explored in the public beta. Because this initial rapid prototype was built quickly, it involved little risk in terms of expense or time required. If it did not turn out to be successful, it would have been easy to kill the project and move on. We did not have to spend the time to create a fully-functional system for public release before we had understood the potential use of the system and could rapidly iterate on the idea.

Secondly, we have shown the often-circuitous path that a project can take from initial ethnographic-style explorations through to a final public system. This is a lesson that startups often learn, but is rarely discussed in HCI venues. We began with a study on inter-generational communication over a distance but ended up with a system that includes professionally-produced content from public broadcasting and city tourism offices in addition to personally created content. This content has little to do with our initial design space or goals, but is turning out to be a significant use of the system (while still not eclipsing the use of personal content). While academically, researchers often tend to stick to particular domains and build up themes of research, often breaking beyond those themes to explore wider implications of work is beneficial to creating more compelling solutions.

Finally, we have shown the importance of returning to users at several points during the design process and how each iteration with users has expanded the concept in new ways or changed our focus. The initial study gave us the inspiration for the concept as well as a set of design guidelines to follow to fully design our first prototype. The field study of the prototype taught us about the process of finding stories, the way stories can change people's perceptions of places in the city and their loved ones, as well as the desire for more historical content and the ability to share with wider sets of people. Our public beta has shown us how we can blend personal and professional content together in one system as well as how to create a feature set that is required for a publicly acceptable system.

We are excited by the potential of this system in helping people to learn more about the places that they live in and visit as well as how it might improve connections between generations and with other friends and family over time and distance.

Acknowledgements

We would like to thank Gunnar Harboe and Pallavi Kaushik for their work on the Elder Communications Study, Sujoy Kumar Chowdhury for his work on the initial Serendipitous Family Stories prototype, and William Hamilton and Van Vuong for their work on the StoryPlace.me system.

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