

**KWENTO: DESIGNING A MOBILE APPLICATION
TO SUPPORT FAMILY STORYTELLING FOR
DOMESTIC HELPERS IN SINGAPORE**

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DECLARATION

I hereby declare that this thesis is my original work and it has been written by me in its entirety. I have duly acknowledged all the sources of information which has been used in the thesis.

This thesis has also not been submitted for any degree in any university previously.

Kakit Cheong

23 December, 2015

DEDICATION

The world may want my time, Eileen, but you have my heart.

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Summary

The recording and sharing of stories is an important part of what it means to be a “family.” Prior research shows that family stories are essential for maintaining close bonds between family members. Additionally, the sharing of significant personal experiences can help families create and present individual and family identities. These stories have traditionally been shared face-to-face. However, with more families geographically distributed, this raises the question: with the possibilities afforded by information and communication technologies (ICTs), how can we help family members living apart better share significant personal experiences with each other?

To date, no prior work directly addresses how we can support family storytelling for foreign domestic workers (FDWs) using ICTs. While there has been extensive research on how migrant families use ICTs to communicate, these studies do not focus on how such families use ICTs to record and share stories. At the same time, the existing work exploring how to support family storytelling does not consider the special circumstances faced by FDWs.

To fill the gap in research, this thesis aims to answer the following questions:

1. Do FDWs record and share family stories, and if so, what role do ICTs play in this process?
2. What difficulties do FDWs face in terms of sharing family stories?
3. How can we support family storytelling for such families to overcome these difficulties?

We conducted three studies to address our research questions. In the first study, we sought to understand if and how migrant workers share stories with their families. We recruited 25 FDWs via snowball sampling for two rounds of ethnographic interviews. Most of the interviewees described themselves during the interviews as having “nothing interesting to share” and being “unable to do more.” However, when we deployed cultural probe packs consisting of a disposable camera and writing materials, participants were able to use these materials to record a variety of stories they hoped to share with their families.

The second study built on insights gained in the first study. Nine FDWs were recruited and divided into three design teams to help design a technology to help FDWs “do more.” The result was the development of *Kwento*: a prototype mobile application that used prompts to encourage domestic helpers to reflect upon their personal experiences.

In the final study, we investigated how our proposed solution, *Kwento* would encourage users to reflect upon and record their daily experiences. We recruited 20 participants for a 6-week field trial, randomly assigning participants to two groups. The first group used a version of *Kwento* which included the prompts, while the second group used another version of *Kwento* without the prompts. Our findings suggested that the prompts were effective in helping users to reflect and record their personal experiences using the application.

This thesis contributes to the literature on the use of ICTs by migrant workers by expanding the research field to include family storytelling. We also contribute to research on technologies supporting family storytelling by

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developing and evaluating a technology with the specific needs of FDWs in mind.

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Chapter 1: Introduction

Storytelling isn't an idle leisure activity that humans developed to while away the hours: it evolved for serious purposes, as a necessary component in the development of human culture.

Without storytelling, humans could never have communicated complex information. Storytelling isn't merely characteristic or even definitive of the human condition – it's absolutely necessary to the existence of human culture (Crawford, 2004, p. 3).

This chapter establishes the context of the thesis, which is that foreign domestic workers (FDWs) find it difficult to record and share significant personal experiences with their family members back in their home countries for various reasons. We explore how we can support family storytelling for such families using ICTs, and lay out the structure of this thesis document.

1.1 Family Storytelling

There are various reasons for families to share stories. In addition to creating and maintaining close ties among family members (Harrigan, 2010; Pratt & Fiese, 2004), stories are also useful for sense-making (Koenig Kellas & Trees, 2006; Koenig Kellas, Trees, Schrodt, LeClair-Underberg, & Willer, 2010; Trees & Kellas, 2009), and necessary for individual and family identity formation (Stone, 1988; B. Thompson et al., 2009).

Broadly speaking, a family story can be defined as “narrative accounts of personal experiences that have meaning to individuals and to the family as a whole” (Pratt & Fiese, 2004, p. 1). In other words, one requirement for a story to be labeled as a family story is that the experience should have occurred to a member of the family, and be significant enough for other family members to

remember and retell. Unlike other types of stories such as fairy tales, family stories are not fixed. Instead, they are evolving cultural performances that are “made from the myriad experiences of being family” (Langellier & Peterson, 2006, p. 111).

For this thesis, a family story is defined as:

- An event or experience that ideally takes place at a particular time and space; and
- Something significant that a family member shares in the hope that it will be remembered or retold by the family.

Traditionally, family stories have been shared face-to-face in two different ways. The first involves a more public performance, taking place during events such as family celebrations, funerals, family reunions and anniversaries. During such gatherings, some family members assume the role of the storyteller while the rest of the family becomes the audience (Langellier & Peterson, 2006). A second type of family stories can be found in the daily conversations family members have. In comparison to the stories shared during more public gatherings, these are typically fragmented and incomplete (Langellier & Peterson, 2006). A fragmented “everyday” story may include, for example, a mother sharing with her husband what their child did while he was away on a business trip.

In recent times, more families are geographically distributed and it is common for one or both parents in a family to work overseas for extended periods of time. Such families typically rely on information and communication technologies (ICTs) such as the mobile phone or computers to communicate (Hutchinson et al., 2003).

1.1.1 Benefits of family storytelling

Prior research on family stories has shown how family stories and storytelling helps families make sense of everyday events (Bohanek et al., 2009; Koenig Kellas & Trees, 2006; Trees & Kellas, 2009), as well as traumatic experiences. For example, Kellas and Trees (2006) argued that through a process of telling a story together, family members are able to reach a “shared conclusion concerning the meaning of the experience” (p.49). In other words, by sharing such stories, family members are able to discuss and shape the meaning of events (Roberts, 1994).

Family stories are also crucial for constructing individual (Fivush, 2007, 2008; Fivush, Bohanek, & Marin, 2010) and family identities (Frensch, Pratt, & Norris, 2007; McCarthy, 2012). Studies have shed light on some of the different ways in which parents reminisce about daily events or experiences with their children, and how such differences may be critical for a child’s emotional understanding and well-being. For example, mothers who reminisce in more elaborative ways and encourage participation from other family members have children who show higher levels of emotional understanding and regulation (Fivush, Haden, & Reese, 2006). While family stories and their messages affect young children in particular, research also shows that identity stories continue to develop and influence a person throughout his or her life (McAdams, 2004). Finally, identity stories have also been found to be positively associated with individual’s ratings of subjective mental health, life satisfaction (Ackerman, Zuroff, & Moskowitz, 2000), and pro-social personality characteristics (Peterson & Klohnen, 1995).

With the importance and benefits of family storytelling in mind, we now discuss why we chose to focus on FDWs.

1.2 Foreign Domestic Workers Globally and in Singapore

The Domestic Workers Convention 2011 (No.189), Article 1 defines a domestic worker as any person engaged in domestic work (any work performed in or for a household or households) within an employment relationship.

Based on that definition, a report by the International Labour Organization (ILO) estimated that there were about 52.6 million men and women employed as domestic workers across the world (ILO, 2013). To put this in perspective, if this number of domestic workers were to work in a single country, the country would be the tenth largest employer worldwide (ILO, 2013). Furthermore, the figure above only accounts for documented migrant workers; the total global number of domestic workers is estimated to be closer to 100 million (ILO, 2013).

Domestic work continues to be a heavily female-dominated industry, with women accounting for 83 per cent of all domestic workers (ILO, 2013). This means that while domestic work can serve as an entry-point into the labor market for women, female domestic workers are disproportionately affected by challenging work environments and poor working conditions.

Interestingly, more than three-quarters of all domestic workers are employed in just two regions – Asia and the Pacific. Like the women in many developed countries, Singaporean women are increasingly joining the workforce, resulting in the replacement of traditional family structures with the husband as the sole breadwinner (Quek, 2014). Many Singaporean families

with two working parents employ female FDWs to perform duties such as cleaning the house, taking care of children or elderly family members, cooking and grocery shopping. Recent statistics from the Ministry of Manpower state that there are currently over 222,500 domestic helpers from countries such as Indonesia, Malaysia, India, Myanmar, and the Philippines working in Singapore (MOM, 2015).

Unlike migrant workers who work in the manufacturing or construction industries, these women are required to live with their employers. As a result, their working experiences and the hospitality of their work environments are largely determined by their employers and the quality of the employer-employee relationship. Not surprising, given these women's low socio-economic status and the primarily menial nature of their work, there is a considerable power differential between them and their employers, with the latter being able to impose often onerous conditions on the former. For example, prior research suggests that maids are often restricted in terms of their access to technology (Thomas & Lim, 2010) and are discouraged by their employers from taking part in social activities outside of the house (Thomas & Lim, 2010). In some cases, employers have also utilized surveillance technology like webcams to track their maids' movements and activities (Rahman, Yeoh, Huang, & Yeoh, 2005). Under such conditions, it is all the more important for these women to have avenues to communicate and share significant personal experiences with their families to maintain a social support system.

1.3 Scope of the Thesis

We chose to focus on Filipino FDWs in Singapore for two reasons. First, while there are no definite figures, a report by the Singapore National Committee for the United Nations Development Fund for women (UNIFEM) states that a large proportion of foreign domestic workers in Singapore are from Indonesia and the Philippines, with the Filipinas generally being more senior and more educated (UNIFEM, 2011). During our preliminary interactions with foreign domestic helpers, we observed that Filipino workers had a better command of the English language compared to other groups, which allowed them to express their thoughts and opinions to the researchers in greater detail. Second, given the sensitive nature of some personal experiences, it was important for us to build rapport with the community to encourage participation in the studies. Taking into consideration that we could only meet with the participants once a week during their rest days¹, we opted to build rapport and recruit participants from a single community.

To explore how we could help FDWs to share family stories with their families, we investigated the three research questions listed below.

RQ1: Do domestic workers record and share family stories, and if so, what role do ICTs play in this process?

RQ 2: What are the difficulties faced by FDWs with regard to family storytelling?

¹ Singapore Ministry of Manpower regulations state that FDWs with work permits issued or renewed after 1 January 2013 are entitled to one rest day weekly, mutually agreed upon by the employer and FDW. For more information refer to <http://www.mom.gov.sg/passes-and-permits/work-permit-for-foreign-domestic-worker/employers-guide/rest-days-and-well-being>.

RQ 3: How can we support family storytelling for such families to help overcome these difficulties?

1.4 Contributions

1. In the course of addressing RQ1, we contributed to existing literature on the usage of ICTs by migrant workers. Our work went beyond existing research to investigate how female domestic workers use ICTs specifically for family storytelling. Our findings suggested that given their often constrained working environments and limited social interactions, FDWs choose to make the “best” use of their limited communication time to share specific types of stories.
2. In addressing RQ2, we explored the types of challenges faced by domestic workers with regard to family storytelling. The participants often described themselves as having “nothing interesting to share” or being “unable to do more.” Yet, our probe pack findings strongly suggested that they did have a variety of stories they wish to share, despite initially believing the opposite about themselves.
3. Finally, in tackling RQ3, we investigated how we could help domestic workers share significant personal experiences with their geographically separated families. As a first step towards this larger goal, our study focused on helping users to reflect and capture significant personal experiences. We adopted a participatory design approach where potential end-users were active in the design process. Through these design activities, we developed and evaluated *Kwento*, a prototype mobile application that used prompts to encourage users to reflect on their personal experiences. Our findings suggested that our

use of text and photo prompts was effective in motivating users to reflect and record their personal experiences. Our findings extended the work on family storytelling systems and provide insights on how future systems can be developed to better suit the needs of migrant workers.

1.5 Thesis Outline

The remainder of this thesis is structured as follows.

- **Related Work:** We begin by reviewing the existing literature on the use of ICTs by migrant families, systems supporting family storytelling and digital reminiscing systems.
- **Research Problem:** We articulate the research gap, the main research problem, and the original contributions of this thesis.
- **Methodology:** In this chapter, we provide a brief summary of the methodology and study design of the three studies in this thesis.
- **Study 01: Understanding Family Storytelling:** Next, we describe our first study, which sought to better understand whether FDWs recorded and share family stories. At the same time, we investigated if ICTs played a role in helping such women share stories.
- **Study 02: Designing a Technology:** Our second study, which explored how technologies can be designed to support family storytelling for domestic helpers.
- **System Overview:** We then provide a description of our prototype mobile application, Kwento, resulting from the second study.
- **Study 03: Evaluating our System:** In our final study, where we deployed the prototype with a pool of participants to evaluate the

strengths and limitations of the system. Specifically, we examined how our system encouraged users to reflect upon and record their daily experiences.

- **Discussion:** Following that, we discuss the implications of our findings, our methods, and the limitations of the studies.
- **Conclusion:** We present a summary of our findings and possible directions for future work.

Chapter 2: Related Work

In this chapter, we survey the work that has been done to explore the use of ICTs by migrant workers, systems supporting family storytelling, and digital reminiscing systems.

2.1 Use of ICTs by Migrant Workers

There is a growing body of research focusing on the use of ICTs by migrant workers and their families. There are two dominant threads: ICT usage for mediated parenting, and ICT usage for social support or interpersonal communication.

2.1.1 ICT usage for mediated parenting

Hondagneu-Sotelo and Avila (1997) found that migrant mothers have been able to maintain their motherly ties to their children even before the advent of digital technologies, relying on traditional methods like letter-writing, sending photos and phone calls.

Letter writing remains a major way for families to share stories in some developing regions without readily available electricity and telecommunications (Susan P Wyche & Grinter, 2012). Madianou and Miller (2013) further put forward that stories in hand-written letters are perceived to be more valuable and personal than electronic mail, as a mistake in a hand-written letter is harder to erase and thus requires more planning by the writer beforehand.

There are, however, some drawbacks to such forms of traditional communication. For instance, a letter or photo may take up to a month to reach its recipient. If readers over-read or misinterpret communications conveyed in these ways, this might also result in misunderstandings that cannot be cleared

up immediately if they do not have access to more instantaneous modes of communication.

Studies have shown that female migrant workers are increasingly adopting the use of mobile devices to reconstruct their roles as parents by fulfilling parental duties like checking that their children have completed their homework or whether they are performing well in school (Peng & Wong, 2015; Platt et al., 2014). In Madianou and Miller's (2011) study of long-distance parenting among Filipina migrants in the UK, the interviewees claimed that they felt empowered by the mobile phone, as it allowed them to partially reconstruct their roles as mothers. Interviewees shared that they were able to use their mobile phones to gain a detailed knowledge of their children's daily lives which would have been impossible via more traditional forms of communication like letters or cassette tapes. In another example, Uy-Tioco's (2007) study of Filipinas working in the US revealed that female migrant workers often used ICTs like the mobile phone to reinforce their parenting authority. Building upon that, Yarti and Bruckamn (2011) proposed that this parenting authority extends over four domains to influence children's behavior: 1) *moral* (e.g. teaching children to share with other family members), 2) *prudential* (e.g. warning children to avoid running with scissors), 3) *social conventions* (e.g. teaching children to show respect to elders), and 4) *personal* (e.g. indicating who children are allowed to be friends with and how they should dress).

Studies focusing on migrant mothers have also noted how these women use mobile media to demonstrate and reinforce their love for their families. As Chib, Malik, Aricat, and Kadir (2014) discuss, transnational

mothers have used ICTs to alleviate emotional strains, such as worry, fear and sadness. Similarly, a study by McKay (2007) showed that ICTs remain an important way for migrant women to create and maintain bonds of intimacy with their families. For instance, they may remit money home as a demonstration of their love. These findings resonate with existing work that argues that mobile phones allow individuals to express feelings of intimacy through brief but perpetual, intermittent contact (Wajcman, Bittman, & Brown, 2008).

Lim (2014) posited that academic investigation of the use of ICTs by female migrant workers has flourished in recent years, reflecting a corresponding upward trend in these women's adoption and use of ICTs. Subsequent work has also touched on the complexities and nuances of ICT usage for mediated parenting. A recent study by Chib et al. (2014) found that migrant mothers used an arsenal of ICT tools to carry out different parenting tasks. Some mothers chose to utilize video-chats to ensure that they could provide real-time input into their children's studies, often by helping their children to do their homework via online chats. Other women made use of social media networks like Facebook to monitor their children's activities and friends. Similarly, in a study conducted by Longhurst (2013), transnational mothers reported that video-chat services like Skype were useful as they allowed them to "see" their children, enabling them to assess their children's well-being more accurately.

ICTs have also enabled migrant parents to carry out parenting behavior by proxy through a support network. Brown and Grinter (2012)'s work on Jamaican migrant parents who were living apart from their teenage children

showed that care was provided through a transnational network of caregivers. In some cases, a relative or non-parent guardian acted as a middleman, conveying information and instructions to and from the parent, while in other instances, migrant parents called guardians to help carry out punishment or mete out restrictions.

Finally, it is worth noting that some studies (Brown & Grinter, 2012; Madianou & Miller, 2011) have found contrasting views towards the use of mobile phones for mediated parenting by migrant mothers. For example, while some migrant mothers reportedly felt that they were able to parent from a distance, the children on the other hand were often ambivalent about the benefits of mobile phones. In some cases, children did not associate the frequency of calls with better parenting, while others felt that mobile phones made it too convenient for their mothers to monitor their activities (Madianou & Miller, 2011). As a result, some of the children in such studies adopted defensive behaviors, such as, hiding or lying about details during conversations with their mothers (Weisskirch, 2009).

2.1.2 ICT usage for social support or interpersonal communication

While the use of ICTs for mediated parenting have been extensively studied, considerable attention has also been paid to how migrant workers use ICTs to gain social support (Alampay, Alampay, & Raza, 2013; Chib, Wilkin, & Hua, 2013) or for interpersonal communication (Thomas & Lim, 2010, 2011). There are numerous studies investigating how migrant workers use ICTs to help maintain their mental and psychological well-being (Aricat, Karnowski, & Chib, 2015; Chib et al., 2013; Thomas & Lim, 2010). As Pui-Lam Law and Yinni Peng (2008) discussed, the mobile phone remains a

powerful tool for workers to build “mobile cyber-kinship” networks, helping them prolong new social relationships developed in the workplace. Migrant workers tapped into such networks to obtain information about job opportunities or to gain better understandings about their rights as workers. They may also use mobile devices are used to coordinate social activities, such as football tournaments and meetings with friends (E. C. Thompson, 2009).

Prior research indicates that migrant workers’ strategic appropriation of ICTs can be empowering, but there are possible negative effects. Due to cost considerations, children of FDWs often choose not to call and instead rely on “missed calling” to notify their parents that they need to speak. Such asymmetries in communication could lead to misunderstandings or frustrations (Madianou & Miller, 2011). Furthermore, mobile communications have allowed for perpetual contact but also “a state of perpetual concern for their children’s well-being” (Thomas & Lim, 2011).

2.2 Systems Supporting Family Storytelling

A number of research studies have explored how computer-mediated communication technologies could be used to support family storytelling. The existing Human-Computer Interaction (HCI) and Computer-Supported Cooperative Work (CSCW) research on family storytelling can be categorized into two groups: synchronous storytelling systems and asynchronous storytelling systems.

2.2.1 Synchronous family storytelling systems

Studies in this category have often focused on supporting synchronous storytelling over video-chat. An advantage of such systems lies in how video communication is able to replicate many aspects of face-to-face

communication (Massimi & Neustaedter, 2014). For example, Ames, Go, Kaye, and Spasojevic (2010) pointed out that video-chat systems allowed users to express themselves with facial emotions, hand gestures and other non-verbal cues. They found that video-chats were often set up to broadcast the screen into a room, allowing different family members to enter or leave the conversation.

Ames et al. (2010) also compared the experiences afforded by video-chats with traditional phone conversations. The group aspect of video-chats allowed children, especially young children, to have varied levels of participation as part of a larger group. In comparison, younger children found talking on the phone difficult to negotiate and often required an adult to support them in various ways in order to enable a conversation.

Such support is typically referred to as “scaffolding.” Examples of scaffolding include adults prompting children to share certain information, holding the phone in the correct position and keeping the kids interested in the phone conversations (Ballagas, Kaye, Ames, Go, & Raffle, 2009).

Some studies have also covered the use of ICT systems other than video-chat for family storytelling. A noteworthy example of this is Vutborg, Kjeldskov, Pedell, and Vetere (2010)'s study on family storytelling for grandparents and grandchildren living apart, where the researchers developed a technology probe that allowed users to experience and exchange stories in real-time. As the authors discussed, participants found value in such computer-mediated sessions. For example, families used the system to read fictional stories together, exchange photos and ask questions about shared photos.

Inkpen, Taylor, Junuzovic, Tang, and Venolia (2013) pointed out that mobile video-chat tools were limited by the cameras on the device. Most mobile phone video-chat tools required the user to choose between the front or rear camera, making it challenging for users to share an external event or activity and their reactions to them at the same time. To overcome this, Inkpen et al. developed a prototype, Experience2Go, that allowed users to view videos from both front and rear cameras simultaneously. The system consisted of a camcorder and a mobile tablet mounted onto the same tripod, allowing users to view both the event as well as the person they were talking to. Users testing the system responded well to it and appreciated how they could see the family member as well as the activity at the same time. This also led to more engaging shared experiences as remote family members felt like they were actually attending the events being shared (Inkpen et al., 2013).

2.2.2 Asynchronous family storytelling systems

A number of research studies have also explored how computer-mediated technologies could support family storytelling asynchronously (Bentley & Chowdhury, 2010; Procyk & Neustaedter, 2014).

Studies within this category often argue that it can be difficult to communicate synchronously for a variety of reasons. Some challenges to doing so include time-zone differences, lack of technical literacy for elder family members, and uneven access to technologies (Forghani & Neustaedter, 2014a; Susan P. Wyche & Chetty, 2013). Forghani and Neustaedter (2014b) also found that some family members could be reluctant to share stories with their children or grandchildren synchronously for fear of bothering them.

Acknowledging these difficulties, some researchers have explored how technology could support asynchronous family storytelling. Wong-Villacres and Bardzell (2011b), studying technology-mediated intimacy for Ecuadorian families separated by migration, proposed a tangible digital album that allowed parents and children to share pictures of past experiences, in addition to audio messages or decorations. They also proposed a “Memory Jar” which would allow children to collect everyday memories (images, text or audio) with low-cost accessories such as caps and earrings, which would not attract the attention of robbers, which are a public safety issue in Ecuador. Memories would be consolidated and mailed to their parents or uploaded online.

Several researchers have explored the use of geo-tagging, or tagging media to geographic location information, in asynchronous ICT family storytelling systems. Bentley, Basapur, and Chowdhury (2011) designed and evaluated a system, which they called “Serendipitous Family Stories”, consisting of a web and mobile service that allowed any family member to record stories and tag those stories to real-world locations. More recently, Procyk and Neustaedter (2014) expanded on the geo-tagging concept to develop a location-based storytelling game called GEMS (Geolocated Embedded Memory System). Through this system, players were asked to reflect and record their personal experiences and digitally store them in real-world locations. In both studies, the intended audience for the story could then retrieve and experience the story by visiting the location. Interestingly, the GEMS study found that users were less willing to travel for the sake of creating and collecting stories. Most participants expressed that it was too much effort and time to travel to each location to embed a story. Such a

finding suggests that while such experiences may be novel, it is important for the system to be closely integrated to the daily routines of the user.

2.3 Digital Reminiscing Systems

Lastly, the third group of related work explores how systems can be designed to support self-reflection (Lindstr et al., 2006). As Peesapati et al argue, the act of reminiscing is “a value activity that people of all ages, spontaneously and informally partake in as part of their daily lives” (Peesapati, Schwanda, Schultz, Lepage, et al., 2010, p. 2027).

Prior research has highlighted the benefits of technology mediated reflection. A study by Isaacs et al. reveals that users who record and reflect on their experiences are able to draw positive lessons from negative experiences. The same study also found that through the act of reminiscing, individuals were able to identify recurring patterns or behaviours, allowing them to change unwanted behaviours (Isaacs et al., 2013).

Acknowledging the benefits of technology mediated reflection, many efforts have been made to design systems to support self-reflection or reminiscing. Pensieve was a system that utilized triggers to support everyday reminiscence. To do this, the system would email memory triggers to its users that contain either social media content they previously created, or text prompts about common life experiences (Peesapati, Schwanda, Schultz, Lepage, et al., 2010). Findings from the study suggest that users found value in the spontaneous reminders to reminisce. At the same time, users appreciated how the system encouraged them to write about their experiences. In another example, a study by Bae et al. examined the design and use of a system called the Ripening Room. Their proposed system provides users with

‘ripening time’ before sharing their experiences. This pause before sharing was intended to encourage users to reflect on their behaviour and writing with regards to their posts. Interestingly, participants shared that they were encouraged to express negative feelings with less pressure in Ripening Room than in other social media, since the ‘ripening’ time provided them an opportunity to revise their expressions before sharing (Bae, Lim, Bang, & Kim, 2014).

As a final example, Deane Brown, Victoria Ayo and Rebecca E. Grinter’s work explored how self-reflection technologies could be designed to help immigrant women manage their health and wellness (Brown, Ayo, & Grinter, 2014). It is worth noting that this study is especially relevant to this thesis given its participatory approach. Through these participatory sessions, the immigrant women were able to conceptualize a number of systems to improve their well-being. For example, some women proposed a wearable device that would support the reflection on one’s dietary habits through the tracking of the food consumed. Other women suggested a mood plant that could provide relaxation activities when it detects a negative mood.

The common thread with these systems, as well as the systems previously discussed, is how these systems provide the user with prompts or cues which are intended to evoke memories and emotions. As a recent study shows, people have long relied on both physical and digital artefacts to trigger memories (Gennip, Hoven, & Markopoulos, 2015). As such, there have been many studies utilizing prompts to support self-reflection or reminiscing. Examples of such include studies where spatial or temporal cues are used to evoke memories (Matassa & Rapp, 2015). Other studies have utilized digital

content like email archives to revive memories (Hangal, Lam, & Heer, 2011). Recent work has even explored how sound can be used as a medium for social reminiscing (Dib, Petrelli, & Whittaker, 2010). Regardless of the type of prompt used, researchers agree that repeated exposure and engagement with potential memory cues to be vital.

2.4 Summary

We have presented an overview of the related work in terms of research into usage of ICTs by migrant workers, systems supporting family storytelling, and design techniques for human-centric design. In the next chapter, we articulate our research problem and research questions.

Chapter 3: Research Problem

In this chapter, we identify the research gap that currently exists. Based on our review of the literature, there has been no prior work exploring how we can support family storytelling for FDWs.

3.1 Research Gap

Despite the extensive research discussed in the previous chapter, there remains a gap that can be valuably filled by our thesis.

While there has been extensive research on how migrant workers use ICTs to communicate, these studies do not focus specifically on how such families adopt ICTs for family storytelling. Much of the work that examines the use of ICTs by migrant workers typically focus on mediated parenting (Parreñas, 2001, 2005; Uy-Tioco, 2007), interpersonal communication (Thomas & Lim, 2011) and gaining social or economic capital (Chib et al., 2013; Cuban, 2014; Thomas & Lim, 2010).

At the same time, while there has been work on supporting family storytelling (Follmer, Raffle, Go, & Ishii, 2010; Yarosh, Cuzzort, Müller, & Abowd, 2009) and reminiscing (Dib et al., 2010; Peesapati, Schwanda, Schultz, & Cosley, 2010), these systems do not consider the special circumstances faced by domestic workers. For example, these workers are required to live with their employers, which in turn affect their access to ICTs and limits their opportunities for communication.

Although both synchronous and asynchronous family storytelling systems have the potential to help families living apart share personal experiences, they also have limitations which are worth addressing.

Based on our literature review, most existing systems are designed for families with ready access to ICTs. Such systems usually require constant and stable internet connectivity. In addition, these systems typically make use of multiple mobile devices. Given these requirements, we argue that such systems are not accessible for many lower-income migrant workers. Additionally, these systems may not be usable in some developing countries with poor communications infrastructure and access. It is also important to note that with the exception of a few studies, most of the reviewed studies adopt a traditional approach, excluding active participation from users throughout the design process.

3.2 Research Problems

Our overall research question for this thesis is “How can we help FDWs share family stories?”

To address this, we investigated three individual research questions:

RQ1: Do domestic workers record and share family stories, and if so, what role do ICTs play in this process?

RQ2: What are the difficulties faced by domestic workers with regard to family storytelling?

RQ3: How can we support family storytelling for such families to help overcome these difficulties?

3.3 Summary

As we have argued, past studies examining the use of ICTs by migrant workers have not focused on how such individuals adopt ICTs specifically for the recording and sharing of family stories. Similarly, while there has been work on supporting family storytelling and reminiscing, these studies focused

on families whose family members are physically proximate and of relatively higher socio-economic status, with ready access to technologies. To date, there has been no prior research investigating the use of ICTs in family storytelling by families who may not enjoy these privileges. All of this suggests that it is worthwhile investigating how we can support family storytelling for low-waged Filipino domestic workers. In the next chapter, we will describe how we intend to address our research questions.

Chapter 4: Methodology

This chapter provides an overview of the methodology used in the three studies conducted in this thesis. We briefly describe how we addressed our research problem, discuss our choice of methodologies, and provide some details on our participants. More detailed information as to how we carried out each study will be presented in the specific chapters.

The table below summarizes the methods we used to address each research question.

	Method	Data gathered
RQ1	Ethnographic interviews Cultural probes	Interview recordings Probe materials – photos, stories written by users
RQ2	Participatory design sessions Cultural probes	Researcher notes Probe materials – photos, stories Paper prototypes and drawings
RQ3	Field deployment Ethnographic interviews	Researcher notes System log data

Table 1: Methods Used to Address Research Questions

4.1 Formative Study

Our first study (see chapter 5) sought to understand: how and why domestic helpers currently record and share family stories and if so, how ICTs played a role in the process. Next, we also investigated the types of stories the women would like to share. To date, there has been little work done on this particular topic. As Smyth, Kumar, Medhi, and Toyama (2010) discuss, failing

to properly understand what people really need or want can result in the partial or total failure of many research projects, despite the intentions of researchers. To address that, we wanted to develop an in-depth understanding of the motivations, needs, desires and challenges faced by maids with regard to storytelling. Additionally, we wanted to explore if ICTs were being used by such women to share personal experiences with their left-behind family members.

For our formative study, we conducted two rounds of semi-structured ethnographic interviews with 25 Filipino domestic helpers, for a total of 50 interviews (refer to Appendix A for interview questions). We selected the semi-structured interview as a methodology to gain a phenomenological understanding of the experiences of the participants. As Seidman argued, interviews could allow researchers to understand the lived experience of other people and the meanings they make of those experiences (Seidman, 2013). Researchers within the HCI community have also used interviews to inspire design and identify design considerations or recommendations (Sadauskas, Byrne, & Atkinson, 2015; Wong-Villacres & Bardzell, 2011a; Yarosh, Tang, Mokashi, & Abowd, 2013). Inspired by these projects, our work also utilizes interviews to shape our understanding of migrant workers use ICTs.

At the same time, we deployed cultural probe packs to identify the types of stories the women currently share or would like to share. According to Gaver, Dunne, and Pacenti (1999, p. 21), a cultural probe is a design-led approach to understanding users that stresses empathy and engagement. Cultural probes are designed to “invoke inspirational responses” from participants. In addition, probes provide “fragmentary clues about their lives

and thoughts”,’ making them “valuable in inspiring design ideas that could enrich peoples’ lives in new and pleasurable ways” (Gaver, Boucher, Pennington, & Walker, 2004, p. 53). It is important to note that Gaver (2004, p. 55) adopts an “unscientific” approach to cultural probes. He argues that cultural probes should value uncertainty, play and exploration. Consequently, his probe results are “impossible to analyse or even interpret clearly because they reflect too many layers of influence and constraint” (Gaver et al., 2004, p. 55).

Since Gaver et al.’s pioneering work, many studies have adapted cultural probes to suit their research objectives (Horst, Bunt, Wensveen, & Cherian, 2004; Hulkko, Mattelmäki, Virtanen, & Keinonen, 2004; Kjeldskov et al., 2005). For example, a study by Hutchinson et al. deployed technology probes instead of cultural probes. As they explain, technology probes situate existing technologies in users’ homes to expose users to new experiences. In other words, the technology itself is used as a ‘catalyst for new design ideas’ In another example, Andy Crabtree, Tom Rodden and Keith Cheverst argue that Gaver’s approach to probes makes it difficult for designers to account for how the probes inspired the design of systems (Crabtree et al., 2003). In contrast, they feel that probes should be used to reveal and gather tacit information in an unobtrusive way. In their study, informational probe packs were deployed with elderly participants to understand about phenomena such as old age, disability and mental impairment. The materials returned from the probes were then used to facilitate various use workshops (Crabtree et al., 2003).

Subsequent work has also highlighted the potential limitations of cultural probes. As Mcdougall and Fels (2010) argue, researchers have to be careful not to design probes that may contain biases. Other critics have pointed out that the researcher's absence while the probe is being deployed may mean that they are unable to ask participants questions while the probe is in use (Luusua et al., 2015). To avoid the possible pitfalls of cultural probes, we were careful to avoid creating the probes based on any specific expectations. Instead, we designed our probe pack, consisting of a disposable camera and writing materials, to enable participants to reflect on and record different types of personal experiences or stories that they hoped to share with their families. We then used the materials returned by the probes to facilitate further discussion in the second round of interviews.

4.2 Participatory Design Study

Having gained an understanding of how domestic helpers currently record and share stories and the role that ICTs play in that process, our second study (see chapter 6) investigated how technologies could be designed to meet the storytelling needs of such women. To do so, we adopted a participatory approach to shape our design solutions.

We recruited nine domestic helpers and divided them into three design teams, each consisting of three members. Team members were provided with another probe pack, consisting of a Polaroid camera and writing materials. The returned probe materials were used to facilitate discussion during the design sessions. The participatory design sessions and cultural probe findings eventually led to the design of Kwento, a prototype mobile application that uses prompts to encourage users to reflect upon their personal experiences.

At this point, it is imperative that we acknowledge our decision to include ourselves as part of the design team, especially given our position of privilege, relative to the participants. To address this, we will discuss how we endeavored to minimize the differences between the researchers and the participants in our discussion section (chapter 9).

4.3 Implementation and Evaluation

Having developed our prototype, we carried out a field study (see chapter 8) to determine how domestic helpers used the system. The two-month-long study sought to evaluate: 1) how domestic helpers used Kwento, 2) the experience of recording personal experiences and the benefit Kwento provided and 3) the effect of prompts on the capturing of personal experiences.

In general, field studies take place in the “real world” as opposed to in a laboratory setting (Kjeldskov & Graham, 2003). In recent years, field studies have been used increasingly by HCI researchers (Isaacs et al., 2013; Kapuire, Winschiers-Theophilus, & Blake, 2015; Peesapati, Schwanda, Schultz, Lepage, et al., 2010). As Monahan, Lahteenmaki, McDonald, and Cockton (2008) discussed, the main advantage of field methods is their ability to provide real world context. In addition, field studies typically generate a rich data set and are likely to gather unanticipated data that perhaps would not have emerged in lab studies. At the same time, there are also some disadvantages to field studies, such as that they can be labor intensive, have a long timescale and may face difficulties with participant recruitment and availability (Monahan et al., 2008).

We chose to utilize the field study as a research method for our final study for two reasons. First, we were interested to find out how domestic workers would use our proposed solution in their natural settings. Second, we wanted to observe how the integration and use of the system evolved over time.

For this study, we recruited 20 domestic workers. To minimize potential biases based on prior interaction with the project, we only selected participants who had no involvement in any of the previous studies. Participants were then randomly assigned to two groups. The first group utilized a full version of Kwento, which included the prompts for self-reflection, while the other group served as the control and used a version of the application that did not include any prompts.

4.4 Participants

Participants for all three studies were recruited through snowball sampling, which is useful for reaching difficult to locate subjects such as undocumented immigrants or migrant workers (Babbie, 2013). All of the participants were female, 24-50 years old, and from the Philippines. Some had worked in Singapore for a few months while others had worked here for up to 22 years. To protect the participants' privacy, we assigned identifying numbers to each of them and refer to them in this paper as such. Appendices B, C and D list the key demographic information and identifying participant numbers for participants of all three studies.

4.5 Summary

In this chapter, we have described the methods we used to answer our research questions. We also provided general details about the participants

who were involved in the three studies. In the following chapters, we present how we carried out each study in detail.

Chapter 5: Study 01 - Understanding Family Storytelling

In this chapter, we investigate if and how domestic helpers record and share family stories. At the same time, we also explored if ICTs played a role in this process². Our findings from our first study suggested that given their constrained working environments and limited social interaction, our interviewees often felt that they were unable to share much about their lives. As such, these women sought to make the “best” use of their time to share specific types of stories. The results also indicated that the FDWs interviewed did have a variety of stories they wished to share with their family members, despite initially believing the opposite about themselves.

5.1 Study Design

For our study, we conducted two rounds of semi-structured ethnographic interviews with 25 Filipino domestic helpers in Singapore. At the same time, we also deployed cultural probes to identify the types of stories domestic helpers currently share or would like to share.

In the first round of interviews, we explained our research goals to the interviewees and asked questions about their age, family background, city of origin and years spent working as a domestic helper. We then asked them to describe which ICTs they used to communicate with their families. Special focus was given to which members of their families they spoke to most often and the types of stories they chose to share. Taking into consideration their

²Part of this chapter has been published as Cheong, K, Mitchell, A. (2016). Helping the helpers: Understanding family storytelling by domestic helpers in Singapore. In S. S. Lim (Ed.), *Mobile Communication and the Family - Asian experiences in Technology Domestication*. Dordrecht, Springer. In press.

unique work environments, we also asked them whether there were any particular stories or experiences that they would want to share, but all of the interviewees were either unwilling or unable to do so at that point.

After the first interview, interviewees were provided with a probe pack consisting of a disposable camera that could capture up to 39 shots, and writing materials (see Figure 1). We gave participants suggestions for the use of the camera, such as capturing significant or new experiences, people or places in their lives. At the same time, we stressed that such suggestions were for inspiration only and that participants could be as creative as they liked in the usage of the materials. Additionally, we encouraged them to write down the specific story that each photo was supposed to tell. Participants were given about three weeks to make use of the probes.



Figure 1: Probe pack materials

Following this, we collected the probes and developed the photos. The photos and stories were used in the second round of interviews to prompt further discussion on the specific types of stories that participants wished to tell their families.

Throughout the study, ethical guidelines were strictly followed. This included informing participants that they could withdraw from the study at any time, that their privacy and confidentiality would be respected, and that interviews would only be audio-recorded with their consent. The interviews were conducted in English in a location specified by each interviewee. Recordings were then transcribed and analyzed using inductive coding, which is useful for condensing raw textual data into a brief summary format and to establish clear links between research objectives and the data findings (Seidman, 2013).

5.2 Results

Having described our study design, we now present our results. First, we discuss if and how domestic workers currently share stories about their lives with their families. In particular, we focus on the role that ICTs play with this storytelling process. This is followed by the types of stories such workers are unwilling or unable to share with their families. Finally, we detail the stories that emerged from the probe materials.

5.2.1 Domestic workers' use of ICTs for family storytelling

The majority of our interviewees utilized a variety of technologies to share family stories, including the mobile phone, landline (albeit to a small extent), personal computers, and the internet. While there were some variations in the frequency of use for each medium, most interviewees agreed that the mobile phone was the primary communicative device. They also shared that during their conversations with their families, they prioritized hearing updates from their families over the sharing of their own personal experiences. More importantly, we found that the types of technologies used

for family storytelling by domestic workers were largely determined by three factors: what technologies their employers permitted, what technologies their families back home had access to, and cost.

Our interviewees shared that their employers often dictated which types of technologies they were allowed to use, even if they were willing to purchase such devices on their own:

During my first 1.5 years, my employer instructed the agency to include a clause in my contract that did not allow me to have a hand phone [mobile phone] or any “off-days” [rest days] for two years, saying it will affect my work. One night, I cried and plead with them to let me call back as it is my daughter’s birthday. I explained to them that they are parents also and that I am working for my daughter, so please let me call to wish her happy birthday. After that incident, my employers asked me to buy a mobile phone for myself. (Participant 8)

In most cases, the interviewees explained that they were often not permitted to use their mobile phones during “work hours”, which typically lasted from 5am to 10pm. As a result of the long working hours, they were often exhausted and found it difficult to recount personal experiences to their families on weekdays.

For some of the interviewees’ employers, the “visibility” of the communicative device appeared to matter. Participant 3 said that although she was permitted by her employer to use the household Wi-Fi for her mobile phone, when she wanted to use a tablet, her employers objected even though she intended to use the same applications and services: “*Sir ok, but Ma’am not*

ok. She don't like me using big tablet.” According to the interviewee, there was no reason given for this reservation, suggesting that some employers could be imposing restrictions based on their whims. As a result of these limitations, our interviewees often chose to use their devices discreetly, even when prior permission had been given.

At the same time, the same employers may not be comfortable with the women purchasing their own tablets, and may express a desire to restrict the helper's ICT usage. Interviewees also said that employers, in particular female heads of the households, would occasionally ask them about the nature of their personal conversations. Hence, interviewees were careful not to openly share negative experiences relating to their employers with their families. This was so they could avoid having to lie about their phone conversations to their employers.

On the other hand, a few participants also expressed that they had learnt to use new forms of communication from members of their employer's family. As Participant 5 recounted, *“my employer daughter is the one who give me the Wi-Fi password and help me create FB [Facebook] account.”* Through this social media account, she was able to post photos of her life in Singapore, as well as share some personal experiences with her parents. In other cases, interviewees said that their employers allowed them to use the household computers or mobile tablets on their days off.

Even so, given the power relations between employers and domestic helpers, the women may choose to use technologies that employers have provided sparingly, for fear of judgment or criticism. Participant 1 said: *“I use but not so much because I don't want them to think I'm greedy.”*

Our interviewees also shared that apart from the limitations set by their employers, the types of technology their own families had access to also influenced the types of ICTs they used for family storytelling. Participant 10 said that it was difficult just to call or text back as her parents resided in a mountainous region with poor cellphone reception. Most respondents also explained that due to the high cost of a monthly broadband plan, their families relied on pre-paid call cards. Some of the interviewees' family members relied on using text messages to set up specific times when they would travel to Internet cafés to talk to the interviewees.

We also found that at times, even if the families had access to pre-paid call cards, some family members, in particular elderly parents, did not possess the technical knowledge to use certain technologies. In such cases, our participants would rely on other members of the family to retell the stories shared or scaffold the interactions. For example, Participant 12 shared how her mother did not know how to use Facebook, and could only view photos when her other daughter came to visit. To overcome this barrier, she would send text messages to her sister with instructions on which photos to show her mother.

Some participants also expressed that they chose to intentionally limit the types of technologies that their children had access to. For example, some felt that their children were too young to have social media accounts or mobile phones, for fear that such technologies may serve as distractions from their studies. Others did not want to give their children mobile phones or tablets in case they became targets of crime.

Finally, cost remains a barrier for FDWs to share family stories with their loved ones: *“Sometimes when you talk on the phone, you cannot explain*

very well. In the mobile phone, very expensive, so you need to save money,”

Participant 9 said.

Interestingly, to overcome this barrier, these women often make use of traditional means of recording their daily events and experiences, such as scrapbooks or diaries (Dalsgaard, Skov, Stougaard, & Thomassen, 2006). With the exception of Participant 6, all of the interviewees shared that they kept a journal, in which they wrote regularly. *“My daily writings are about what makes me happy, what makes me sad, what encourages me, and writing to my future self, like my plans to go to Canada and study one day,”* Participant 1 said.

While most interviewees acknowledged that such diaries were for themselves, many said that they intended to draw upon these entries to share personal experiences with their families upon returning home, suggesting that non-computer mediated forms of recording stories remained important, especially for such transnational families.

5.2.2 Stories for sense-making

As discussed by Kellas (2010), family storytelling is useful for sense-making and navigating difficult experiences.

We found that our interviewees often used stories to explain to family members why they needed to work overseas. Such stories were often targeted not only at their children, but also at their husbands or parents who would try to persuade them to return home. In such circumstances, they would choose to repeat a particular story to reassure the other party. *“I am working to provide for you and your future, because your father cannot afford, don't have stable job, that's why I need to work,”* Participant 2 told her son.

Depending on whom the story was being shared with, it was common for interviewees to reassure the family member in question by painting a picture of future possibilities or outlining what they could do with the money they were earning overseas, so as to justify their collective sacrifice. For example, promises would be made to children to buy them toys or technological devices, such as mobile phones or laptops. Participant 2 mentioned that her stories would at times include plans to rebuild the family's existing house or to buy a new house to "secure a future".

Stories were also used by the participants to help their family members make sense of difficult experiences. For example, Participant 2 said:

My son call me and say 'cause he eat with whole family so not enough to eat, very hungry. I explain to him that when I work here, I also eat very little, but through God we can overcome this and I am working hard so when I come back can take care of you.

Interestingly, she chose to withhold certain details about the story from her son. For her, the story was intended to teach her son about the importance of sharing. However, when she spoke with her husband, she would be more open. "I tell my husband that I cook for the whole family every day, but sometimes they eat finish all [the food], then I left with very little, so I also feel very sad," she said.

Participant 8 also selectively shared information with her family members. "*I don't share with my father because I left to work without his approval, but I tell my mother that I work here for them*

and so I can take care of them. I tell her to remind him that I will come back when I save enough,” she said.

The above examples by Participants 2 and 8 suggest that FDWs may adapt the same stories to suit different audiences within their families. They could choose to reinforce their parental role by using their personal experiences as life lessons for their children, or seek solace and support from their siblings, parents or spouses.

5.2.3 Stories for identity formation

Apart from using stories for sense-making, our interviewees also told and retold stories to construct specific identities, such as the identity of a religious, loving mother. All of the participants who had children insisted that it was important that their children remember them as a “good Christian”. As a result, many of the photos and stories they captured with the probes revolved around their Sunday activities at church:

“It surprises me to know that not everyone is a child of God... It is very important that you know to whose family you belong [to]. The first step in becoming a member of God’s family is an understanding of who God is and what he has done.” (Participant 3)

“This bible was gift from my employer. I’m so blessed to having this book because I learned a lot from them. Through reading, sharing and encouraging of my employer and church mates, I become one of them.” (Participant 5)

Arguably, such stories support Fivush’s (2010) position that family stories are critical for the construction and reinforcement of individual and

family identities. In this case, our interviewees were active practitioners of their Catholic faith and would combine their personal experiences with religious teachings to portray themselves as appropriate role models for their children.

5.2.4 Types of experiences not shared

While our primary focus was to investigate the types of family stories shared by domestic helpers, we felt that it was also critical to delve into stories that the women were unable or unwilling to share and the underlying reasons for their omissions. We found that they deliberately excluded numerous types of experiences from their usual conversations:

“I don’t want to share with my children my troubles, it will affect the children. Also, husband care but so far apart, will only make him more worried.” (Participant 4)

“Already they have a lot to think, I try not to, I don’t want them to worry but of course simple things like I not feeling well, they cannot do anything, just pray for me.” (Participant 6)

Other types of stories that were withheld by these women included reprimands from their employers, feminine health problems, and their love interests (for single women). For one interviewee, even positive experiences such as outings were kept from her children. *“If I told them (her children) I am going out with my friends, they feel like jealous and ask ‘why me cannot go out with my friends’,”* Participant 4 said.

While most participants, especially the mothers, felt this way, other participants (2, 8) felt otherwise and said that it was important to share “both

the good and bad things” with their families in order to gain moral support. Given the sensitive nature of these stories, interviewees responded that these types of stories were usually shared with only one or two family members. Notably, it was common for them to share sensitive stories with their siblings. They felt that they could speak freely with their siblings about their problems without fear of causing additional worry to the rest of their family. It is also important to note that while our interviewees were not willing to share particular stories with their families while overseas, they expressed a strong desire to share these stories with them in the future.

Based on the interviews, there appeared to be two reasons for this desire for future family storytelling. First, most of our interviewees expressed that they would only be able to engage in “true sharing” upon their return. For these women, face-to-face communication was still the best way to share about their lives. Second, some interviewees, in particular domestic helpers who were mothers, explained that they were not currently able or willing to share particular stories with their children as the latter were still too young to fully grasp the meaning of their stories.

5.2.5 Discovering stories not previously shared

During the first interview session, we noticed that the participants often claimed that they did not have many stories to share with their families, despite their strong desire to do so. To better understand this issue, we provided all participants with the probe packs to observe if there were events or experiences in their daily lives that could be recorded to be shared as a family story.

With the exception of one participant whose camera malfunctioned, all the other participants were highly motivated to complete the activity. Every participant took a minimum of ten photos, with many using the entire reel of 39 photos. These photos were then discussed during the follow-up interview session.

In general, most of the photos reflected the stories already identified earlier, such as the participants' Sunday church activities, their daily chores, the occasional outing, and the dishes they cooked. However, some photos involved experiences or stories that had not previously been shared in any of their conversations, and that reflected a deeper level of engagement.

Participant 7 wrote:

“This place is in my past two years, I’m always here at this place [see Figure 2] in Bedok Clearwater. After church I come here and read my daily bread and some textbook. I love this place, so quiet and fresh air. At this place I’m thinking of my children and then I talk to God. I cried because I miss my family. One time it [crying] happened here...while I’m walking, the ... man [a construction worker] following me and trying to take my number and I scold him.”

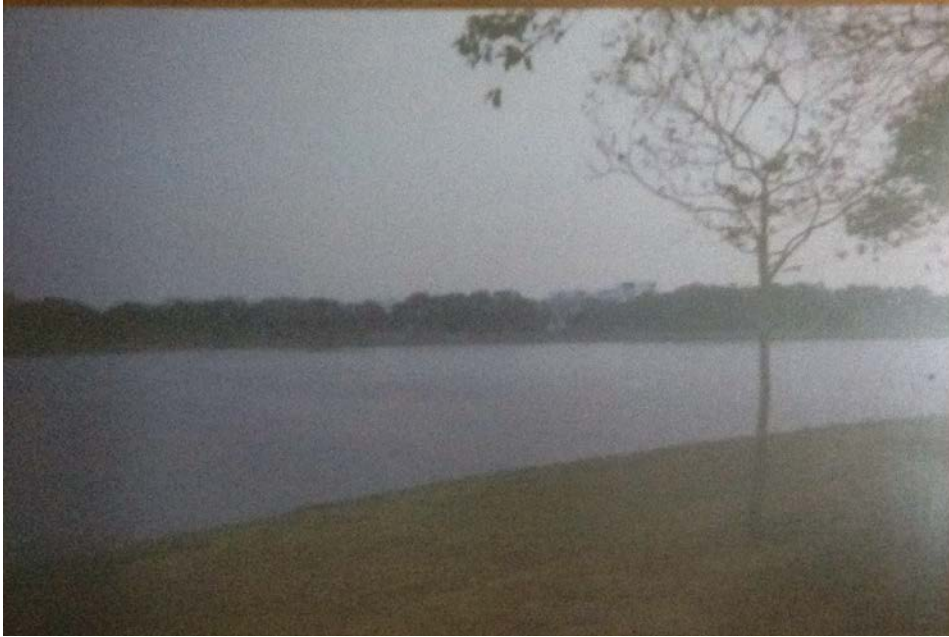


Figure 2: Participant's photo of the park she frequented

This excerpt revealed a moment of quiet solitude when the participant enjoyed a reprieve from her work to think of her family. Notably, she also shared during the interview that she chose not to mention the incident of harassment above to her family, as she wanted to protect them.

Describing a photo of the view from her bedroom window (see Figure 3), Participant 10 wrote:

“I choose to take this photo because this place makes me confident if I am lonely or feel bored. I go stand by the window of my room so I can see all of these buildings, so I can think and see far from my employer house and become fresh my mind. It makes to gone my feeling lonely or boring. If I go back to my parent's house, I don't have a place like this.”



Figure 3: Participant's photo from her bedroom window

This account captured the introspective moments in this participant's working life, moments from which she drew stimulation and rejuvenation. By looking out of her bedroom window, she was virtually liberated from the physical boundaries of her employer's home, thereby easing her feelings of loneliness and tedium. Again, this was a personal story that she kept to herself and did not share with loved ones, perhaps because it reflected the greyer aspects of her working life that she did not wish to burden them with.

The interviewees mused that even though their mobile phones had built-in cameras which they often used, the cultural probes used during this exercise spurred them to reflect upon their daily activities and experiences in different and unprecedented ways, enabling them to notice how their lives had changed both positively and negatively since moving abroad for work. Furthermore, all the participants expressed that they intended to continue reflecting on their daily experiences to share new stories with their families.

As Participant 10 said, *“these photos and stories let me show my children and family what Singapore is like, which they may never see.”*

5.3 Discussion

Having presented our results, we now discuss the implications of our findings.

Earlier on in this chapter, we identified three determinants of the types of ICTs used: what ICT usage employers permitted, what technologies migrant workers’ families could access, and cost considerations. While cost remained a significant barrier, our interviewees reported that their working conditions served as the larger obstacle. We found that even in cases where employers were willing to temporarily provide maids with communicative devices, these rare opportunities often came with certain conditions, such as the obligation to let employers know about the content of their conversations. Furthermore, given the power dynamics of their working relationships, domestic helpers often chose to use such devices sparingly. Our interviewees also mentioned that they had to take into consideration the level of access that their family members back home enjoyed. In these cases, the participants chose to forgo opportunities for better communication, and developed strategies to overcome their limited ICTs access, resonating with findings from previous studies such as that of Yeoh and Huang (1998).

We also found that traditional, non-computer mediated technologies still played an important role in the lives of the women we studied. Most of our interviewees chose to record their daily experiences on traditional journals or scrapbooks, with the aim of sharing these stories in the future. In the same vein, other studies on family storytelling by migrant workers have noted that

transnational families adopted creative adaptations to circumvent technological constraints (Susan P Wyche & Grinter, 2012).

Our interviewees shared particular personal experiences for the purposes of sense-making and maintaining specific identities with their significant others. This was supported by how they would often tailor the content of each story to suit the intended audience. In some cases, interviewees noted that some experiences, in particular negative ones, were not suitable for sharing with their young children. However, they pledged to share such stories during opportune moments as they hoped such stories about themselves will be remembered. Again, these women are often ready to put their own needs and wishes aside, choosing not to share negative experiences to avoid worrying their family members.

The cultural probes were crucial in provoking deeper insights into the kinds of stories FDWs could potentially share with their family members. During the interviews, participants often claimed that they did not have many interesting personal experiences to share and that they were 'unable to do more'. However, their eagerness to tell stories using the probe photos suggested that actually *did* have stories to share, but simply did not realize it.

One possible explanation for this incongruence could be the Looking Glass Theory, developed by Cooley (1902), which postulated that an individual's "self" grows out of his or her social interactions with others. In other words, individuals are likely to shape their self-concepts based on how others perceive them. Therefore, it is possible that given their limited opportunities for social interaction, domestic helpers feel that their lives of

repetitive drudgery do not merit discussion and would only cause them to develop a more negative self-image.

Prior research has shown that FDWs are generally a marginalized group in Singapore who are typically discouraged by employers from partaking in social activities outside of the house (Yeoh & Huang, 1998). Therefore, given their circumscribed experience and worldview, these women may not have been naturally inclined to view themselves as individuals with personal stories worth telling or repeating, until they were given indirect encouragement to do so through the probes.

5.4 Summary

In this chapter, we described our formative study that explored if and how domestic workers shared stories with their families. In addition to that, we examined how ICTs were used by such women for family storytelling. We found that given their constrained working environments and limited social interactions, our participants often felt that they were unable to share much about their lives. As such, these women sought to make the “best” use of their communication time to share specific types of family stories. These stories were intended to help family members make sense of their migrant experience, as well as to construct individual and family identities. More importantly, our probe pack findings suggested that while FDWs do have a variety of stories they wish to share with their families, they may believe the opposite about themselves. In the next chapter, we discuss how we adopted a participatory approach to design and develop a technological solution to overcome this challenge.

Chapter 6: Study 02 - Participatory Design of a Family

Storytelling System³

Having gained a better understanding of how FDWs use ICTs for family storytelling, we carried out a participatory design study to further identify possible design problems, and to develop a proposed solution.

Findings from the participatory design sessions suggested that domestic helpers perceive themselves to be “unable to do more” with regard to family storytelling. To address this, the design teams conceptualized and designed prototype mobile application that encouraged participants reflect upon their personal experiences.

6.1 Study Design

For our second study, nine domestic workers were recruited via snowball sampling. Participants were divided into three design teams, each consisting of three members. Collaboration with the participants took place over three sessions, each lasting between an hour and 90 minutes. The three sessions consisted of: 1) a focus group, 2) a design session and 3) an evaluation session. The entire study took place over a period of four months.

Following the completion of all of the sessions, we carried out inductive coding on the researcher notes taken during the sessions, as well as on the probe pack materials gathered by the participants. From this, we were able to sort low-level codes into broader themes. For instance, *suggestions*, *topics*, and *inspirations* were grouped into the theme *prompts and triggers*.

³ Part of this chapter has previously been published in Cheong, K., & Mitchell, A. (2015). Kwentto: Using a Participatory Approach to Design a Family Storytelling Application for Domestic Helpers. In J. Abascal, S. Barbosa, M. Fetter, T. Gross, P. Palanque & M. Winckler (Eds.), *Human-Computer Interaction – INTERACT 2015* (Vol. 9298, pp. 493-500): Springer International Publishing.

At this point, it is important to note that we had three common participants between study 1 and study 2 (Participants 1, 5 and 7). During the recruitment phase, we found it challenging to identify participants who were able and willing to commit to the multiple design sessions. As a result, we decided to rely on the trust we had established with the interviewees from the formative study. This approach proved fruitful as the three repeat participants were able to help recruit and retain additional participants for the study. Furthermore, these participants were able to help facilitate the sessions, drawing on their familiarity with the project. For instance, they would help translate between other participants and the researchers in cases where other participants were unable to express their ideas fully in English.

Careful measures were taken to ensure, as much as possible, that the researchers did not introduce any biases into the design process. For example, we did not mention any of the findings from our formative study. We also stressed to the three common participants that this was a different study and that they were not required to draw upon their experience with the previous study.

Having described our study design, we now detail how we conducted each session and the key findings that emerged.

6.2 Focus Groups

As none of our participants had any design experience, we began the focus group session with an explanation of the concept of participatory design. Following this, team members discussed how they currently made use of technology to share stories with their families and the problems they faced

with regard to family storytelling. This discussion yielded some additional findings that added to our insights from our formative study.

First, current working conditions did play a role in preventing the participants from sharing stories with their families. For example, participants said that they were expected to work an average of ten to fourteen hours a day, making it difficult to communicate with their families. Some participants were also restricted in their access to technology, with employers choosing not to provide them with access to the household Wi-Fi.

Second, the focus group findings supported prior literature which pointed out that migrant workers tend to prioritize hearing updates about their families (Chib et al., 2014; Law & Chu, 2008). As such, they often have limited opportunities to share about their own experiences, despite a strong desire to.

Finally, the findings suggested that these women currently perceive themselves to be unable to “do more” to share stories with their families. Participant 2 shared, “Every day we do the same things, clean the house and take care of the children. If we go out, it’s to church or to send money, so quite hard to think of stories to share.”

At the end of the focus group session, all team members, including the researcher, were provided with a probe pack consisting of a Polaroid camera and writing materials (see Figure 4). Participants were given two weeks to capture significant personal experiences for discussion during the design session.



Figure 4: Probe pack materials

6.3 Design Session

Our objectives for the design session were as follows: 1) to identify a challenge faced by domestic workers, and 2) to conceptualize a possible solution. To achieve these goals, we broke the session down into the following sections: 1) identifying a design problem, 2) brainstorming for possible solutions, 3) identifying the design requirements, and 4) prototyping a solution.

6.3.1 Identifying a design problem

First, participants were asked to present the photos and stories they recorded using the probes (see Figure 5). Next, we grouped the returned materials to uncover dominant themes. Special focus was given to the intended audiences of the stories and how the women hoped to share such experiences.

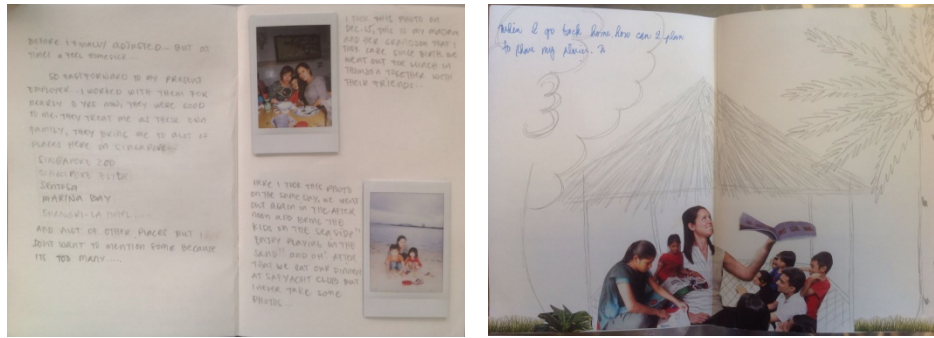


Figure 5: Design session materials showing 1) intended audiences for stories and 2) plans for sharing

Once all members of the team had shared their photos and stories, we proceeded to identify a design problem. As we mentioned earlier, these women faced a variety of challenges with regard to sharing family stories. For example, they had limited and uneven access to ICTs, long working hours and few opportunities for communication. However, the greatest challenge was that they had trouble coming up with “interesting” experiences to share with their families.

During the focus group session, some of the participants explained that their daily routines were mundane and regulated, making it difficult to think of anything worth telling their families about. Yet, after using the probe materials for two weeks, the participants overwhelmingly shared that the exercise was able to motivate them to reflect and find significance in some of their daily activities. For instance, Participant 2 showed us a picture of a bus, explaining:

“When I first come here, I always lost and I will get very scared. Now I know this bus go where and I am happy that I learnt to be strong... when my daughter wants to go work overseas, I will share such experiences to teach her.”

Similarly, Participant 7 initially said that she had no stories to share due to her “boring work”, but using the probe materials, she was able to write down the following story:

“I can say that my experience here in Singapore makes me stronger, open minded and made me a better person. I experienced hardships, happiness and too much sadness but it doesn’t stop me from achieving the things I want in my life which is to give a better future for my kid... Someday I go home and I will bring these memories that I’m going to share with my daughter and of course, my future grandchildren.”

Based on these experiences, the design teams felt that other FDWs could also be facing a similar challenge and that it would be worthwhile designing a technology that could help other FDWs uncover new stories or experiences that they could share with their families.

6.3.2 Brainstorming for possible solutions

Once we agreed on the design problem, we proceeded to a brainstorming session for possible solutions. At this stage, the researchers stressed that we would be open to all ideas and proposals. Nonetheless, participants were conscious that the proposed solution would have to be feasible and suitable for use by most domestic helpers.

One idea the design teams proposed was to create a physical-digital journal. Some participants noted that it was common for participants to keep a physical journal or diary (a finding that corroborated with our observations during the first study). As such, the teams suggested that it would be interesting if there was a technology that could allow users to link their

physical journals with digital artefacts like photos and videos. The digital component of the system would be a website or application, which would automatically synchronize with changes to the physical journal.

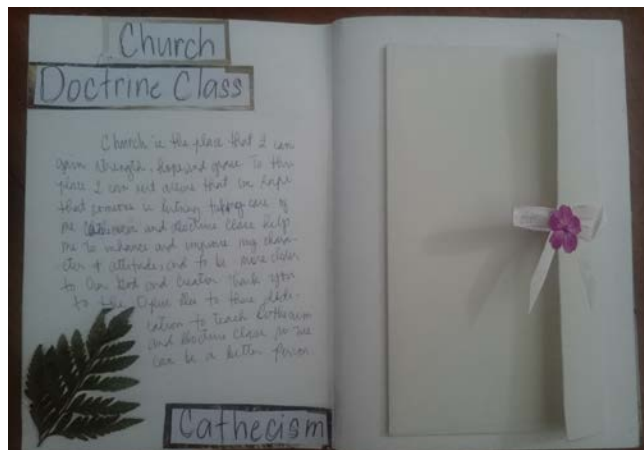


Figure 6: Proposed mock-up for a physical-digital journal

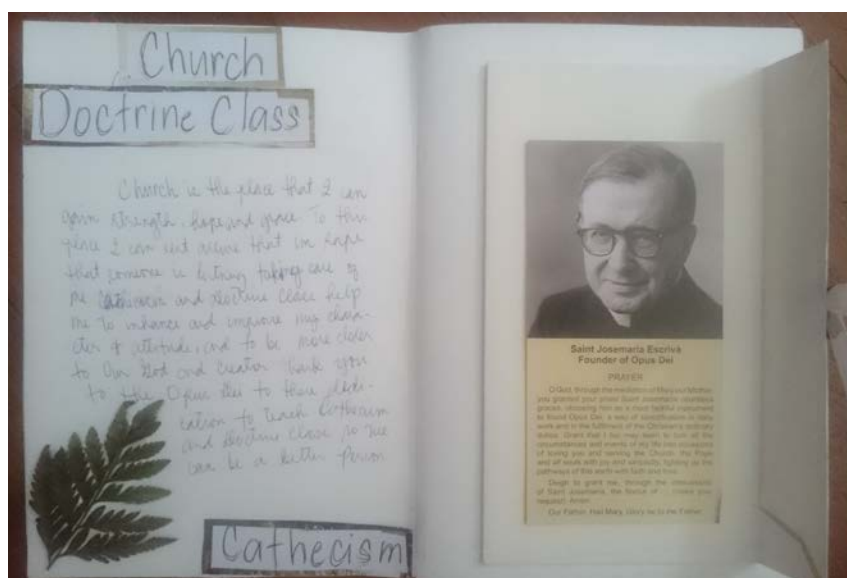


Figure 7: Proposed mock-up showing both the collection of physical items.

As seen by the mock-ups above (see Figure 6 and 7), the proposed technology would allow users to write their stories physically, as they were accustomed to, and then share them online. Users could collect physical artifacts like the pressed plant in Figure 7 to decorate their journals, as well as collect relevant photos to add to the richness of their stories. The envelope on the right of Figure 6 was intended for the collection of photos.

In another iteration of this idea, the teams suggested that users could be presented with a digital background to which they could add physical Polaroid photos (see Figure 8).



Figure 8: Proposed interface for physical-digital journal

The researchers agreed that a physical-digital journal would be interesting to design and develop. There has also been some work done examining the potential of such technologies (West, Quigley, & Kay, 2007). However, our design teams ultimately felt that such a technology would be unattainable for most domestic helpers, given their relatively low wages. In addition, many participants would be unable to gain access to the household Wi-Fi, which could mean that they would have to pay more for pre-paid data cards.

Another idea proposed was to create a mobile application that would allow users to record videos or to video-chat with their family members. The participants felt that the benefit of such video-chats was that they would allow them to “see” the other party. Having said that, they conceded that there are already applications or services like WeChat, Skype and Line that had such

features. Again, a key barrier was that most FDWs still relied on pre-paid data cards, making it extremely difficult for them to access such services.

6.3.3 Identifying design requirements

Having completed the brainstorming activity, we focused our attention on how our proposed solution would look and the features we wanted to include. With the exception of the first group, the other two groups were also presented with the design ideas proposed by the previous groups and asked to critique and build upon these designs. It is important to note that this critique was done only after each team had finished proposing their ideas. We chose to adopt this mixing ideas technique as it remains a useful way of merging individual ideas into a larger, collaborative idea (Guha et al., 2004).

6.3.3.1 Systems that are “safe and suitable for work.”

As a start, we talked about what technologies we should consider for our system.

The foremost requirement that emerged from the design sessions was that the proposed solution should be both practical and suitable for the work environments of FDWs. Therefore, taking into consideration that they had limited access to technology, the design teams suggested a mobile application. As previously mentioned, the mobile phone remains the primary and often, only communication device for such workers. The participants also pointed out that most domestic helpers were reliant on pre-paid data cards that they had to purchase every month. As such, they were not willing to use applications or services which required them to be online all the time. Participants also acknowledged that given their working hours, they would only be able to spend between fifteen to thirty minutes a day to record their

personal experiences. This meant that it was important that the system was efficient and took minimal time to record a story.

The participants emphasized that it was important that they would have complete control over the audience of the recorded stories. Participant 8 shared: “I used to share on Facebook, but one day, I see my employer there also. After that I change my account name and don’t post anymore.”

Participant 5 also said: “Facebook all that is too open, I am not happy to share about my problems with everyone, just my sister and some close friends.”

With these considerations in mind, the design teams proposed a mobile application that would allow users to share their stories with a closed network of family members and confidants.

6.3.3.2 Prompts or triggers

To address our design problem, which was that FDWs often had difficulty of thinking of personal experiences to record, the design teams suggested a system that could prompt or guide the users on possible stories to record and save. Participant 7 said: “*During our gatherings, we like to take pictures and talk. It’s easy to ask questions to our friends. Maybe the system can also be like our friend and ask us.*”

Our participants shared that when using the cultural probes, some were initially unsure of what to record. In response, they would speak with other members of the team to “be inspired.” Additionally, we noticed that the participants often relied on asking one another questions to determine what experiences would be worth sharing. Examples of such reflective prompts include questions like “What was the first meal you had in Singapore?” and “What is something you wish you had known about Singapore before leaving

the Philippines?” Consequently, we had all members of the team suggest questions which we could include in our system (see Figure 9).

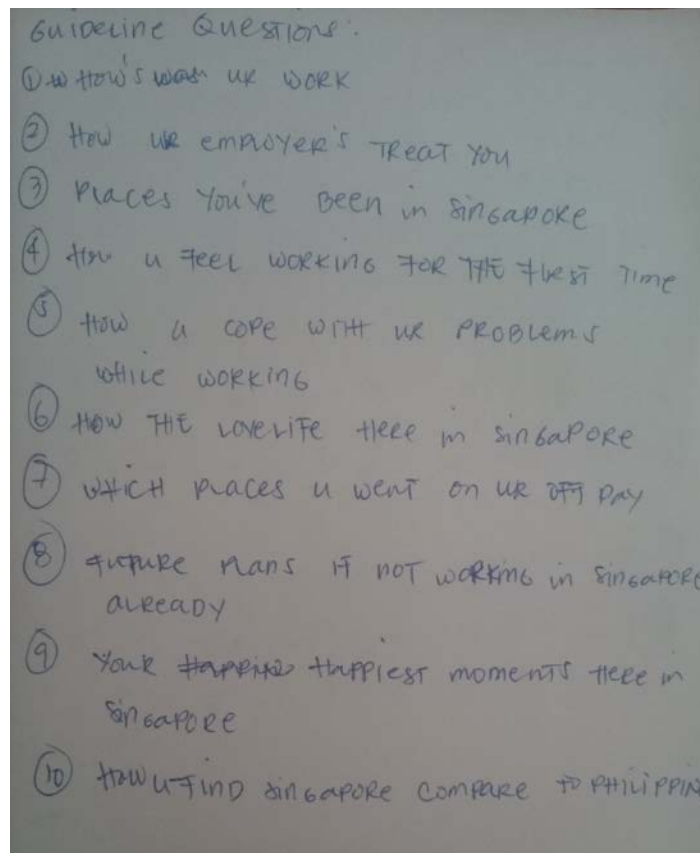


Figure 9: Examples of prompt questions provided by the participants

Apart from these text prompts, participants suggested that previously taken photos could also be used to encourage reflection. For example, a participant mentioned how she went through her entire phone media library to determine what types of stories to write. Prior studies have endorsed the value of using photos to support everyday reminiscence (Peesapati, Schwanda, Schultz, Lepage, et al., 2010).

Finally, we also discussed the possibility of including meta-cognitive prompts. As Flavell (1979) explained, meta-cognition refers to the “knowledge and awareness of one’s cognitive processes and ability to actively control and manage those processes”. Prompts to encourage users to reflect on

their own cognitive processes and learn from them can be conceived of as “strategic activators” that encourage “learning strategies that the learners are in principle capable of but do not spontaneously demonstrate, or demonstrate to an unsatisfactory degree” (Berthold, Nückles, & Renkl, 2007, p. 567).

As we presented in our methods chapter, participatory design is a process where both researchers and end-users are active and able to provide suggestions and feedback throughout the design process. In this case, the researchers found out about meta-cognitive prompts while reading existing literature on prompts. Prior research suggests that meta-cognitive prompts could be useful in optimizing journal writing (Nückles, Hübner, & Renkl, 2008). Based on this, we felt that such prompts would help the user to be more aware of the reflection and writing process. For example, if a user felt that her stories were too short, she could indicate this, and the system would prompt her to include more details from other experiences in her next story.

During the design session, we shared what we had learnt with the participants. We then asked the design teams for their thoughts on such prompts. Keeping to the study protocol, we stressed that this was only a suggestion and that there was no reason to include it if the teams did not want to. Of the nine women recruited, seven felt that such prompts could be useful. Participant 3 said that she thought the idea was good, elaborating that *“Questions [text prompt questions] can run out but maybe this can help us think of questions after that.”*

The remaining participants (4 and 9) did not actively support the idea, but did not object to it completely either. Participant 4 said that she was “ok” with it, but *“I think the photos more interesting.”*

At this stage, we took care to reiterate the concept of participatory design. We emphasized that all of the participants' opinions mattered greatly, and that it was vital for us to collaborate as a team. We discussed the meta-cognitive prompts as a team again before deciding that we would include them.

6.4 Prototype mock-up

We developed a mock-up prototype based on the feedback gathered during the participatory design session. This initial prototype was built and presented to the design teams during a final evaluation session.

The mock-up design included two principle features. First, users could choose to receive either a text prompt or a photo prompt (see Figure 10). After receiving a prompt, users would be asked to write a story based on the prompt. We felt that this was important to the design as we wanted to avoid uninteresting or inappropriate text prompts. Second, users could import up to five images to supplement their stories. We included this as we wanted to observe the types of images users would add to their stories.

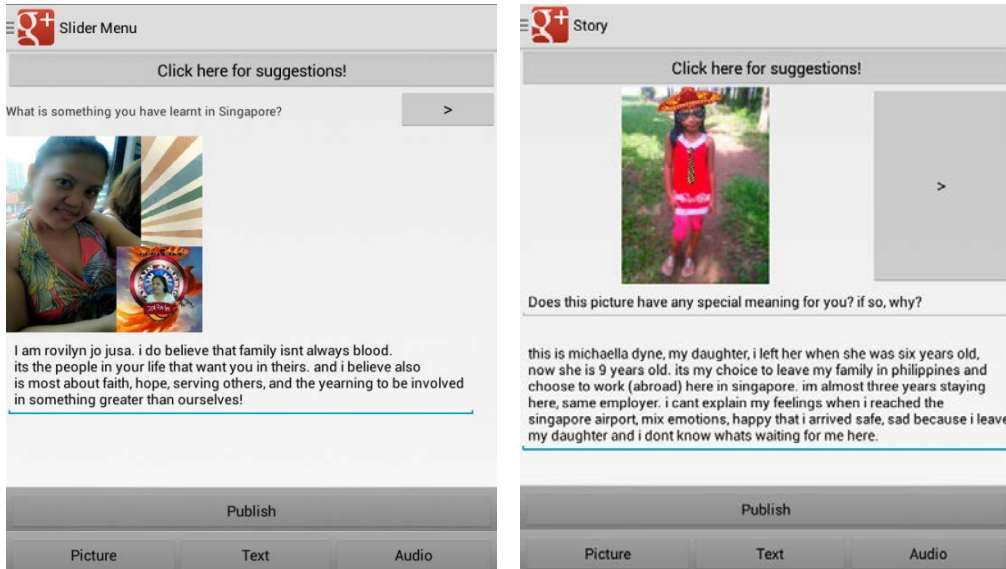


Figure 10: Screenshots showing prototype mock-up 1) text prompt and 2) photo prompt

Given that we only had two weeks to put together the mock-up, we were not able to develop additional features that could also be useful, such as the saving of stories, visualizing progress for users and voice recording, into the software. Instead, we made use of low-fidelity paper prototypes and sketches to explain how such features would work to participants (see Figure 11).



Figure 11: The two low-fidelity prototypes we used during the design sessions

6.5 Evaluation Session

In the final session, participants interacted with the mock-up and provided feedback on the system. The evaluation session was undoubtedly a helpful exercise as the participants were able to provide immediate feedback on the system.

To evaluate the usefulness of the reflective prompts, participants were tasked with creating a story using one of the prompts. Participants could explain why they were not willing or able to use a certain text prompt to write a story. Prompts that were deemed unsatisfactory were then removed. Additionally, participants could also critique the interface, allowing us to address these problems for the next iteration.

6.6 Summary

In this chapter, we described our second study, where we adopted a participatory design approach to design a family storytelling system for FDWs. Based on the design sessions and the probe materials, we identified two design requirements: 1) systems that are “safe and suitable for work” and the 2) inclusion of prompts or triggers to encourage reflection. In the next chapter, we describe in more detail how we built our prototype mobile application, Kwento, with these requirements in mind.

Chapter 7: Overview of Prototype

This chapter provides an overview of the prototype that was developed for this thesis. We present details on the main features, visual design and interface for the version of Kwento used in the field trial.

7.1 System overview for Kwento

Kwento (Tagalog for “story”) is a mobile application specifically designed for use by domestic helpers to create and record personal experiences without Internet connectivity. The application was developed using the Android SDK and is compatible with any mobile phone running on Android. To minimize the amount of data used, users can choose to upload or download their stories on their rest days when they are able to gain access to free public Wi-Fi. It is important to note that our current prototype does not include a send or share story function. In other words, users were not able to send their recorded stories back home. As we discussed earlier, we focused on solving the design challenge that domestic workers may feel that they have nothing interesting to share. We felt that this was important to address before we investigated how the system would be used by multiple members of the family. As we discuss later, we intend to investigate how such stories are shared and received by the left-behind family members in our future work.

7.1.1 Usage scenario

We developed the following usage scenario to illustrate how a user could use Kwento.

Rose, a Filipino FDW working in Singapore, wants to write a story to share with her family back home. However, she does not have any specific topic in mind. She opens Kwento on her Android phone and signs in. Once she

has done that, she clicks on the “create a new story” icon which is represented with a green plus sign at the top of the screen (see Figure 12).

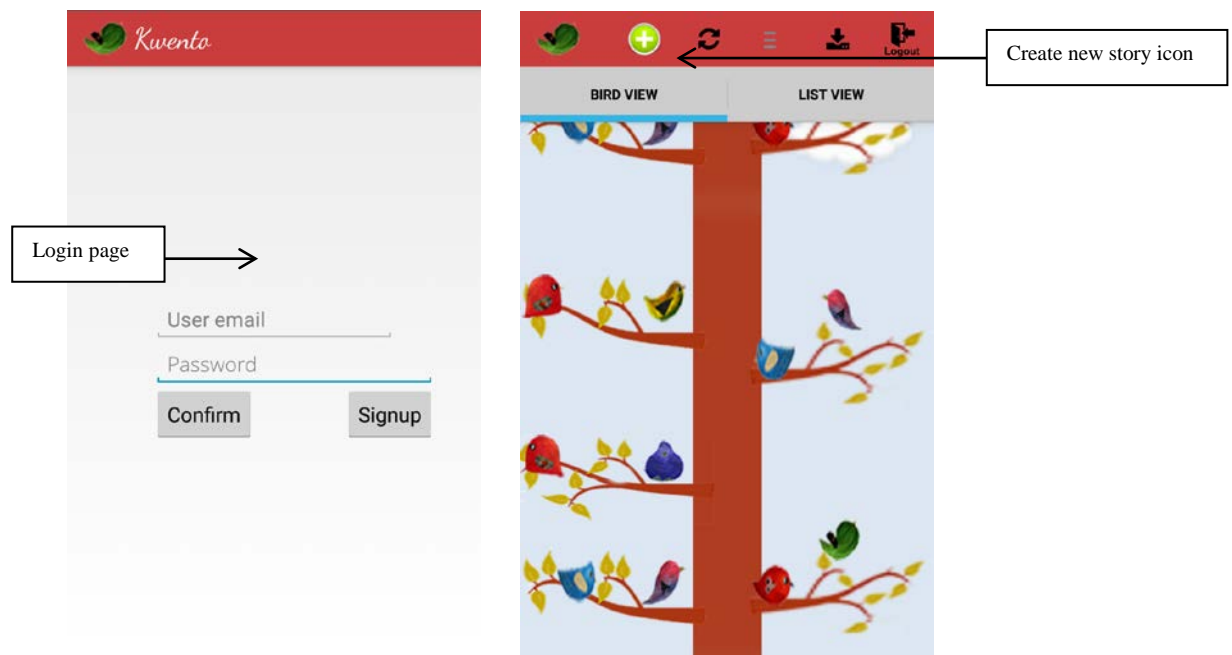


Figure 12: Screenshot showing 1) login page and 2) main menu

Next, a pop-up menu displays three options for her (see Figure 13). She can choose either one of two types of prompts for inspiration: a text prompt or a photo prompt. She can also opt to receive no prompts if she already has a story in mind.

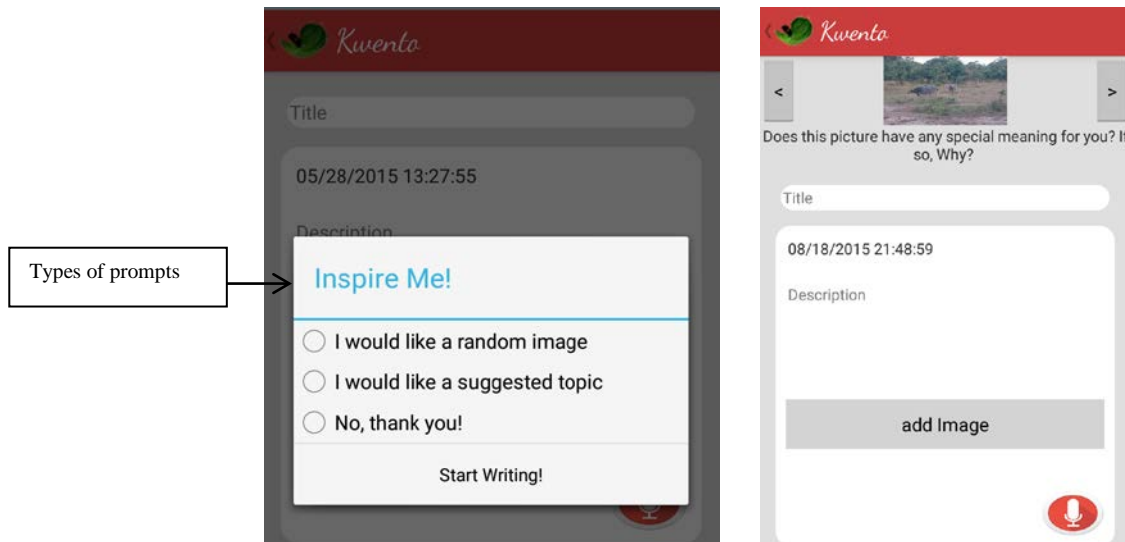


Figure 13: Screenshots showing 1) types of prompts and 2) story creation page

In her case, she chooses to receive a photo prompt and is directed to the story creation page. A randomly selected photo from her phone memory is presented at the top of the page. In this instance, she sees a photo of her trip to East Coast Park last month. Upon reflection, she remembers the games and activities that she took part in during the event and decides to write a story about the day. She types out her experience and imports several photos to supplement her story. Once the story is completed, the story is automatically saved and can be accessed or revised at a later date (see Figure 14).

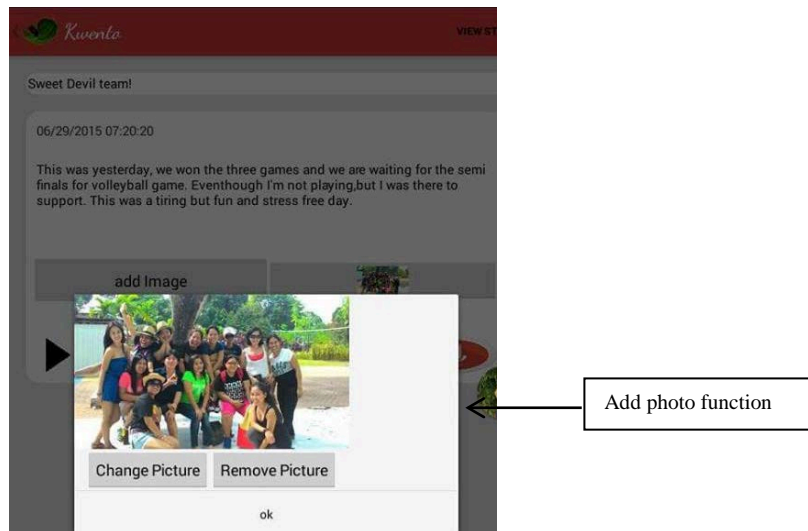


Figure 14: Screenshot showing the “add photo” dialogue

After saving her story, Rose is prompted by the system to answer a few questions. First, she has to rate how difficult it was to write the story. Second, she has to rate how useful the provided prompt was. Finally, she is instructed to reflect on the writing process itself. Upon reflection, she feels that it was a little challenging deciding what else to add to her story and enters that as feedback to the system (see Figure 15).

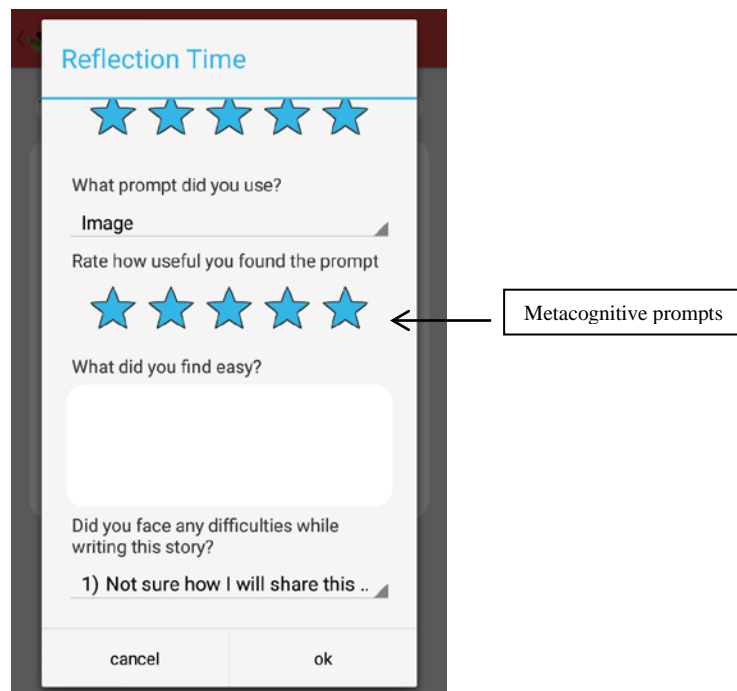


Figure 15: Screenshot showing metacognitive prompts

Rose realizes that her completed story is now represented as a bird on the main menu page and is pleased that she is rewarded for her efforts (see Figure 16).



Figure 16: Screenshot showing main menu page

She is motivated to find other experiences to reflect upon and record for her family. She decides to write another story immediately. Upon clicking on the “create a new story” icon, the system reminds her that she expressed a particular difficulty in her previous story and provides her with a general suggestion for how she may overcome that challenge (see Figure 17).

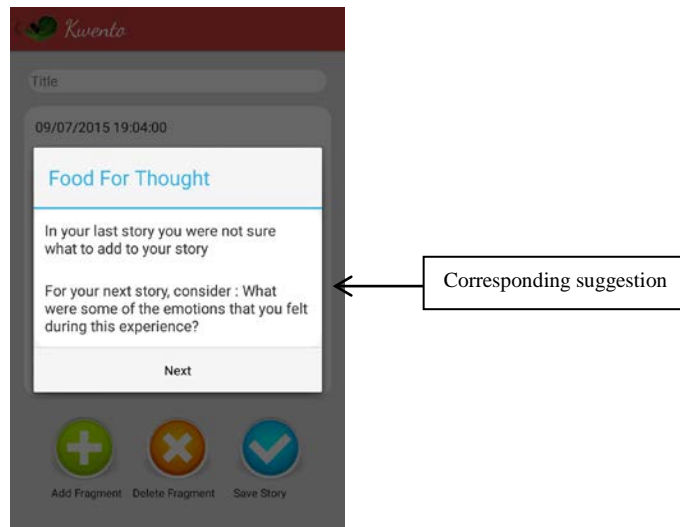


Figure 17: Screenshot showing suggestion made based on the participant’s previous story

The following flow chart summarizes the sequence of steps and decisions a user may take when using Kwento, as illustrated in the usage scenario above (see Figure 18).

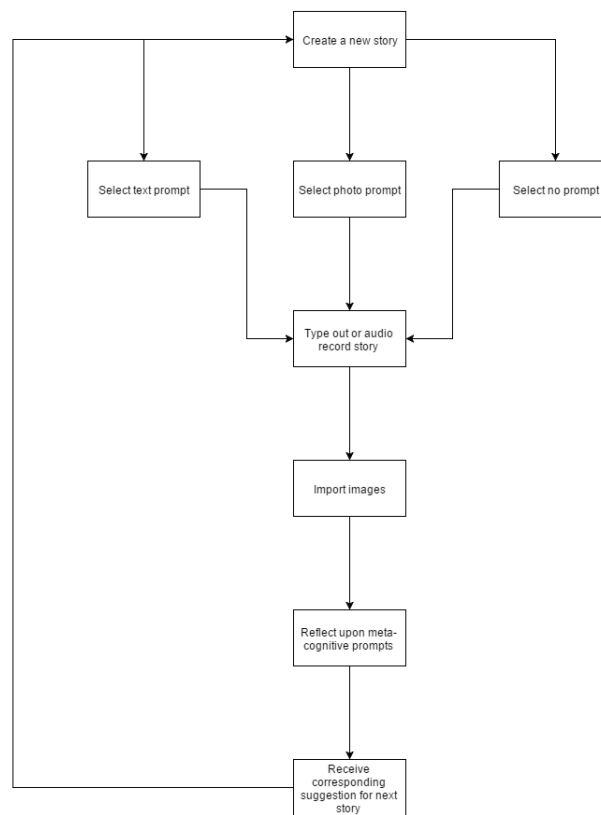


Figure 18: Flow chart showing story creation process

7.2 System Features

Having presented a usage scenario, we will now describe the features of Kwento in detail.

7.2.1 Reflective prompts

The main feature of the application lay in the implementation of prompts to encourage self-reflection (see Figure 19). Each time a helper logged in, she would be free to choose from two types of reflective prompts: 1) a question or 2) a randomly selected image. The reflective questions included in the system emerged directly from the design sessions in the hopes that other FDWs with similar backgrounds would find such topics relevant. Users can also choose to receive a randomly selected photo taken from their phone. From there, they are encouraged to examine the photo and reflect if there is an interesting experience worth sharing.

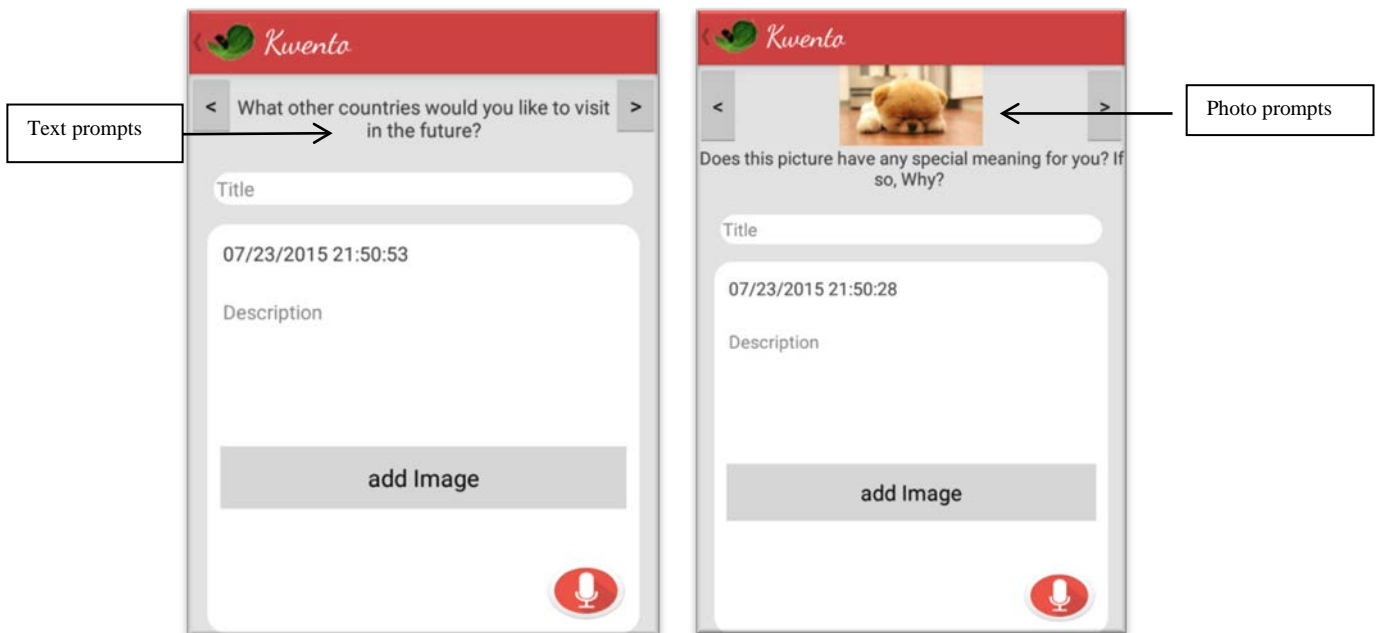


Figure 19: Screenshots showing 1) text prompts and 2) photo prompts

7.2.2 Meta-cognitive prompts

We included meta-cognitive prompts to address the main design problem, which was that the FDWs we interviewed felt that they “nothing interesting to share.” When a user saved her story, Kwento would ask her what problems she faced when writing the story (see Figure 20). Based on her choice, the system provided relevant suggestions when she starts writing her next story. These prompts were designed to provide a personalized experience for each user, and offer support in the specific areas of difficulty faced in formulating their stories. Users would learn new ways of thinking about their experience from these prompts over time, and may consequently become better at communicating stories without support.

Drawing upon the design sessions, we identified three common difficulties users faced: 1) uncertainty over how they planned to share the story, 2) being unable to organize their stories and 3) being unsure of what else to add to their stories. The design teams were tasked with proposing suggestions to help users address these difficulties.

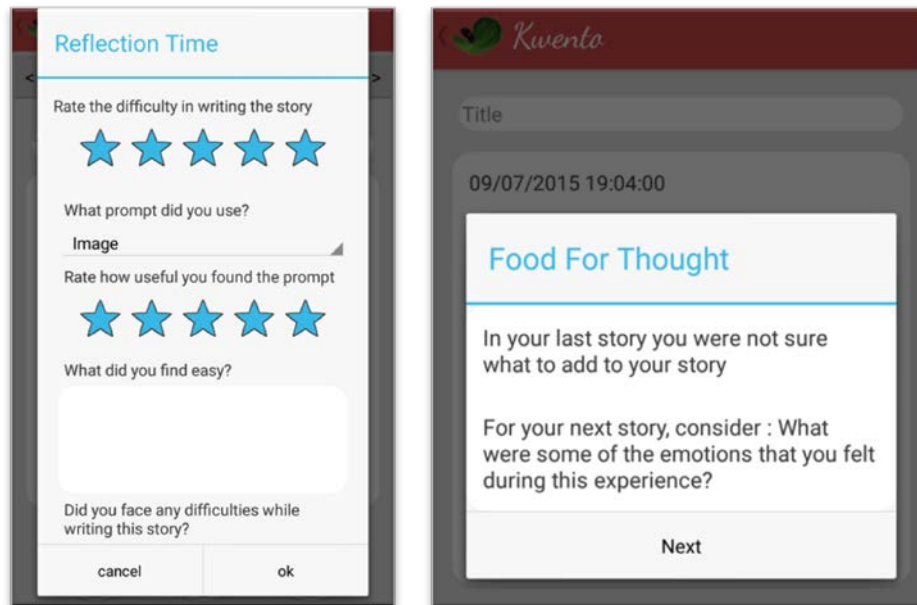


Figure 20: Screenshots showing 1) meta-cognitive prompts and 2) corresponding suggestions

The participatory design session participants felt that such prompts would help users become more aware of which aspects of the story recording and sharing process they found difficult. More importantly, the prompts may guide users to think of strategies to overcome these difficulties.

7.3 Kwento Visual Design

The aim of our design was to create a non-intimidating environment for our users. With this in mind, we made efforts to keep the visual design for Kwento straightforward and minimal (see Figure 21).

This design consideration was realized in two main ways. First, features were represented with clear, recognizable icons. For example, the “create a story” function was represented with a green plus, positioned at the top of the page. In another example, the “voice recording” function is represented with a microphone sign.

Secondly, we also considered how some domestic helpers' mobile phones might have a small screen. In response, we implemented large icons for users. Finally, during our participatory design sessions, participants felt that it was important to reward the user for their efforts. As a result, each time the user saves a story a new bird icon is added to her main page. Each bird represents a story, and can be clicked to access and read or edit the story.

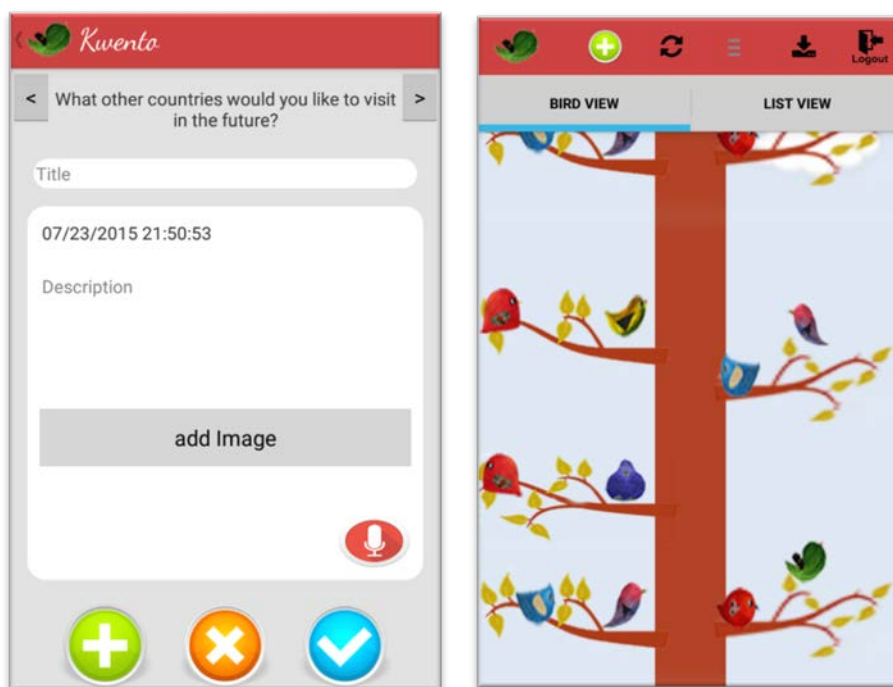


Figure 21: Screenshots presenting 1) story creation page and 2) user main page showing progress

7.4 Summary

In this chapter, we explained the main features, visual design, and interfaces for our prototype mobile application, Kwento. In the next chapter, we discuss how we had participants from the target group of Kwento test and evaluate the application.

Chapter 8: Study 03- Evaluating our System

In this chapter, we critically evaluated Kwento. Our findings from our user study suggested that text and photo prompts are effective in motivating individuals to reflect and record their personal experiences. On the other hand, the results also indicate that the visibility and frequency of the provided prompts matter, as seen by how most users chose to ignore the meta-cognitive prompts.

8.1 Study Design

To evaluate the system, we conducted a final user study with a new pool of participants. In addition to identifying the strengths and limitations of the system, we also sought to examine the effects of the prompts. To do so, we created two versions of the application. The first version included the reflective (text and photo) and metacognitive prompts, while the second version did not include either type of prompts.

20 domestic helpers were recruited via snowball sampling. To remove all biases, all of the women who were recruited for the final study had no involvement in the first or second study. The participants were randomly assigned to two experimental groups: 1) the *prompt* group, which used the full version of the app that contained the prompts, and 2) a control group, which used a variation of the app which did not contain the prompts. Assignment to the conditions was purely random. Participants were given six weeks to use the application.

The researchers met the participants at the start of the study to brief them and to install the apps on their mobile phones. The participants were then asked to use the app to write stories for their families over the next six weeks.

No other instructions were given, as we wanted to observe how the participants would choose to use the app.

Participants were individually interviewed twice after the system was deployed. The first interview took place halfway through the study, while the second interview was conducted at the end of the six-week study period. Each interview lasted 30-45 minutes. During the interviews, participants were asked open-ended questions related to their experiences using the system. We opted for this approach as we did not want to impose any assumptions about how the systems should have been used on the participants.

In addition to the two interview sessions, we also instrumented the app to collect usage logs, and captured all of the participants' stories and their responses to the meta-cognitive prompts. The researchers analyzed the data using inductive coding of the interview notes, stories, and usage logs.

8.2 Results

In this section, we discuss the results of our study. We first discuss how the participants from both groups made use of the application. Next, we describe how our participants perceived Kwento. Finally, we present how users in the prompt group responded to the textual, photo and meta-cognitive prompts.

8.2.1 Modes of usage: reflection and writing

Based on the collected data, users in the prompt group recorded a total of 133 stories, with a mean of 13.3 stories per participant. In comparison, users from the control group generated a total of 41 stories, resulting in a mean of 4.1 stories per participant.

Another difference we observed between the two groups was how often the participants engaged with the systems. Prompt group users made use of the application between three to five times per week. With the exception of two participants who used the system more (these two users made use of the application between two to three times per week), all of the control group users used their system only once a week. Participants from both groups reported that they were mostly able to write their stories once a week. However, eight users from the prompt group added that they would open the application throughout the week to interact with the text and photo prompts or to re-read their stories, which in turn made it easier for them to write about their personal experiences.

8.2.2 Perception of Kwento

Overall, participants were highly positive about Kwento. They appreciated how the application was designed to take into consideration their limited access to technology. For example, Participant 3 (prompt group) explained:

“Sometimes if we are alone and feeling homesick, we can make stories. We can put everything about us. And it’s nice that we no need to use Wi-Fi for this app.” Participant 6 (prompt group) similarly said: *“It’s good that you don’t need Internet connection to upload [stories] because in my work, I only stay at home, so I am bored. Now I can write the story to say what I feel.”*

The women we studied told us that they appreciated that the application was easy to pick up and fun to use. As Participant 4 (prompt group) said:

“The app entertains me and I feel happy too when I write some of my memories there. It’s like a diary and when the day is over, I can just pick up my phone and write anything I want. I like the idea of the bird because if I see a bird, I think of freedom.”

More importantly, the tool was viewed as supportive as *“you can write whatever you want, freely and decide whether you want to publish it or not... it’s important because sometimes we skip thinking about all those things”* (Participant 1, prompt group).

We found that the participants largely ignored our voice-recording function. During the participatory design sessions, the design teams felt that this feature could help users reduce the amount of time needed to record their personal experiences. However, participants in the final study reported that they felt that it would be “strange” to play back the audio, and that it would be easier to record their stories using text and images. Some participants did express an interest in a video-recording feature for future iterations. While this feature has potential, the researchers are of the view that it will be difficult to implement for our intended users as most of them use mobile phones with limited storage capabilities.

Finally, participants reported that the system suffered from occasional bugs that affected their experiences. For example, two participants stated that their systems would crash when they tried to log in. Another participant reported that she was not able to save her stories. This issue was resolved once she reinstalled the application.

8.2.3 Usefulness of prompts

Having presented how our participants responded to Kwento, we now describe the participants' experiences with the text, photo and meta-cognitive prompts.

In general, with the exception of one user, all of our participants claimed that the reflective prompts were useful for inspiring them to reflect and find new experiences to write about. Participant 10 (prompt group) shared:

“It’s useful for me as I don’t write diaries since I don’t have the time to think how to start doing it. This app seems like a diary but it helps me to start making a story through the suggestion topics. Questions for me are interesting, because some of them are personal questions like what motivates me and so on.”

Participant 4 (prompt group) echoed this sentiment:

“It gives me an idea of what to write. When I don’t feel like answering the questions, I can go to the random image and select a photo that is from my gallery and that image gives me an idea on what to write.”

We were also interested to examine whether the prompts had any effect on how difficult it was for participants to reflect and write stories about their personal experiences. Consequently, we had each participant rate, on a scale of one to ten, how difficult it was to reflect and write about their experiences before and after using Kwento (see Table 2).

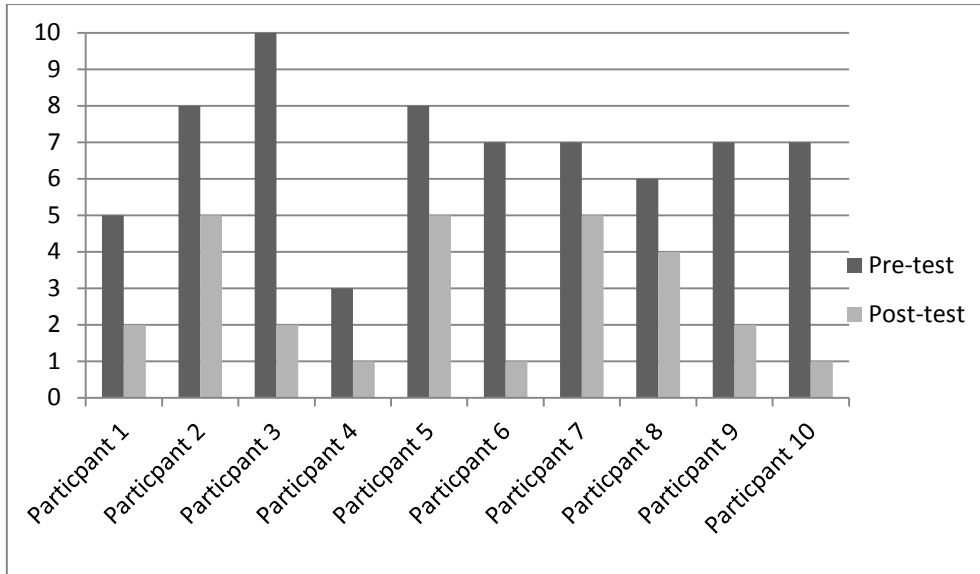


Table 2: Change in difficulty for reflection and writing for users in the prompt group

Interestingly, all of the users from the prompt group reported a decrease in difficulty after using the app. In comparison, seven out of ten users in the control group reported no change.

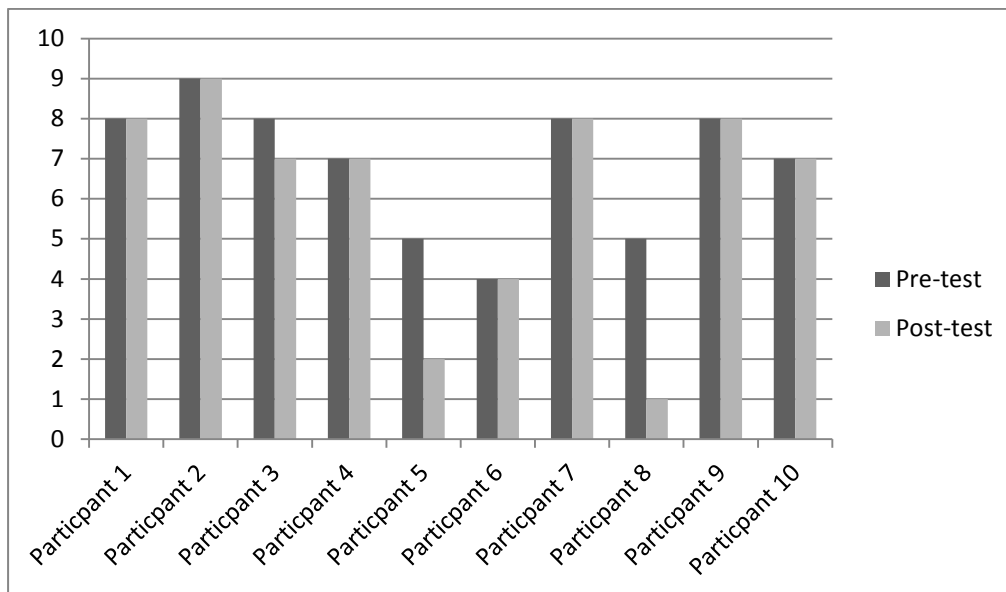


Table 3: Change in difficulty for reflection and writing for users in the control group

The qualitative comments of participants in the two groups also reflected the difference in their perceptions of difficulty in reflection and

writing before and after using Kwento. For example, Participant 8 from the prompt group shared: *“When I started, it was very difficult but now it’s simple to write the story... I describe the pictures and think how these photos are important to me.”*

In contrast, Participant 17 from the control group said that there was *“no change because I am not sure what to say. I wrote some stories but I have already shared these stories with my family before.”*

It is worth noting that three users from the control group reported a decrease in their difficulty reflecting and writing after using Kwento (see Table 3), despite their versions of the application having no prompts. As we will discuss later in this chapter, we found that some users were able to adopt strategies on their own to motivate themselves to reflect on their daily lives.

Based on our interview questions, we also found patterns in the ways that participants made use of the prompts. Users typically described the images presented in the photo prompts. In addition, we also observed that the participants would add the particular photo they were prompted with to their story. Many participants found the photo prompts to be an “easier” way to start the writing process.

In comparison, text prompts required the user to reflect on a deeper level to determine if the experience was worth recording. Consequently, participants tended to feel they were able to write more meaningful stories with the text prompts.

To support the above observations, we present two stories recorded by a participant. A story written by Participant 3 (prompt group) using the photo prompt (see Figure 22) read: *“This was yesterday, we won three*

games and we are waiting for the semi-finals for the volleyball game. Even though, I am not playing, I was there to support. This was a tiring but fun and stress-free day.”



Figure 22: Photo taken by participant using Kwento

Meanwhile, the same participant made use of two text prompts: “How do you motivate yourself to being strong while working in Singapore?” and “What lessons have you learnt while working in Singapore?” to record the following story:

“Last time my first employer never give off days. I just wait until my contract finish and find a new one that can give me off days. I promised to myself that if I have off days, I will use them in a useful and good way. So when I start working with my new employer. I decided to learn sewing. The school is Filodep (Filipino ongoing development) managed by Sister Roslinda Tan, a Franciscan Missionary nun. I study basic sewing, advance and advance 1. I got best student in advance and advance 1. I always participate in our school activities. I win first prize in our Easter egg painting, one of the best costumes in our international costume competitions. Sometimes I help as an assistant student teacher in the sewing class.”

During the follow-up interview, we asked the participant what she thought about both stories. Her reply was that the text prompt story was more interesting and personal, while the photo prompt story was like a caption. More importantly, she added that she enjoyed creating and re-reading the text prompt story more, which in turn motivated her to think about similar experiences.

It is worth noting that two of the participants in the prompt group opted not to make use of any of the prompts. They explained that they wanted the freedom to create their own stories. Even so, these participants acknowledged that they would at times scroll through the text or photo prompts for inspiration.

Finally, we observed that most of the participants from the prompt group chose to ignore the meta-cognitive prompts. As we mentioned earlier, these prompts were intended to help users increase their awareness of their weaknesses and strengths in terms of storytelling. However, participants shared that given their limited free time, the meta-cognitive prompts required too much effort. As Participant 10 (prompt group) expressed, *“Sometimes, honestly I just go straight to no difficulties as I want to save my stories quickly. I don’t like to answer so many questions.”* Participant 3 similarly said, *“I don’t like the reflection because so far I can’t see any problem. It takes time and I didn’t use them.”*

On the other hand, Participant 4 (prompt group) claimed that she found the meta-cognitive prompts useful. She said:

“Yes I think the questions are useful because you’ll have the idea on what to write next. It helped on how I will make my

story more interesting and how it can entertain the reader. In short, it gives me ideas on how to improve my writing.”

While we are encouraged by the final quote, the fact stands that most of our participants did not engage with the meta-cognitive prompts. Taking that into consideration, it is worth re-examining why the prompts failed, which could be related to how we implemented the prompts in the system. We delve deeper into this and other findings in our discussion below.

8.3 Discussion

Having presented the results from our study, we will discuss the following points: 1) how Kwento encourages users to reflect upon and record significant personal experiences 2) what makes a good prompt, 3) failures of the meta-cognitive prompts and 4) the limits of using technology to support family storytelling.

8.3.1 How Kwento encourages users to reflect upon and record daily experiences

We begin our discussion by examining how Kwento was designed to encourage users to reflect upon their daily experiences to identify potential stories to share with their families at a later date. As mentioned in chapter 3, prior projects may not be suitable for domestic workers for a variety of reasons, including that these systems typically require constant internet connectivity. To address this, we collaborated with the intended end-users to develop a prototype mobile application that did not require internet connectivity.

Furthermore, in response to feedback from the first two studies that many members of our target group had difficulty coming up with “interesting”

stories, we included and tested the use of prompts to motivate individuals to reflect on and record significant experiences. As aforementioned, we believe that this is a necessary first step towards supporting family storytelling. While there have been studies adopting a prompt or cue approach, these studies typically evaluated their systems with a single group of users (Frank R Bentley, Santosh Basapur, & Sujoy Kumar Chowdhury, 2011; Bentley & Chowdhury, 2010; Peesapati, Schwanda, Schultz, Lepage, et al., 2010). In contrast, we decided to conduct a comparative study using two versions of Kwentto, with and without prompts.

From the usage data, we found that when compared to the control group, the prompt group users recorded more stories, engaged with the app more regularly, and reported that it was easier to reflect on and record personal experiences for their families after using the system. However, the data failed to explain *how* and *why* the prompts worked. To answer this, we draw upon the responses provided by participants during the follow-up interviews.

As previously mentioned, users in the prompt group shared that they found the repeated exposure to the text and photo prompts useful. Given their limited free time, participants reported that they would only write stories on their off days. In between their off days, when they did not have time to actually write a story, many of the prompt group participants would however still open up the application to browse through the text and photo prompts. Participant 2 (prompt group) mentioned that the prompts kept her memories fresh in her mind. *“I can start with a title, and think more about my story over the week,”* she said.

Other participants said that the re-reading of their stories motivated them to think of similar experiences to write about. This is in line with prior research that showed that people value the idea of revisiting their responses, and this in turn encourages them to “reflect, reminisce, and write more in a virtuous circle” (Peesapati, Schwanda, Schultz, Lepage, et al., 2010, p. 2027). The simple presence of the prompts and previously written stories on their mobile phones could have encouraged the participants to continue the process of reflecting and reminiscing, even when they were not actively engaged in writing new stories. Through this ongoing reflection and reminiscence, many of the participants were able to begin to get over their assumptions that they are “unable to share” their experiences with their families.

In addition, some participants were able to make use of the prompts to discover new meanings in some of their daily experiences. For instance, Participant 6 (prompt group) shared that the prompts challenged her assumptions regarding what made an experience significant or interesting. In her case, she shared about her experience of finding a bird’s nest: “*Before I won’t write about this, maybe at most take a photo and caption for Facebook. Now, I want to record the journey of this egg... didn’t think I could write stories about these things.*” We therefore concluded that Kwento was largely successful in encouraging users to actively reflect on their daily experiences, and helping users to discover interesting experiences to share with their families. Based on our formative study, many of our participants expressed that they felt that they had “nothing interesting to share”. Given that finding, we endeavored to address how we could design a system that would motivate

them to reflect upon their daily experiences, as a step towards identifying and writing family stories.

8.3.2 What makes a good prompt?

During our user study, we had observed that some prompts were experienced by users as being more evocative than others. Taking into consideration the growing body of work exploring the use of cues or prompts, we hope to share some of the insights gained on the topic from our study.

We had observed that users made use of the two types of prompts in specific ways. Users generally found the photo prompts to be a good starting point. They explained that it was straightforward to respond since all they had to do was to describe the image. On the other hand, text prompts required users to reflect more on the experience. As a result, although participants found it easier to write using the photo prompts, they were able to write more thoughtful stories using the text prompts.

Based on these findings, future systems may wish to consider the order that prompts are presented to the user. For example, systems that are intended for young or novice users might benefit from having users engage with photo prompts first. Text prompts could then be slowly introduced as users become better at and more interested in formulating stories based on the prompts.

Our participants' interview responses also revealed that prompts were rarely used in isolation. Many of our participants shared that they would often combine two to three prompts to write their stories. Taking that into consideration, it may be worthwhile for designers to group or categorize their prompts. Alexander (1979)'s pioneering work on patterns and pattern languages may be relevant here. According to Alexander (1979), a pattern

language is created by the fact that individual patterns are not isolated. Furthermore, he argued that each pattern “sits at the center of a network of connections which connect it to certain other patterns that help complete it” (p.313). In the same way, our findings suggest that participants find the relationship between individual prompts useful. This may be a worthwhile point to take into consideration in the design of the way the prompts are presented to the user in similar systems. In order to fully exploit the conceptual linkages between different prompts, such a system could also be refined to make it more *adaptive*. For example, the system could provide users with a follow-up prompt each time they re-read or revise their current stories.

8.3.3 Failures of the meta-cognitive prompt

Finally, there are lessons to be learnt from the failure of our meta-cognitive prompts to engage most of the participants in the final study. One concern that emerged from our participatory design session was that some participants may find the writing process challenging. For example, novice writers may not know how to end a particular story, or be unsure of what to include in their story. To address that, the participatory design teams felt that meta-cognitive prompts could help our users to improve their writing abilities. Earlier work backs up the researchers’ belief that meta-cognitive prompts can enhance an individual’s ability to learn and transfer (Bannert, 2006), and encourage self-learning (Kauffman, Zhao, & Yang, 2011).

However, the meta-cognitive prompts were mostly ignored by our participants. Participants explained that the prompts appeared too often, the open-ended nature of the prompt questions required too much effort and time.

The design implication from such a finding is that the visibility and frequency of prompts can have an impact on whether or not they are actually used.

8.3.4 Limits of technology

There is a growing interest in developing technologies for migrant workers and immigrants (Brown et al., 2014; Susan P. Wyche & Chetty, 2013). Having said that, researchers and designers have to acknowledge the limits of what technology can accomplish. We had hoped that technology could provide a solution for participants to send stories to their families. However, most participants insisted that no technology could replace face-to-face communication. As Participant 4 shared, *“I want to share it to them during our family get-together and show them the images. Maybe I can read them a few stories and hear what they say.”*

Clearly, traditional forms of communication remain highly valued among the FDWs we interviewed: many of the participants expressed that they still made use of traditional journals and scrapbooks. Researchers and designers designing ICT solutions for FDWs therefore have to carefully consider how their proposed systems integrate into the users' current lifestyles and behaviors.

It is also worth noting that some of our participants viewed Kwento as a temporary measure. In such cases, they appreciated how the system allowed them to record their personal experiences while working overseas, but looked forward more to being able to share personal experiences face-to-face upon their return.

The significance of this result is not that Kwento is lacking in achieving its intended purpose, but that the researchers should consider how it

is intended to be a temporary measure rather than a permanent solution. This finding also resonates with a finding by Brown (Brown, 2015, p. 130), who observed that migrant families were typically in a period of transition.

Acknowledging that, the tools she developed for the migrant workers needed only to persist for a period of time, such as while parents are separated from their children. She added that “designing for transient use is an acknowledgement that a particular technology is not in and of itself a solution to the challenge, but rather a transitory means to a more permanent solution” (Brown, 2015, p. 130).

8.4 Summary

In this chapter, we discussed the evaluation of Kwento in a six-week field trial involving 20 FDWs. Our observations provide insights into the ways that systems can support the capturing or recording of significant personal experiences. In particular, our results suggest that text and photo prompts are an effective way to motivate users to reflect on their experiences. Our comparative study also highlighted interesting differences in the interactions of users in the prompt group and users in the control group with the app. Users in the prompt group were able to write more stories, and reported that it was easier to reflect on their daily experiences after using the app, while most users in the control group reported no change in the difficulty in reflection and writing. Based on these results, we offered a number of observations on how participants used the prompts and what makes a “good” prompt. In the next chapter, we extend the discussion to the overall implications of all three

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studies, reflect on the methods used, and acknowledge the limitations of our work.

Chapter 9: Discussion

In this chapter, we discuss the implications of our three studies, provide insights into the advantages and disadvantages of our study methods, and describe the limitations of our studies. We also address possible objections towards our studies.

9.1 Implications

Our findings suggest that FDWs have a variety of stories to share with their families, despite many initially believing themselves to have “nothing interesting to share.” This may have implications for future research investigating how migrant workers adopt and utilize ICTs.

This perception of “being unable to do more” could influence other aspects of their lives. For example, as we discussed earlier in chapter 2, there has been a growing body of research exploring how migrant workers use ICTs for social support or for interpersonal communication. Such studies typically argue that the workers’ access to technologies remain the main obstacle preventing them from attaining social support. However, it could also be possible that some individuals feel that they are unable to gain social support, even if they already have access to a mobile phone. With this in mind, future research may want to probe participants to better understand their current attitudes and perceptions on ICT usage.

Findings from our user study also have implications for the design of family storytelling systems. Based on our initial studies, our interview findings showed that many domestic helpers typically perceive themselves to have no interesting or significant stories to share with their families. Yet, as our probe pack findings strongly suggest, the women we interviewed did have a range of

stories they wanted to share with their families. Given the scope of this thesis, we decided to focus on examining how we could design a system that would encourage users to reflect upon and record their personal experiences. As we have stated numerous times in this thesis, this remains a crucial first step towards supporting family storytelling. With that focus in mind, our final user study showed that the text and photo prompts were effective as cues to motivate the users to reflect on and record their personal experiences. Additionally, our findings suggest that users made use of prompts in specific ways. For example, text prompts resulted in detailed stories while photo prompts resulted in brief descriptions of the image. Future family storytelling systems could consider the order of when prompts are presented to the user.

Based on our study, the researchers posit that it may be worthwhile for systems to present novice users with more photo prompts, before transitioning to text prompts as the user becomes more familiar and experienced with the reflection and story creation process. In addition, we also note that our participants often made use of multiple prompts simultaneously. This has significant implications as it suggests that the relationships between prompts may be important. Taking this into consideration, future researchers and designers may want to explore why and how prompts work together.

As a whole, our studies suggest that traditional forms of communication, such as diaries and journals remain important. The participants stressed how no technology could replace face-to-face storytelling. Some of our participants also viewed Kwento as a temporary measure. In such cases, the women found the system to be useful as it allowed

them to record their daily experiences, which could then be shared in person upon their return.

The researchers do not intend for Kwento to be a permanent solution for FDWs to communicate with their families. Instead, we hope that the prompts provided by the system will motivate users to reflect upon and record their daily experiences. As the user becomes more experienced, he or she may no longer require the prompts to reminisce. Ideally, this would help the user better appreciate the importance of reminiscing and storytelling and inspire them to do so without help from the system.

9.2 Reflection on methods

Having presented the implications for our studies, we reflect upon the methods we adopted.

9.2.1 Cultural probes

Methodologically, our experience showed that the probes were valuable in revealing insights beyond more traditional research methods. However, we faced several challenges which future researchers may wish to take into consideration.

Firstly, as mentioned earlier, probes have to be carefully designed to ensure that they do not include assumptions or biases. As McDougall and Fels (McDougall & Fels, 2010) noted, probes that are built on researchers' biases are likely to be ineffective, since researchers will learn nothing beyond what they already assumed. In our study, the probes were carefully redesigned several times to eliminate pre-conceptions or expectations. For example, even though we were interested in family storytelling, we did not specify any particular interpretation of what constitutes a "family story."

Secondly, the analysis of data from probes can prove challenging as researchers may not always understand the full meaning of a particular text. To reduce the chance of misinterpretation by the researchers, we used the second round of interviews to ask the participants follow-up questions. Consequently, we did not encounter significant problems with the data coding and analysis.

9.3 Possible Objections to Use of Participatory Design

Next, we wish to highlight and address possible objections to different aspects of the research described in this thesis.

Some might argue that the primary researcher should not have been part of the design teams in study 2. It is possible that our active involvement in the design process could have inadvertently introduced biases to the end solution. Alternative techniques like PICTIVE (see Muller, 1991) have been developed by other researchers to avoid this situation, primarily discussing and elaborating on initial designs made solely by participants with no researcher intervention.

However, based on our experience with the focus groups, we found it useful for the researcher to be part of the design teams. The benefit of doing so was that it was easier for researchers to relate to some of the challenges faced by the participants, as all members of the design teams, including the researchers, were tasked to make use of the probe packs. For instance, both participants and researchers found it difficult to reminisce without any cues.

Another possible objection may be that due to uneven power relations between the researcher and the participants, participants may have a tendency to agree to the suggestions made by the researchers. In recent years,

much ink has been spent on reporting how traditional human-computer interaction (HCI) methods may not be suitable for developing countries without significant adaptation (Dell, Vaidyanathan, Medhi, Cutrell & Thies, 2012). For example, a study by Dell et al. found that if participants believed that a particular technological artifact was favored by the interviewer, their responses were biased to favor it as well.

We concede that such power relations may exist, despite the best intentions and precautions taken by the researchers. To mitigate this effect, we stressed to the participants that they were co-designers of the system. More importantly, we emphasized that the system was to be developed as a team effort.

In this thesis, we have also made an effort to explain how we conducted each design session, in order to acknowledge and account for any possible influence that the researchers may have had on the final end-product. For example, we detailed how the researchers initially suggested the meta-cognitive prompts, and sought the views of the participants before including these prompts in the system. As with any co-design or participatory design work, deep, honest reflexivity is required by the researchers. Consequently, we have provided the readers with the opportunity to relate data to the findings drawn by the researchers for themselves. For example, we have carefully detailed how each design session was conducted, what ideas were considered, which were discarded and so forth. According to a report by Burrell and Toyoma, such explicit information helps to increase the confidence in the research (Burrell & Toyama, 2009).

Yet another possible objection could be that with the exception of the first group, we asked the other two groups to critique and build upon one another's design ideas, rather than having participants come up with design ideas independently. As in the above point, some critics might argue that incrementing on ideas from a different group may introduce biases, and that it would be better to allow participants to build upon their own ideas or build upon ideas from participants in the same group. However, as we earlier mentioned, we only brought in the ideas of other groups and conducted discussions after each team had finished proposing their own ideas. More importantly, existing work suggests that such a "mixing ideas" technique is a useful way for merging individual ideas into larger collaborative ideas (Guha et al., 2004). It is worth noting that our participants also found value in this "mixing" ideas approach. As one participant shared, "it's good that we can also see other people's ideas. Then we know what everyone is thinking... this way we make everyone happy" (Participant 3).

9.4 User Study Limitations

As previously mentioned in chapter 8, we conducted a user study with 20 participants to evaluate Kwento. While the initial findings were positive, they are not without their limitations.

Participants were randomly assigned into two groups for the study. The focus group findings suggest that married mothers may choose to share specific types of stories with their children back home. It would be interesting for future work to examine such differences, although the random assignment of participants into the groups for this study have made it impossible for the researchers to collect enough evidence to draw any conclusions on this.

Our decision to divide the participants into two groups also meant that we were not able to draw any conclusions in terms of how each type of prompts worked individually. Ideally, we could have created a total of six conditions: 1) users provided with text prompts only, 2) users provided with photo prompts only, 3) users provided with meta-cognitive prompts only, 4) users provided with all prompts, 5) users provided with no prompts and 6) users not provided with the application at all. With such a set-up, we would be able to examine the effects of each type of prompt. Having said that, such a study would be much more costly and time-consuming.

Alternatively, we could also have conducted a detailed study involving one or two families. The advantage of such a study would be that we would be able to observe how different family members recorded, experienced and retold family stories. However, as we have previously discussed, our primary concern was to address the desires of our primary users. Given the scope of this thesis, we were not able to recruit overseas family members.

9.5 Summary

In this chapter, we presented the implications of the findings from our three studies, reflected upon our chosen methods, acknowledged the limitations of our studies, and addressed the potential objections to our work. In the next chapter, we will summarize and conclude our research, presenting the possible contributions of this work to future studies and discussing potential future studies drawing on our findings.

Chapter 10: Conclusion

This chapter provides a summary and recap of the thesis, giving an overview of the results and findings of the three studies conducted. We then present the contributions of our work to existing bodies of knowledge. Finally, we will discuss the possible directions for future work.

10.1 Contributions

This thesis aimed to explore how we could support family storytelling for families living apart using ICTs. Acknowledging how different types of families face different obstacles, we chose to focus on how we could design an application that could encourage the recording and capture of significant personal experiences of FDWs in Singapore.

As we discussed earlier in chapter 2, this design space remains largely unexplored. To the best of our knowledge, there has been no prior work focusing on storytelling for domestic helpers. To address this gap in research, we investigated the following research questions:

- RQ1: Do domestic workers record and share family stories, and if so, what role do ICTs play in this process?
- RQ2: What are the difficulties faced by domestic workers with regard to family storytelling?
- RQ3: How can we support family storytelling for such families to help overcome these difficulties?

In the course of answering these research questions, our thesis makes the following contributions.

First, in addressing RQ1, we contribute to existing literature on the usage of ICTs by migrant workers. Our work adopts a different lens to

investigate how female domestic workers use ICTs specifically for family storytelling. Our findings suggest that, given their constrained working environments and limited social interactions, FDWs choose to make the “best use” of their limited communication time to share specific types of stories, such as stories for sense-making or for constructing family identities. In addition to that, the study also revealed that FDWs often choose not to share certain types of stories with their families, for fear of making them worry. As a result of this limited family storytelling, the FDWs we interviewed expressed a concern that they might be forgotten by their family members, opening up the possibility of a technological intervention.

Next, in addressing RQ2, we explored the types of challenges faced by FDWs with regard to family storytelling. Our findings suggest that FDWs continue to face a variety of obstacles, such as uneven access to ICTs, long working hours and challenging working conditions. As we previously discussed, the participants agreed that it would be difficult to design a solution to solve such problems. Findings from the participatory design sessions revealed that domestic helpers often described themselves as having “nothing interesting to share” or being “unable to do more” when it came to communicating with their families through storytelling. Yet our probe pack findings strongly suggested that these domestic helpers do have a variety of stories they wish to share, despite initially believing the opposite about themselves.

Finally, in tackling RQ3, we investigated how we could help FDWs to capture and record significant personal experiences. As we have discussed, this first step is necessary given how our participants shared they did not have

“interesting stories” to write about. We adopted a participatory design approach where the end-users were active in the design process. Through these design activities, we developed and evaluated Kwento, a prototype mobile application that used prompts to encourage users to reflect on their personal experiences. We evaluated Kwento in a 6-week field trial involving 20 FDWs. Our findings suggest that our use of text and photo prompts was effective in motivating users to reflect and record their personal experiences. Users in the prompt group also reported that it was easier to reflect and record their daily experiences using the tool. At the same time, we found that our meta-cognitive prompts were often viewed as intrusive, and were largely ignored. Our findings extend the work on family storytelling systems and provides insights into how future systems could be developed to better suit the needs of migrant workers.

The primary contribution of this thesis then is a demonstration of how carefully designed ICTs can potentially help to mitigate family storytelling challenges for FDWs. In our case, the most important contribution was that Kwento appeared to have helped some of these domestic helpers overcome the perception that they had “nothing interesting to share.” It is also important to emphasize that it was beyond the scope of this thesis to examine how technologies can be designed to retell or perform family stories. Instead our primary focus was to encourage our users to reflect upon their daily experiences to identify possible stories to share with their families.

10.2 Future Work

There is a growing interest in developing technologies to help people write and share about their personal experiences. Kwento was designed to

address the concerns of FDWs. Based on our studies we found that the women that we recruited typically felt that they had nothing interesting to share about their lives. Furthermore, they expressed a distinct fear of being forgotten by their left-behind family members. To address this, we sought to explore ways of encouraging our participants to reflect upon their daily experiences.

Drawing upon the findings from our design sessions, we developed a prototype that would provide the users with various prompts, which in turn would encourage them to reflect and reminisce.

We acknowledge that the process of creating family narratives is complex and nuanced. Similarly, we concede that our current prototype is unable to investigate other aspects of family storytelling (see figure 23). For example, as we defined in chapter 1, family storytelling involves elements of retelling and performance. Given the scope of our work, we were not able to examine how ICTs could be designed to better support the actual sharing of family stories. As such, we believe that this would be a rich research area for future work.

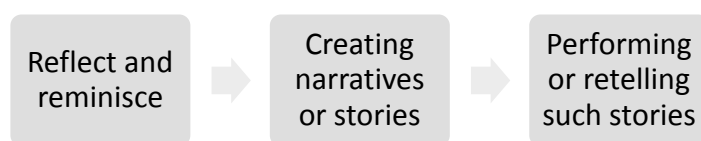


Figure 23: Flowchart showing the stages for storytelling

Another possible direction for our future work could be to examine how our system could be expanded to support domestic workers from other countries like, Indonesia, Myanmar and India. In addition to that, the main features of the system could also be modified to suit military families where one or both parents are deployed overseas, separated families and other types of migrant families. As rightly pointed out by Toyoma and Burrell (2008), applicability and generalizability are important as studies that fail to consider how findings might apply outside of the specific, directly examined case are of limited use to researchers. On the other hand, many researchers, including Burrell herself, caution against embracing a blind stress on generalizability. As she opines, “such a mindset would favor studies that amass data points and cover large regions but fail to explore a topic in-depth as a case study might”.

Next, we have only been able to investigate how family stories were created and from the perspective of the mothers living overseas. In the future, we hope to examine how the family members living in their home countries experience and retell family stories. Based on our literature review, there is a growing body of research investigating this. However, existing studies typically focus on conventional families. As such, we believe it would be worthwhile to explore how migrant families living apart record, share and remember family stories.

Finally, the data presented in this thesis describes a field trial conducted over a relatively short period of six weeks. We are encouraged by

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how our participants found it easier to reflect and write about their daily lives over this short period. Following on from this, we could refine our prototype and explore the longer-term effects and benefits of Kwento's design.

REFERENCES

- Ackerman, S., Zuroff, D. C., & Moskowitz, D. (2000). Generativity in midlife and young adults: Links to agency, communion, and subjective well-being. *The International Journal of Aging and Human Development*, 50(1), 17-41.
- Alampay, E., Alampay, L., & Raza, K. (2013). The impact of cybercafés on the connectedness of children left behind by overseas Filipino workers.
- Alexander, C. (1979). *The timeless way of building* (Vol. 1): New York: Oxford University Press.
- Ames, M. G., Go, J., Kaye, J. J., & Spasojevic, M. (2010). *Making love in the network closet: the benefits and work of family videochat*. Paper presented at the Proceedings of the 2010 ACM conference on Computer supported cooperative work.
- Aricat, R. G., Karnowski, V., & Chib, A. (2015). Mobile Phone Appropriation and Migrant Acculturation: A Case Study of an Indian Community in Singapore. *International Journal of Communication*, 9, 22.
- Babbie, E. (2013). *The basics of social research*: Cengage Learning.
- Bae, J.-e., Lim, Y.-k., Bang, J.-b., & Kim, M.-s. (2014). *Ripening room: designing social media for self-reflection in self-expression*. Paper presented at the Proceedings of the 2014 conference on Designing interactive systems, Vancouver, BC, Canada.
- Ballagas, R., Kaye, J. J., Ames, M., Go, J., & Raffle, H. (2009). *Family communication: phone conversations with children*. Paper presented at the Proceedings of the 8th International Conference on Interaction Design and Children, Como, Italy.
- Bannert, M. (2006). Effects of Reflection Prompts When Learning with Hypermedia. *Journal of Educational Computing Research*, 35(4), 359-375. doi: 10.2190/94v6-r58h-3367-g388
- Bentley, F. R., Basapur, S., & Chowdhury, S. K. (2011). *Promoting intergenerational communication through location-based asynchronous video communication*. Paper presented at the Proceedings of the 13th international conference on Ubiquitous computing, Beijing, China.
- Bentley, F. R., Basapur, S., & Chowdhury, S. K. (2011). *Promoting intergenerational communication through location-based asynchronous video communication*. Paper presented at the Proceedings of the 13th international conference on Ubiquitous computing.
- Bentley, F. R., & Chowdhury, S. K. (2010). *Serendipitous family stories: using findings from a study on family communication to share family history*. Paper presented at the Proceedings of the 12th ACM international conference adjunct papers on Ubiquitous computing - Adjunct, Copenhagen, Denmark.
- Berthold, K., Nückles, M., & Renkl, A. (2007). Do learning protocols support learning strategies and outcomes? The role of cognitive and metacognitive prompts. *Learning and Instruction*, 17(5), 564-577. doi: <http://dx.doi.org/10.1016/j.learninstruc.2007.09.007>
- Bohanek, J. G., Fivush, R., Zaman, W., Lepore, C. E., Merchant, S., & Duke, M. P. (2009). Narrative interaction in family dinnertime conversations. *Merrill-Palmer Quarterly*, 55(4), 488-515.
- Brown, D. (2015). Designing Technologies to Support Migrants and Refugees.
- Brown, D., Ayo, V., & Grinter, R. E. (2014). *Reflection through design: immigrant women's self-reflection on managing health and wellness*. Paper presented

- at the Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, Toronto, Ontario, Canada.
- Brown, D., & Grinter, R. E. (2012). *Takes a transnational network to raise a child: The case of migrant parents and left-behind Jamaican teens*. Paper presented at the Proceedings of the 2012 ACM Conference on Ubiquitous Computing.
- Burrell, J., & Toyama, K. (2009). What constitutes good ICTD research? *Information Technologies & International Development*, 5(3), pp. 82-94.
- Chib, A., Malik, S., Aricat, R. G., & Kadir, S. Z. (2014). Migrant mothering and mobile phones: Negotiations of transnational identity. *Mobile Media & Communication*, 2(1), 73-93.
- Chib, A., Wilkin, H. A., & Hua, S. R. M. (2013). International migrant workers' use of mobile phones to seek social support in Singapore. *Information Technologies & International Development*, 9(4), pp. 19-34.
- Cooley, C. H. (1902). The looking-glass self. *O'Brien*, 126-128.
- Crabtree, A., Hemmings, T., Rodden, T., Cheverst, K., Clarke, K., Dewsbury, G., . . . Rouncefield, M. (2003). *Designing with care: Adapting cultural probes to inform design in sensitive settings*. Paper presented at the Proceedings of the 2004 Australasian Conference on Computer-Human Interaction (OZCHI2004).
- Crawford, C. (2004). *Chris Crawford on Interactive Storytelling (New Riders Games)*: New Riders Games.
- Cuban, S. (2014). Transnational families, ICTs and mobile learning. *International Journal of Lifelong Education*, 33(6), 737-754. doi: 10.1080/02601370.2014.963182
- Dalsgaard, T., Skov, M. B., Stougaard, M., & Thomassen, B. (2006). *Mediated intimacy in families: understanding the relation between children and parents*. Paper presented at the Proceedings of the 2006 conference on Interaction design and children, Tampere, Finland.
- Dib, L., Petrelli, D., & Whittaker, S. (2010). *Sonic souvenirs: exploring the paradoxes of recorded sound for family remembering*. Paper presented at the Proceedings of the 2010 ACM conference on Computer supported cooperative work, Savannah, Georgia, USA.
- Fivush, R. (2007). Maternal reminiscing style and children's developing understanding of self and emotion. *Clinical Social Work Journal*, 35(1), 37-46.
- Fivush, R. (2008). Remembering and reminiscing: How individual lives are constructed in family narratives. *Memory Studies*, 1(1), 49-58.
- Fivush, R., Bohanek, J. G., & Marin, K. (2010). Patterns of family narrative co-construction in relation to adolescent identity and well-being *Narrative development in adolescence* (pp. 45-63): Springer.
- Fivush, R., Haden, C. A., & Reese, E. (2006). Elaborating on elaborations: Role of maternal reminiscing style in cognitive and socioemotional development. *Child development*, 77(6), 1568-1588.
- Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive–developmental inquiry. *American psychologist*, 34(10), 906.
- Follmer, S., Raffle, H., Go, J., & Ishii, H. (2010). *Video play: playful interactions in video conferencing for long-distance families with young children*. Paper presented at the CHI '10 Extended Abstracts on Human Factors in Computing Systems, Atlanta, Georgia, USA.
- Forghani, A., & Neustaedter, C. (2014a). *The routines and needs of grandparents and parents for grandparent-grandchild conversations over distance*. Paper

- presented at the Proceedings of the SIGCHI Conference on Human Factors in Computing Systems.
- Forghani, A., & Neustaedter, C. (2014b). *The routines and needs of grandparents and parents for grandparent-grandchild conversations over distance*. Paper presented at the Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, Toronto, Ontario, Canada.
- Frensch, K. M., Pratt, M. W., & Norris, J. E. (2007). Foundations of generativity: Personal and family correlates of emerging adults' generative life-story themes. *Journal of Research in Personality, 41*(1), 45-62.
- Gaver, B., Boucher, A., Pennington, S., & Walker, B. (2004). Cultural probes and the value of uncertainty. *interactions, 11*(5), 53-56.
- Gaver, B., Dunne, T., & Pacenti, E. (1999). Design: cultural probes. *interactions, 6*(1), 21-29.
- Gennip, D. v., Hoven, E. v. d., & Markopoulos, P. (2015). *Things That Make Us Reminisce: Everyday Memory Cues as Opportunities for Interaction Design*. Paper presented at the Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems, Seoul, Republic of Korea.
- Guha, M. L., Druin, A., Chipman, G., Fails, J. A., Simms, S., & Farber, A. (2004). *Mixing ideas: a new technique for working with young children as design partners*. Paper presented at the Proceedings of the 2004 conference on Interaction design and children: building a community.
- Hangal, S., Lam, M. S., & Heer, J. (2011). *MUSE: reviving memories using email archives*. Paper presented at the Proceedings of the 24th annual ACM symposium on User interface software and technology, Santa Barbara, California, USA.
- Harrigan, M. M. (2010). Exploring the narrative process: An analysis of the adoption stories mothers tell their internationally adopted children. *Journal of Family Communication, 10*(1), 24-39.
- Hondagneu-Sotelo, P., & Avila, E. (1997). "I'm Here, but I'm There" The Meanings of Latina Transnational Motherhood. *Gender & Society, 11*(5), 548-571.
- Horst, W., Bunt, T., Wensveen, S., & Cherian, L. (2004). *Designing probes for empathy with families*. Paper presented at the Proceedings of the conference on Dutch directions in HCI.
- Hulkko, S., Mattelmäki, T., Virtanen, K., & Keinonen, T. (2004). *Mobile probes*. Paper presented at the Proceedings of the third Nordic conference on Human-computer interaction.
- Hutchinson, H., Mackay, W., Westerlund, B., Bederson, B. B., Druin, A., Plaisant, C., . . . ck. (2003). *Technology probes: inspiring design for and with families*. Paper presented at the Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, Ft. Lauderdale, Florida, USA.
- ILO. (2013). Domestic workers across the world: Global and regional statistics and the extent of legal protection. Geneva: International Labour Organization.
- Inkpen, K., Taylor, B., Junuzovic, S., Tang, J., & Venolia, G. (2013). *Experiences2Go: sharing kids' activities outside the home with remote family members*. Paper presented at the Proceedings of the 2013 conference on Computer supported cooperative work.
- Isaacs, E., Konrad, A., Walendowski, A., Lennig, T., Hollis, V., & Whittaker, S. (2013). *Echoes from the past: how technology mediated reflection improves well-being*. Paper presented at the Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, Paris, France.

- Kapuire, G. K., Winschiers-Theophilus, H., & Blake, E. (2015). An insider perspective on community gains: A subjective account of a Namibian rural communities' perception of a long-term participatory design project. *International Journal of Human-Computer Studies*, 74, 124-143. doi: <http://dx.doi.org/10.1016/j.ijhcs.2014.10.004>
- Kauffman, D. F., Zhao, R., & Yang, Y.-S. (2011). Effects of online note taking formats and self-monitoring prompts on learning from online text: Using technology to enhance self-regulated learning. *Contemporary Educational Psychology*, 36(4), 313-322. doi: <http://dx.doi.org/10.1016/j.cedpsych.2011.04.001>
- Kjeldskov, J., Gibbs, M., Vetere, F., Howard, S., Pedell, S., Mecoles, K., & Bunyan, M. (2005). Using cultural probes to explore mediated intimacy. *Australasian Journal of Information Systems*.
- Kjeldskov, J., & Graham, C. (2003). A review of mobile HCI research methods *Human-computer interaction with mobile devices and services* (pp. 317-335): Springer.
- Koenig Kellas, J., & Trees, A. R. (2006). Finding meaning in difficult family experiences: Sense-making and interaction processes during joint family storytelling. *The Journal of Family Communication*, 6(1), 49-76.
- Koenig Kellas, J., Trees, A. R., Schrodt, P., LeClair-Underberg, C., & Willer, E. K. (2010). Exploring links between well-being and interactional sense-making in married couples' jointly told stories of stress. *Journal of Family Communication*, 10(3), 174-193.
- Langellier, K. M., & Peterson, E. E. (2006). Family storytelling as communication practice. *The family communication sourcebook*, 109-128.
- Law, P.-l., & Chu, W.-c. R. (2008). ICTs and migrant workers in contemporary China. *Knowledge, Technology & Policy*, 21(2), 43-45.
- Law, P.-l., & Peng, Y. (2008). Mobile networks: Migrant workers in southern China. *Handbook of Mobile Communication Studies*, 55-64.
- Lim, S. S. (2014). Women, "double work," and mobile media: The more things change the more they stay the same.
- Lindstr, M., #246, St, A., #229, hl, H, K., . . . Bresin, R. (2006). *Affective diary: designing for bodily expressiveness and self-reflection*. Paper presented at the CHI '06 Extended Abstracts on Human Factors in Computing Systems, Montr#233;al, Qu#233;bec, Canada.
- Longhurst, R. (2013). Using Skype to mother: bodies, emotions, visuality, and screens. *Environment and Planning D: Society and Space*, 31(4), 664-679.
- Luusua, A., Ylipulli, J., Jurmu, M., Pihlajaniemi, H., Markkanen, P., & Ojala, T. (2015). *Evaluation probes*. Paper presented at the Proc SIGCHI Conference on Human Factors in Computing Systems. New York, NY, USA, ACM Press.[forthcoming].
- Madianou, M., & Miller, D. (2011). Mobile phone parenting: Reconfiguring relationships between Filipina migrant mothers and their left-behind children. *New Media & Society*, 13(3), 457-470.
- Madianou, M., & Miller, D. (2013). *Migration and new media: Transnational families and polymedia*: Routledge.
- Massimi, M., & Neustaedter, C. (2014). *Moving from talking heads to newlyweds: exploring video chat use during major life events*. Paper presented at the Proceedings of the 2014 conference on Designing interactive systems, Vancouver, BC, Canada.
- Matassa, A., & Rapp, A. (2015). *Map: making: designing a mobile application for enhancing memories' retrieval*. Paper presented at the Proceedings of the

- 17th International Conference on Human-Computer Interaction with Mobile Devices and Services Adjunct, Copenhagen, Denmark.
- McAdams, D. P. (2004). Generativity and the Narrative Ecology of Family Life.
- McCarthy, J. R. (2012). The powerful relational language of 'family': togetherness, belonging and personhood. *The Sociological Review*, 60(1), 68-90.
- McDougall, Z., & Fels, S. (2010). *Cultural probes in the design of communication*. Paper presented at the Proceedings of the 28th ACM International Conference on Design of Communication, São Carlos, São Paulo, Brazil.
- McKay, D. (2007). 'Sending Dollars Shows Feeling'—Emotions and Economies in Filipino Migration. *Mobilities*, 2(2), 175-194.
- MOM. (2015). Foreign workforce number. Retrieved 1 July, 2015, from <http://www.mom.gov.sg/documents-and-publications/foreign-workforce-numbers>
- Monahan, K., Lahteenmaki, M., McDonald, S., & Cockton, G. (2008). *An investigation into the use of field methods in the design and evaluation of interactive systems*. Paper presented at the Proceedings of the 22nd British HCI Group Annual Conference on People and Computers: Culture, Creativity, Interaction - Volume 1, Liverpool, United Kingdom.
- Muller, M. J. (1991). *PICTIVE—an exploration in participatory design*. Paper presented at the Proceedings of the SIGCHI conference on Human factors in computing systems.
- Nückles, M., Hübner, S., & Renkl, A. (2008). *Short-term versus long-term effects of cognitive and metacognitive prompts in writing-to-learn*. Paper presented at the Proceedings of the 8th international conference on International conference for the learning sciences-Volume 2.
- Parreñas, R. S. (2001). Mothering from a Distance: Emotions, Gender, and Intergenerational Relations in Filipino Transnational Families. *Feminist Studies*, 27(2), 361-390. doi: 10.2307/3178765
- Parreñas, R. S. (2005). Long distance intimacy: class, gender and intergenerational relations between mothers and children in Filipino transnational families. *Global Networks*, 5(4), 317-336. doi: 10.1111/j.1471-0374.2005.00122.x
- Peesapati, S. T., Schwanda, V., Schultz, J., & Cosley, D. (2010). *Triggering memories with online maps*. Paper presented at the Proceedings of the 73rd ASIS&T Annual Meeting on Navigating Streams in an Information Ecosystem - Volume 47, Pittsburgh, Pennsylvania.
- Peesapati, S. T., Schwanda, V., Schultz, J., Lepage, M., Jeong, S.-y., & Cosley, D. (2010). *Pensieve: supporting everyday reminiscence*. Paper presented at the Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, Atlanta, Georgia, USA.
- Peng, Y., & Wong, O. M. H. (2015). Who Takes Care of My Left-Behind Children? Migrant Mothers and Caregivers in Transnational Child Care. *Journal of Family Issues*. doi: 10.1177/0192513x15578006
- Peterson, B. E., & Klohnen, E. C. (1995). Realization of generativity in two samples of women at midlife. *Psychology and Aging*, 10(1), 20.
- Platt, M., Yeoh, B. S., Acedera, K. A., Yen, K. C., Baey, G., & Lam, T. (2014). Migration and Information Communications Technology Use: A Case Study of Indonesian Domestic Workers in Singapore.
- Pratt, M. W., & Fiese, B. H. (2004). *Family stories and the life course: Across time and generations*: Routledge.

- Procyk, J., & Neustaedter, C. (2014). *GEMS: the design and evaluation of a location-based storytelling game*. Paper presented at the Proceedings of the 17th ACM conference on Computer supported cooperative work & social computing, Baltimore, Maryland, USA.
- Quek, K.-T. (2014). The Evolving Challenges of Modern-Day Parenthood in Singapore. In H. Selin (Ed.), *Parenting Across Cultures* (Vol. 7, pp. 145-161): Springer Netherlands.
- Rahman, N. A., Yeoh, B. S., Huang, S., & Yeoh, B. (2005). Dignity overdue: transnational domestic workers in Singapore. *Asian women as transnational domestic workers*, 233-261.
- Roberts, J. (1994). *Tales and transformations: Stories in families and family therapy*: Norton.
- Sadauskas, J., Byrne, D., & Atkinson, R. K. (2015). *Mining Memories: Designing a Platform to Support Social Media Based Writing*. Paper presented at the Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems, Seoul, Republic of Korea.
- Seidman, I. (2013). *Interviewing as qualitative research: A guide for researchers in education and the social sciences*: Teachers college press.
- Smyth, T. N., Kumar, S., Medhi, I., & Toyama, K. (2010). *Where there's a will there's a way: mobile media sharing in urban india*. Paper presented at the Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, Atlanta, Georgia, USA.
- Stone, E. (1988). *Black sheep and kissing cousins: How our family stories shape us*: Transaction Publishers.
- Thomas, M., & Lim, S. S. (2010). *On maids, mobile phones and social capital: ICT use by female migrant workers in Singapore and its policy implications*. Paper presented at the E-seminar Working Paper: Migrant workers' use of ICTs for interpersonal communication.
- Thomas, M., & Lim, S. S. (2011). ICT use and female migrant workers in Singapore. *Mobile communications, dimensions in social policy*, 175-190.
- Thompson, B., Kellas, J. K., Soliz, J., Thompson, J., Epp, A., & Schrodt, P. (2009). Family legacies: Constructing individual and family identity through intergenerational storytelling. *Narrative Inquiry*, 19(1), 106-134.
- Thompson, E. C. (2009). Mobile phones, communities and social networks among foreign workers in Singapore. *Global Networks*, 9(3), 359-380.
- Trees, A. R., & Kellas, J. K. (2009). Telling tales: Enacting family relationships in joint storytelling about difficult family experiences. *Western Journal of Communication*, 73(1), 91-111.
- UNIFEM. (2011). Made to work: Attitudes towards granting days off to domestic workers in Singapore. from <http://unwomen-nc.org.sg/uploads/Day%20Off%202011%20June%2022.pdf>
- Uy-Tioco, C. (2007). Overseas Filipino Workers and Text Messaging: Reinventing Transnational Mothering. *Continuum*, 21(2), 253-265. doi: 10.1080/10304310701269081
- Vutborg, R., Kjeldskov, J., Pedell, S., & Vetere, F. (2010). *Family storytelling for grandparents and grandchildren living apart*. Paper presented at the Proceedings of the 6th Nordic Conference on Human-Computer Interaction: Extending Boundaries.
- Wajcman, J., Bittman, M., & Brown, J. E. (2008). Families without borders: Mobile phones, connectedness and work-home divisions. *Sociology*, 42(4), 635-652.

- Weisskirch, R. S. (2009). Parenting by cell phone: Parental monitoring of adolescents and family relations. *Journal of youth and adolescence*, 38(8), 1123-1139.
- West, D., Quigley, A., & Kay, J. (2007). MEMENTO: a digital-physical scrapbook for memory sharing. *Personal and Ubiquitous Computing*, 11(4), 313-328.
- Wong-Villacres, M., & Bardzell, S. (2011a). *Technology-mediated parent-child intimacy: designing for ecuadorian families separated by migration*. Paper presented at the CHI'11 Extended Abstracts on Human Factors in Computing Systems.
- Wong-Villacres, M., & Bardzell, S. (2011b). *Technology-mediated parent-child intimacy: designing for ecuadorian families separated by migration*. Paper presented at the CHI '11 Extended Abstracts on Human Factors in Computing Systems, Vancouver, BC, Canada.
- Wyche, S. P., & Chetty, M. (2013). *"I want to imagine how that place looks": designing technologies to support connectivity between africans living abroad and home*. Paper presented at the Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, Paris, France.
- Wyche, S. P., & Grinter, R. E. (2012). *This is how we do it in my country: a study of computer-mediated family communication among kenyan migrants in the united states*. Paper presented at the Proceedings of the ACM 2012 conference on Computer Supported Cooperative Work.
- Yarosh, S., Cuzzort, S., Müller, H., & Abowd, G. D. (2009). *Developing a media space for remote synchronous parent-child interaction*. Paper presented at the Proceedings of the 8th International Conference on Interaction Design and Children.
- Yarosh, S., Tang, A., Mokashi, S., & Abowd, G. D. (2013). *"almost touching": parent-child remote communication using the sharetable system*. Paper presented at the Proceedings of the 2013 conference on Computer supported cooperative work, San Antonio, Texas, USA.
- Yeoh, B. S., & Huang, S. (1998). Negotiating public space: Strategies and styles of migrant female domestic workers in Singapore. *Urban studies*, 35(3), 583-602.

APPENDICES

Appendix A: Interview Protocol

1. Introduce the research

- The study is to help us better understand how and what you currently share with your family
- We are also interested to find out if you would like to share more about your lives in Singapore with your families back home
- If so, how can we help support this desire?

2. Collect generic demographic data

- Name?
- Age?
- Where you are from?
- Number of years you have worked as a domestic helper in Singapore?
- Marital status?
- Do you have children back home?
 - If so, how many? Their age?

Have you been back to your family since you started work in Singapore?

- If so, when? For how long?
- Working environment
- Details about your current employer
 - Do they have children?
 - What are your duties?
 - Do they provide Wi-Fi?
 - Do they provide you with off-days?

- Do they provide you with top-up cards?
- 4. Ask about current communication with family
 - Who do you normally call/SMS/skype/chat with?
 - Frequency of calls/SMS
 - Average time spent on calling/SMS
 - How much do you spend a month on pre-paid?
 - What communications tools do you use most often?
 - Phone
 - SMS
 - Skype
 - Facebook chat
 - Email
 - Issues with current technologies
 - Price
 - Access for families (do they have Wi-Fi?/ mobile phones)
 - Affordances of such technologies (do you value immediacy more? Or being able to ‘see’ your children via skype)
 - Time-zone differences
 - What do you share with your family currently?
 - During your calls/SMS, what are common things you talk about?
 - What are things you choose not to tell them?
 - On a scale of 1 – 10, how well do you think your family knows about your life in Singapore?

- Do you feel like your family has stories about you to re-tell and remember?

Topic	Importance to participant	Examples
Sentimental feelings		(I miss you, I love you...)
Motherly duties		Personal hygiene
Hearing updates about their lives		Where they went, who are their friends
Sharing about your own life		Where you went, who are your friends
Explaining why you are working overseas		Working overseas for children's future
Future plans		Saving up for...

After the interview, we move to explaining what participants will have to do for a minimum of two weeks. Provide participant with disposable camera and instruct them to take photos of specific events or experiences that has happened to them that they would want to share with their family. These events or experiences can be categorized into the following groups.

Regular events or experiences

- An activity that you do during your free time that you want to share with your family
- A place you regularly visit during your off-day
- A friend you usually meet during your off-day
- Activities you perform on a regular basis that you may want to share with your children (for example, the dishes you may have to cook every day, the children you have to take care of)

New events or experiences during your stay in Singapore

- Something you did with your employer/employer's children that you want to share with your family

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- A new friend/person you have met in Singapore
- A place in Singapore that you feel reminds you of home
- A new dish or cuisine that you have tried in Singapore

While these are some suggested events or experiences participants may wish to capture, it is important to stress that participants can make use of the probe materials in any way that they wish. Researcher will also collect the photographs a day or two before session 2.

Session 2:

- Have participant share about the different types of images they have taken
 - Explain the photos
 - How many of these events have you shared with your family?
 - If not, reasons?
 - How would you share about such experiences with your family?
 - What are some of the stories that you also want to hear from your family?
 - Find out if participants would like to share more stories about their lives?
 - Reasons? (maintaining bonds, wanting to be remembered)
 - Would they like to be part of the later stages where we will work as a design team to try and support this desire
 - Can they introduce more participants for the interview

Appendix B: Profile of interviewees (formative study)

Name	Age	Marital status	No of children/age	Technologies used	Time spent overseas
Participant 1	24	Single	None	Mobile phone, email	3 months
Participant 2	34	Married	2 (12, 8)	Mobile phone, Facebook	5 years
Participant 3	34	Separated	1 (13)	Mobile phone, Facebook	1 year
Participant 4	39	Married	2 (10, 8)	Mobile phone, Skype, Facebook	9 years
Participant 5	37	Single	None	Mobile phone, Facebook	4 years
Participant 6	46	Single	None	Mobile phone	22 years
Participant 7	36	Married	3 (12, 11, 9)	Mobile phone, Facebook	3 years
Participant 8	28	Married	1 (8)	Mobile phone, Skype, Facebook	2 years
Participant 9	42	Married	3 (11, 10, 8)	Mobile phone, Facebook	3 years
Participant 10	30	Single	None	Mobile phone, email, Facebook	4 years
Participant 11	29	Married	1 (12)	Mobile phone, Facebook	2 years
Participant 12	30	Single	None	Mobile phone	6 years
Participant 13	31	Married	2 (10, 2)	Mobile phone, Skype, WeChat	2 years
Participant 14	46	Married	None	Mobile phone	8 years
Participant 15	30	Single	None	Mobile phone	6 years
Participant 16	31	Mother	2 (11, 8)	Mobile phone, Facebook	2 years
Participant 17	38	Mother	2 (9, 11)	Mobile phone, Facebook, WeChat	4 years
Participant 18	32	Mother	1 (6)	Mobile phone	5 years
Participant 19	32	Mother	1 (12)	Mobile phone	2 years
Participant 20	28	Single	None	Mobile phone, Facebook	1 year
Participant 21	29	Single	None	Mobile phone, WeChat, Facebook	4 years

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Participant 22	27	Single	None	Mobile phone, Facebook	2 years
Participant 23	31	Single	None	Mobile phone, Facebook	2 years
Participant 24	27	Single	None	Mobile phone, WeChat, Facebook	1 year
Participant 25	36	Mother	2 (16, 11)	Mobile phone, Facebook	7 years

Appendix C: Profile of participants (Participatory design sessions)

Name	Design Group	Age	Marital
Participant 1	1	31	Mother
Participant 2	1	36	Mother
Participant 3	1	28	Mother
Participant 4	2	27	Single
Participant 5	2	28	Single
Participant 6	2	26	Single
Participant 7	3	39	Mother
Participant 8	3	32	Single
Participant 9	3	28	Single

Appendix D: Profile of participants (User study)

Name	Age	Marital status	Group
Participant 1	41	Single	Prompt
Participant 2	38	Single	Prompt
Participant 3	28	Single	Prompt
Participant 4	26	Single	Prompt
Participant 5	36	Married	Prompt
Participant 6	29	Single	Prompt
Participant 7	28	Married	Prompt
Participant 8	28	Single	Prompt
Participant 9	33	Married	Prompt
Participant 10	26	Single	Prompt
Participant 11	29	Single	Control
Participant 12	25	Single	Control
Participant 13	29	Single	Control
Participant 14	25	Single	Control
Participant 15	30	Single	Control
Participant 16	31	Mother	Control
Participant 17	26	Single	Control
Participant 18	32	Married	Control
Participant 19	31	Married	Control
Participant 20	28	Single	Control

Appendix E: Text prompt questions

1. What was the first photo you took while overseas?
2. Where was the first place you visited while working in Singapore?
3. What are some of the places you hope to visit while working in Singapore?
4. What were your first impressions of Singapore?
5. How do you motivate yourself to being strong while working in Singapore?
6. What experiences do you want to share with your family when you go back home?
7. What lessons have you learnt while working in Singapore?
8. How did you choose your children's names?
9. What advice would you give to a friend who wants to work in Singapore?
10. What was your first employer like?
11. What do you do on your off days?
12. Who are your important friends in Singapore?
13. What dishes have you learnt to cook while in Singapore?
14. What is the strangest thing you have eaten?
15. What makes you happy?
16. What are your plans when you return home?
17. How has Singapore changed from when you first arrived?
18. What is one of the most difficult things you have ever done?
19. What do you like most about Singapore?
20. What are some things that you don't like about Singapore?
21. Have you ever gotten lost in Singapore? What was that like?
22. What do you miss most from the Philippines?
23. What is your favorite lesson from the Bible?
24. Where do you normally go to shop in Singapore?
25. Who inspires you?
26. What do you see yourself doing in five years?
27. What do you see yourself doing one year from now?

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28. What do you see yourself doing in ten years' time?
29. Which is your favorite public holiday in Singapore?
30. Who have been your closest friends in Singapore?
31. What was your first job like?
32. Share about one of the best days you can remember
33. Which Bible lesson do you wish to share with your family back home?
34. Which Bible lesson do you wish to learn from the most?
35. What are some of the activities that you do in church?
36. What are some of your family traditions?
37. What was your parent's advice for you while working overseas?
38. Are you more like your mother or father? Why?
39. What is your most prized possession? Why?
40. What was your worst employer like? How did you deal with them?
41. What makes you sad?
42. What makes you angry?
43. What are your favorite songs?
44. Which celebrity would you like to meet one day?
45. Tell me about an embarrassing experience?
46. How do you normally spend your off day?
47. What is a dish that you enjoy but cannot find in Singapore?
48. What advice would you give your younger self?
49. Which family member do you share the most with?
50. What has changed about you since your time at the agency?
51. Who is the most exciting thing you have done this last year?
52. What is one of the best photographs you have ever taken?
53. What is one of the most embarrassing photographs you have taken?
54. What is one of your greatest strengths?
55. What is one weakness you like to get rid of?
56. What qualities do you value most in your friends?
57. Who is your role model? What lesson have you learnt from him or her?
58. Share about a romantic moment in your life
59. What were you like as a child?
60. Share about a smell that reminds you of home
61. How do you relax after work?

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62. Share about a funny work incident
63. What do you miss most about home?
64. Where is your favorite place to visit in Singapore?
65. What new words have you learnt while working in Singapore?
66. How do you want to be remembered by your family?
67. How do you want to be remembered by your friends?
68. What are some of your future plans?
69. What other countries would you like to visit in the future?
70. Do you have any funny or embarrassing memories?