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# CO-DESIGNING WITH AND FOR MILK DONORS

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A dissertation submitted to the Department of Computer Science at the  
University of Cape Town in fulfilment of the Degree of Master of Science



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# Abstract

Many mothers of small children (<2 years old) rely on technological interventions to provide aid and advice for child-rearing during the early stages of motherhood. This time can feel very isolating and so many mothers turn to technology as a medium to reach others and access information. In this research, I examine South African mothers' experience with computer-supported aid for online communication and information searching. I describe these mothers in the context where they are also milk donors and provide insight into their utilization and preferences for social networks through the lens of co-designing with them a donor mother chatroom for improved communication between donor mothers and the NGO.

Breastfeeding mothers who want to become milk donors have to go through a rigorous screening process to qualify to be a human milk donor. The lack of feedback from Milk Matters and the demanding donation process deters mothers from donating, especially considering the existing constraints of mother resources. The transition to becoming a mother can be very stressful, isolating and challenging, even more so as a donor.

Through this work I identify several design implications to consider when co-designing a chatroom with donor mothers, for donor mothers with the purpose of improving engagement and feedback between them and the milk bank.

Designing mobile applications for breastfeeding mothers can be challenging; creating spaces to foster co-design – when a mother's primary focus is on her child rather than on design activities – is even more so. Based on this knowledge, I have approached this study with a variety of co-design methods, comparing Cultural Probes, interviews, participant observation, high- and low-fidelity prototyping, and cognitive walkthroughs.

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# Chapter 1

## 1 Introduction

In this Human Computer Interaction (HCI) study, I have endeavoured to understand women in the early stages of motherhood as users of computer-supported devices. I have focused on the role that social media plays during the early stages of motherhood, as I believe the increasing adoption rate amongst breastfeeding mothers means it has a significant role in the future of parenting. Specifically, I have tried to uncover how donor mothers use social networks to form social connections, communicate, entertain themselves and increase their parenting knowledge. I also aim to uncover how this increasingly popular medium can be leveraged to further the breast- milk donation agenda and improve engagement between the milk bank and donor mothers.

This work takes place in Cape Town, South Africa and the participants in this study are donor mothers from a local milk bank NGO. I also aim to understand mothers in their capacity as milk donors. Donated breastmilk is often used in hospital Neonatal Intensive Care Units (NICUs) to supplement the diet or ensure the survival of premature babies (Palmquist & Doehler, 2016; Perrin, Goodell, Allen et al., 2016). The milk needs to be pasteurized by a milk bank before it can be safely consumed by the sick and fragile infants in these units (Ewaschuk et al., 2011). Many hospital NICUs in Cape Town, South Africa obtain this milk from a non-governmental organization (NGO) milk bank, Milk Matters<sup>1</sup> (<http://milkatters.org/>).

I have already done some preliminary work in this field, working with two Milk Matters donor mothers to develop a Milk Matters application that offers mothers real-time feedback on the number of babies they have fed, an easy-to-use, navigational map of all of the depot locations in Cape Town, and consolidated information on topics related to milk donation and expressing. Through this preliminary work I identified three factors to consider when co-designing with and for mothers: 1) interrupted interactions 2) elements that might distract a baby and 3) the importance of empowering mothers through positive reinforcement. I also learnt about the importance of different approaches to understanding the mothers, through hosting workshop sessions, online surveys and cognitive walkthroughs.

Milk Matters relies on donated breastmilk and support from local women who have excess milk to donate during the early stages of motherhood. The NGO has limited resources and struggles to keep up with the milk orders while simultaneously signing up new donors and motivating and communicating with their existing donors.

The mothers who donate to Milk Matters are still in the early stages of motherhood and as such are dealing with their own issues of 'realizing', 'unready', 'drained', 'aloneness', 'loss' and 'working it out' (Barclay et al., 1997; Paris & Dubus, 2005). The additional effort of

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<sup>1</sup> Milk Matters have given consent that their name be included in this dissertation

donating their milk to support sick and preterm babies that are not their own can be extremely challenging.

I have adopted a feminist HCI approach in this work. Taking inspiration from Bardzell's (2010) 'agenda for design', I wanted to work towards building a system imbued with sensitivity to the central commitments of feminism: agency, fulfilment, identity and the self, equity, empowerment, diversity, and social justice (spoken about in more detail in section 2.2.6). I wanted this project to be about women, for women, and to come from women. This translated directly into this project by giving my participants a voice throughout and keeping them engaged with co-design. I wanted the donor mothers to benefit equally from the final intervention as much as they did from experiencing the entire design and development process. I believe I have left this group of donor mothers with not only a chatroom they can use to engage with the milk bank and each other, but also with the knowledge that they had a strong hand in designing and developing it.

The number of participants I had in this project is small (9 mothers in total), however, the information I was able to learn about them is large and in-depth. Following on from my desire to have the mothers involved throughout the design and development process, I felt it more apt to have a few, engaged participants who were given the time to share their story and ideas with me.

I also wanted to engage with the milk bank as more than just a researcher and so I began volunteering for Milk Matters in February 2017, working in their office for three hours once a week, collecting milk from mothers and depots, and delivering it to the milk bank. While collecting donor milk, I observed the donor mothers and how they interacted with the milk bank.

While working for Milk Matters, with the aim of acquiring knowledge on the milk bank, such as how much time they had available to manage the proposed ICT intervention, what the milk bank's technical capabilities were and how the bank provided feedback and motivation to their donors, I was also able to assist them in their daily tasks. Participant observation was more than just a means for me to learn more about their activities, but also served as an avenue for me to compensate them for sharing their donor mothers and their time with me.

Over a two-year period, while continuing with **participant observation**, this study has been structured into five stages of fieldwork (as shown in the table below). The first stage was explorative whereby **Cultural Probes and semi-structured interviews** were used to gather in situ data and understand the donor mothers as mothers of small children. In addition to the participant observation, the Cultural Probes and semi-structured interviews were used to understand the mother's interaction with the milk bank, and their motivation for donating and continuing to donate their breast milk. In the next stage the aim was to understand the donor mothers as users of social networks. Individual **semi-structured interviews and brainstorming** sessions were used to generate ideas on how to improve the donor network and communication with the milk bank. The collated ideas and suggestions from the brainstorming sessions were evaluated by the donor mothers through an **online questionnaire**. The feedback gathered from the donor mothers through the brainstorming

and online questionnaire were then adapted into a **low-fidelity prototype** which demonstrated to the donors the proposed intervention. The paper prototype was evaluated in individual sessions and the feedback from these contributed to the creation of a **high-fidelity prototype**, which was evaluated by the donor mothers through an online questionnaire. The last stage included the development of the Milk Matters donor mother chatroom, which was presented to the donor mothers in individual sessions where **cognitive walkthroughs** were used to evaluate the application.

Method	Aim	Timeline	Chapter
Participant Observation	<ul style="list-style-type: none"> <li>• Observe the interaction between the milk bank and their donor mothers</li> <li>• Observe the milk bank's capabilities for maintaining any technical interventions</li> <li>• Compensate/reward the milk bank for their input in this project</li> </ul>	January 2017 – December 2018	1
Cultural Probes and Semi-structured Interviews	<ul style="list-style-type: none"> <li>• Understand the donor mothers as mothers of small children</li> <li>• Understand their motivation for donating and continuing to donate</li> <li>• Understand the mothers' interaction with the milk bank</li> <li>• Understand the mothers' use of social networks to communicate, entertain, connect and learn</li> <li>• Gather in situ data</li> </ul>	August 2017 – September 2017	3
Semi-structured Interviews with Brainstorming	<ul style="list-style-type: none"> <li>• Understand the donor mothers' use of social networks</li> <li>• Brainstorm solutions to improve the donor network and communication with the milk bank</li> </ul>	September 2017 – November 2017	4
Online Questionnaires	<ul style="list-style-type: none"> <li>• Evaluate the ideas and suggestions from the brainstorming sessions</li> <li>• Evaluate the high-fidelity prototype</li> </ul>	November 2017	5

Low-fidelity and High-fidelity Prototyping	<ul style="list-style-type: none"> <li>• Demonstrate the proposed intervention</li> <li>• Evaluate the suggested features and functionality</li> </ul>	December 2017 – May 2018	5
Cognitive Walkthroughs	<ul style="list-style-type: none"> <li>• Evaluate the beta version of the application</li> </ul>	September 2018	5

Table 1: A table showing the aims of the methods used over a two-year research project

The research questions I aim to address in this work are as follows:

**Why are potential and existing donor mothers motivated to donate their milk?**

From an HCI perspective, breast-milk donation and breast-milk donor mothers as users of technology have not been researched before. I wanted to begin this work by identifying what the life of a breast-milk donor in South Africa looks like, using Cultural Probes and semi-structured interviews (this is detailed in chapter 3). Then to answer the question on what motivates her to begin and continue donating her excess breast milk, I used the Theory of Planned Behaviour as a framework to explain what attitudes, social norms and influences contribute to the motivation and behaviour of donating breast milk (this is detailed in chapter 4). I believe answering this will help to identify criteria for technological interventions to improve the motivation of breast-milk donor mothers.

**What are preferred computer-supported modes of interaction between donor mothers and the NGO receiving the expressed milk?**

After identifying why potential and existing donor mothers are motivated to donate their milk, I want to understand the existing communication, or lack of communication, between the milk bank and the donor mothers. This will then serve as a base upon which we can improve. This question also provides a framework to understand the interaction between an NGO and its volunteers, and how various channels are used to enhance the relationship. Both the milk bank and the mothers make use of several computer-supported modes of interaction, such as cell phones (for making phone calls, direct messaging, information searching and accessing social media) and computers (for generating emails and reviewing). This is explained in more detail in chapter 3.

The phrase ‘preferred’ refers to several aspects: preferred for donor motivation and to engage donors throughout the donation process; preferred for promoting self-efficacy and empowerment of the donor mothers; preferred for content creation and information sharing; preferred for providing and receiving feedback and preferred because of usability - how easy it is for a mother to use or learn how to use.

**What are preferred computer-supported modes of interaction between donor mothers and their support network?**

This addresses the larger social network of the donor mother, beyond breast-milk donation. To understand her behaviour within the Milk Matters network, we first need to understand her within her support network. Answering this question will provide insight into the connections in a donor mother’s life that enhance it and those that hurt it. This classification will provide insight into how the Milk Matters interaction can be improved. Additionally, the

broader design implications may provide some guidance to future developers designing technologies for breastfeeding mothers.

The layout of this thesis highlights the chronological progression of this research. Each stage of the project presented the opportunity for learning and reflection, which was then adapted into the next stage. **Chapter 1**, the current chapter, introduces the topic to the reader and provides insight into the motivation behind the work. It also outlines the questions this thesis will attempt to answer.

**Chapter 2** provides background about the context of the research, as well as an overview of related research and projects. Specifically, it introduces the reader to the concept of human milk banking, the Milk Matters milk bank, their milk donors and the importance of human milk banking. As the donor mothers are also mothers of small children, I have included related work on research that has been done with mothers of small children and breastfeeding mothers, specifically looking at existing applications designed for mothers, projects that have used co-design with women in the early stages of motherhood and the impact social media has had on modern parenting. The latter has informed and influenced the work explained in Chapter 5.

Before diving into the complexities of milk donation and the relationship between Milk Matters and their donors, I took an explorative approach to understand what the life of a breastfeeding mother looks like.

In **Chapter 3** I describe what I learnt about the daily lives of a donor mother, using a month-long cultural probe study with three donor mothers. This chapter details what I learnt about their technology usage, social network behaviour and their interaction with the milk bank and other mothers. I have also provided a summary of three design implications for developing a cultural probe study for mothers of small children.

The findings from the probes were a good starting point to learn about the donor mothers and their day-to-day lives. In **Chapter 4** I describe what I learnt about them as breast-milk donors and about the interaction between the mothers and the milk bank. I held semi-structured interviews with nine donor mothers and asked questions related to their motivation for donating their milk and their relationship with Milk Matters. I have used the Theory of Planned Behaviour as a framework to explain the mothers' intentions and resulting behaviours to donate their excess breastmilk.

Each semi-structured interview session, discussed in the previous chapter, ended with a brainstorming session where I asked the mothers to think about potential improvements to the Milk Matters network that could help them as donors and as breastfeeding mothers. The popular idea was to have a donor-specific chatroom, which could be co-designed to suit the needs of this population. In **Chapter 5** I discuss the process of prototyping the chatroom with the mothers, evaluating it and eventually developing a working Android- and iPhone-compatible mobile application. This was evaluated by nine donor mothers using cognitive walkthroughs.

The final chapter, **Chapter 6**, concludes the overall findings and contribution of this work to the field of HCI. Specifically, it summarizes what I have learnt about why women are motivated to donate their breast milk, the behaviour of breastfeeding mothers on social networks and considerations for methodologies that work well with this population. This chapter ends with a description of future work in this domain.

# Chapter 2

## 2 Background and Related Work

### 2.1 Background

#### 2.1.1 The Importance of Human Breast Milk and Milk Banking

Human breast milk has vital nutritional and immunological properties that cannot be replicated in infant formula (manufactured food for babies) (Perrin, Goodell, Allen et al., 2016). As such, the use of human breast milk in an infant's diet results in positive health outcomes (Perrin, Goodell, Fogleman et al., 2016). This is especially true for fragile infants (Rinaldi, Brierley & Bekker, 2009), such as sick or premature infants in Neonatal Intensive Care Units (NICUs), whose immune systems may be weak. In addition, formula or alternate forms of food may result in health complications for some infants, such as those whose bodies cannot tolerate it (Perrin, Goodell, Allen et al., 2016). For these reasons human milk is considered to be a vital medical resource and the ideal source of food for infants, as stipulated by the World Health Organisation (Palmquist & Doehler, 2016; Perrin, Goodell, Allen et al., 2016).

Milk banks play a very important role in collecting, screening and distributing human milk to the premature population. In this regard, the services provided by milk banks could be considered "preventative medicine" (Arnold, 2006), as they provide the infant with many positive health outcomes (Arnold, 2005). However, the resources needed to ensure the milk is safe for consumption can be costly and are not available globally.

In countries such as Brazil, where donor milk banking is protected, promoted and supported as an extension of national breastfeeding policies, milk banking has been incorporated into the health care delivery agenda for infants and children (International Baby Food Action Network [IBFAN], 2001; Almeida & Reis Novak, 2004; Thomaz et al., 2008). Other countries, such as France, Germany, Canada, Great Britain and the Scandinavian countries, have made milk banking a national public health policy and the service is covered by their national health insurance plan. However, in countries such as the United States, the growth of donor milk banking services has been neglected and no public health policy supporting donor milk banking has been made. As a result, mothers tend to rely on peer-to-peer milk sharing, which is riskier and costlier (Palmquist & Doehler, 2016).

#### 2.1.2 Milk Matters

Milk Matters is a non-profit human milk bank that operates in the Western Cape, South Africa (Milk Matters, 2015). The milk bank is run by five women whose primary activities include sourcing human breast milk from donor mothers, pasteurising the milk for safe consumption and distributing the breast milk to sick or preterm infants in local NICUs. The staff of Milk Matters comprises a dietician, a nurse, a lactation consultant and two other staff members. Most of Milk Matters' present interaction with donor mothers takes the form of emails (they have a mailing list consisting of 1016 donors, supporters and the general public who subscribe via their website), both generalized and personal. This makes sourcing and attaining donor mothers and their excess breast milk a labour-intensive task,

especially for a small non-governmental organisation like Milk Matters. At any one time they receive milk from an average of 20 women.

### 2.1.3 Breast Milk Donation

In order to become a donor, a mother has to undergo a rigorous screening process, which includes completing a health-related form and submitting to a Human Immunodeficiency Virus (HIV) test, repeated every three months, and a Hepatitis B blood test. Once the mother is a registered donor she has to collect, from one of Milk Matters' depots, jars in which to store the milk she expresses for donation. Once she has taken the time and energy to express milk for donation, she then also has to drop the milk off at one of the 24 depot locations situated in the Western Cape. This can be a demanding process that may deter many mothers from becoming donors and continuing to donate, especially considering the existing constraints on mothers' resources (Karleen and Gribble, 2013; Perrin et al., 2016).

Once the first three batches of milk have been received, Milk Matters will send an email detailing the quantity of milk donated and an estimate of the number of babies saved, to the mother to thank her for the donation. They also use this communication to ask if the mother wants to sign-up for a Milk Matters MySchool card (<http://www.myschool.co.za/>). Milk Matters also tries to send a postcard to the mother when she stops donating, thanking her and her baby for "sharing their milk". Communication after this is mostly by sharing news and events sent to the Milk Matters mailing list or Facebook page.

However, mothers tend to stop donating their milk after four or five months. Donors become frustrated and discouraged by the lack of feedback. For some, not only is the screening and collection process onerous, but since Milk Matters is unable to give immediate feedback on receipt, some mothers feel that their donations are not as important as they really are. In order to overcome the difficulties and issues associated with donating breast milk to a human milk bank, it is clear that mothers need significant motivation to both start and continue donating, be it altruistic or otherwise.

## 2.2 Related Work

### 2.2.1 Co-designing with Mothers

Many different approaches have been used in projects that involve co-designing with mothers. Hui, Ly and Neustaedter (2012) used semi-structured interviews during the design process of MammiBelli. With only ten participants, this approach was successful in maximizing the amount of feedback they got from each participant, specifically as each mother's experience is unique to their situation, as it is in this project.

Other projects that required mother-generated innovation and ideas preferred to use brainstorming workshops. For instance, D'Ignazio et al. (2016) ran a workshop with a group of mothers and experts to find potential solutions to problems facing breast-pump users during the postpartum period. The workshop demonstrated how much interest there was in their problem and the need for a large-scale conversation on the topic. Thereafter, they made use of crowdsourcing to gather more ideas via email and social networking sites.

Gibson and Hanson (2013) also made use of workshops in their research. They recruited participant mothers by advertising 'special guest' attendance at each meeting, with limited

success. The researcher, who was a new mother herself, brought her child to each workshop and was able to identify with the participants based on the shared experience of pregnancy, childbirth and motherhood. However, the presence of small children required deviations from normal workshop practice, such as nappy-changing breaks that halted the session but were valuable and allowed the researcher to consolidate her notes. Similar disruptions were experienced while co-designing the Milk Matters application and chatroom, and so I have adjusted my research approach accordingly. This will be discussed in more detail in the following chapters.

Morris (2014) and D'Ignazio et al. (2016) employed online surveys to gather a broader range of diverse feedback from more participants where a workshop would not suffice. Both these projects' surveys were advertised online via social networking sites and email. Morris offered an incentive for participation and found that the majority of her participants (34.2%) learnt about the research from paid-for promotional posts on BabyCenter (babycenter.com). Morris and D'Ignazio et al. received a large amount of feedback using this approach. However, D'Ignazio et al. noted that analysing so much data proved to be resource-costly and took up more time than expected.

Westerland, Lindqvist and Sunblad (2003) acknowledge that there are many ways to approach research involving mothers and family units. They used triangulation (Mackay & Fayard, 1997) in their work, an approach that involves a combination of methods to obtain different results. Notably they made use of Cultural Probes, workshopping, observations, interviews and prototyping, much like the project in this thesis. The use of Cultural Probes encouraged their participants to be innovative and successfully included the whole family unit by giving each member different activities suited to their maturity. Although the probes took a long time to yield results that may not have provided any specific design ideas, they were useful to frame the design space and subsequent activities and to prompt discussion in further workshops and interviews.

### 2.2.2 Applications Designed for Mothers

Several projects have researched the use of ICTs to support, engage and empower women during the early stages of motherhood. For instance, Balaam et al. (2013) developed Feedfinder, an application designed to support mothers who want to breastfeed in public but are anxious about doing so. They used an iterative user-centred design process where mothers were involved in the design and evaluation of the application. Interviews and workshop research methods were used during the design phase, and walkthrough and think-aloud methods were used to evaluate the Feedfinder prototype.

At the end of the study they discovered that it was challenging to co-design a technological artefact with mothers of young children, because the mothers' attention is divided between the unpredictable demands of their child and the design task. The study suggests that research methods used to co-design with mothers of young children should be flexible, quick and undemanding, to ensure that mothers are able to remain fully involved in the design process.

The transition phase to motherhood has provided many avenues for research and development (Balaam et al., 2013; Balaam et al., 2015). ICTs have been designed to provide

pre- and postnatal support, social connection and information. Projects like the “memory stone” (Enquist & Tollmar, 2008) look at supplying pregnant women with a tool to collect and review clinical and personal information from their healthcare providers. Other projects, like MammiBelli (Hui, Ly & Neustaedter, 2012), address expectant mothers’ desire to share this kind of information with their intimate social groups. Kosaka et al. (2011) created Mommy Tummy, which is able to simulate the experience of being pregnant and allow others to feel the mother’s sensations.

ICTs have been designed to support the care of premature babies during the transition from hospital to home (Hayes et al., 2011). Furthermore, ICTs such as BabySteps, developed by Kientz, Arriaga & Abowd (2009), have been developed to support the child’s early years, with regards to creating memories, keeping health records and using the ICT to communicate this information with family and health-care professionals.

There are many existing applications created to support new mothers with things including, but not limited to, pregnancy tracking ([babycentre.co.uk](http://babycentre.co.uk)), sleep and baby monitoring ([tmsoft.com/white-noise-baby](http://tmsoft.com/white-noise-baby)), recording baby milestones ([todaysparent.com](http://todaysparent.com)), recording growth ([growthapp.net](http://growthapp.net)) and tracking nursing ([sevenlogics.com/mobile-apps/baby-nursing-app](http://sevenlogics.com/mobile-apps/baby-nursing-app)).

### 2.2.3 Social Media and the Sharing Economy

The emergence of Web 2.0 brought with it the concept of social media and the sharing economy (Belk, 2014). Content and applications that had previously been created and published by individuals or corporates took on a collaborative nature. The web we see today is a participatory effort by users who continuously moderate and modify. Kaplan and Haenlein (2010) define six different types of social media: collaborative projects, such as wikis; blogs; content communities like YouTube (<http://youtube.com/>) or Flickr (<http://flickr.com/>), where it is not necessary to have a personal profile to share content; social networking sites, such as Facebook (<http://facebook.com/>); virtual game worlds; and virtual social worlds, like Second Life (<https://secondlife.com/>). Each type offers different avenues for research and user engagement, but for the purpose of this work we will look specifically at social networking sites.

Some would say that the primary goal on these sites is to “consume and distribute personal content about the self” (Ellison et al., 2011). Xuan, Salehi, and Naranjit (2013) look at a representation of this process on the Facebook platform, splitting up the sharing landscape in three distinct regions. The performance region is where users manage their most recent data and posts. Much like Goffman’s (1949) analogy of selective self-presentation, this is the front-stage region and users are putting on a performance when they initially post here. They also choose who they want in the audience, by curating the users that they befriend through the social network. The exhibition region describes where long-term data sits. When referring to this content, users are constructing their long-term identity. In this region, users tend to go back and evaluate the appropriateness of their previous posts, to confirm if they conform to their current persona. The personal region describes the space for users to reminisce and reflect. Archiving moments in one’s life on social networks is not

only for the pleasure of sharing with others but has increasingly been used as an online vault to store personal records.

Social networks offer users a place to form social bonds (Valenzuela, Park & Kee, 2009), express themselves, connect with others no matter the physical distance (Spillius & Bott, 2014), join a cause (Bond, 2012), join a community and educate themselves (Dabbagh, Nada and Kitsantas, 2012). However, the downside to sharing intimate, personal and emotional data online also raises concerns about privacy (Ellison et al., 20), bullying, judgement (Lenhart, 2011), fraudulent and illegal behaviour (Wehinger, 2011).

#### 2.2.4 Breastfeeding Mothers on Social Networks

There is a gap in HCI research on how donor mothers interact with social networks and besides the US-based application “Mom’s Milk: Donate, Buy, Sell” (2018), nothing has been specifically developed for donor mothers to connect with each other online. In this chapter I explore how mothers leverage social media like Facebook, digital messaging and parenting sites. This will hopefully provide context and situate this work with a baseline understanding, upon which we can add knowledge on how donor mothers interact and want to interact online.

The early stages of motherhood can be described by six common themes: ‘realizing’, ‘unready’, ‘drained’, ‘aleness’, ‘loss’ and ‘working it out’. Specifically, when discussing aleness, this can be caused by: travel constraints which prevent regular interaction with others; geographic or emotional separation from family; the 24-hour physical and emotional demands of caring for an infant and the inability to relate to non-parents (Barclay et al., 1997; Paris & Dubus, 2005). To overcome these difficulties, mothers turn to online channels such as websites, online discussion forums, blogs, digital messaging and social media.

Broad or specialized websites and online forums provide opportunities for users to chat with each other through discussion boards. The value obtained from such sites is often complementary to advice previously provided by an expert or family member. Many of these boards are hosted by parenting websites and usually feature advertisement and product marketing. Many of these sites have evolved their network to include a dedicated Facebook page, Instagram or Twitter account (Lupton, Pedersen & Thomas, 2016). “Mommy blogs” are more personal outlets where mothers describe their parenting experiences in entertaining ways.

Digital messaging and mobile phones are used by mothers of small children while caring for their child to both stay connected with others (messaging), entertain themselves and access the internet (search engine, social networks or websites) (Lupton, Pedersen & Thomas, 2016).

However, to access a larger community, mothers turn to social networks. Facebook, YouTube, Pinterest, Twitter and Instagram provide parents with multiple ways to connect with other parents, express themselves, share experiences and learn about parenting. These

sites provide mothers with the opportunity to curate their own material and share it or respond to another users' content. Gibson and Hanson (2013), Lupton and Pedersen (2016) and Morris (2014) demonstrate that the use of social media in the early stages of motherhood can help alleviate feelings of isolation and boredom by providing parents with a space to connect and meet online or offline. Parents use social media to share personal information and keep friends or family updated on their child's progress through posts and pictures (Ammari et al., 2015; Bartholomew, 2012; Morris, 2014). Parents also turn to social media for validation on their parenting performance, by sharing "good mothering" moments (Kumar & Schoenebeck, 2015; Collett, 2005).

Parents value the personalization and freedom these channels provide to express themselves (Hearn, Miller & Fletcher, 2013; Lupton & Pedersen, 2016); however, data privacy and security has become an increasing concern as these details may be used against them for criminal activity (for example, using stolen data to make fraudulent health insurance claims) (Huckvale, 2015). For parents, data privacy concerns are extended to their children, who may fall victim to kidnappers or sexual predators online (Kumar & Schoenebeck, 2015; Kramer-Duffield & Hank, 2008).

Contrary to the aforementioned work, which examines the benefits of social networking and online information searching or sharing (Kraschnewski et al., 2014; Ybarra and Suman 2008; Grimes, Forster & Newton, 2014; Hesse et al., 2005; Kaimal et al., 2008, Duggan and Smith, 2013), this is not the case for all women. Peyton and Wisniewski (2019) conclude that although most sites provide efficient medical and birth event information, they lacked functionality for leveraging meaningful social support. Many women are uncomfortable sharing intimate pregnancy information with anyone beyond immediate family and a few close friends who are also mothers (Peyton and Poole, 2014). Subsequently, some woman only use social media for general information sharing like pregnancy bump photo's.

Additionally, almost all pregnancy applications exclude the spouse despite the collaborative nature of pregnancy management and the important role men have in maternal and child health (Lu et al., 2010; Yogman, Kindlon & Earls, 1995; Peyton and Wisniewski, 2019). This exclusion is demonstrated through gendered interfaces and information pertaining exclusively to the mother. Peyton et al. (2014) propose a shift towards designing pregnancy applications which are more inclusive of the mother's social circle and provide tailoring for the uniqueness across pregnancy and child-rearing experiences.

### 2.2.5 Co-design

Research in the field of human computer interaction (HCI) looks at the interaction between humans and computers, focusing on the design of technology. This ever-growing field is increasingly engaging with under-represented communities, social change and inclusive, sustainable development (Dell & Kumar, 2016; Ho et al., 2009).

Co-design, a combination of user-centred design and participatory design, encourages the inclusion and engagement of the end-users from the inception till the completion of a project. Co-design has been a common approach for developers in the HCI field who want to learn about their users, conceptualize their context, evaluate the intervention and constantly revise it. These inclusive qualities promote the sustainability and adoption of an

artefact, making it an attractive approach for projects that involve the development of a mobile application, such as Jordan Broderick et al.'s (2014) health literature application. Sanders and Stappers (2008) describe the shift toward the 'new landscapes of design', whereby users are given an active role in the design process, as 'experts of their own experience' (Sleeswijk Visser et al. 2005). Co-design promotes collective creativity from the initiation stage or fuzzy front-end, when the end product is not clear, to the completion of a project when the aim is to hand over an intervention that is not only relevant for today's users, but for future users as well.

### 2.2.6 Feminist HCI

Feminist HCI is an emerging field within HCI, which focuses on developing technologies that are universal, ubiquitous and pervasive. Feminist Standpoint Theory acknowledges that women are limited to certain roles, such as child-rearing and breastfeeding, and because of this have different types of knowledge to their male counterparts. We draw on Bardzell's (2010) 'agenda for design' where she outlines a proposal to design systems imbued with sensitivity to the central commitments of feminism: agency, fulfilment, identity and the self, equity, empowerment, diversity and social justice. Feminist HCI is also relevant when looking at social-media and user-generated content. Research in this area centres on themes of identity and how women represent themselves on Social Networks (SNS). SNS, as (Boyd and Ellison, 2007, P. 1) define it, is a means for users to create an identity with the information they post about themselves and the groups that they join. On these groups they are connecting with others who may share common interests, from their self-generated profiles.

### 2.2.7 HCI and The Theory of Planned Behaviour

During a review of CHI proceedings from 2003 to 2013, Heckler et al. (2013) found that HCI research has increasingly focused on exploring the use of technology to support behavior change. Common domains where this has been the focus include research on health (Grimes et al., 2008; Consolvo et al., 2008), sustainability (Froehlich et al., 2012), commerce (Lee et al. 2011) and educational behavior changes (Cajander et al. 2017).

In this work HCI research has drawn on theories from behavioral sciences. Specifically, behavioral theories have been used to inform the design of technical systems (Consolvo, McDonald and Landay, 2009), to guide methods of evaluating these systems (Lee et al. 2011), and to define target users for these studies (Consolvo et al., 2008; Consolvo, Everitt, Smith & Landay, 2006).

An example of this is the Theory of Planned Behavior (Ajzen and Madden, 1986). The Theory of Planned Behavior (TPB) has been used in HCI research as a framework to inform the design and guide the evaluation of a Personal Health Information system that offers health information to rural women to increase their awareness about menses and maternal health (Parmar, Keyson & Debont, 2008); It has been used to analyze the participation of students in a non-compulsory, highly educational activity (Cajander et al. 2017); It has been used to predict adolescents' disclosure of personal information in exchange of incentives offered by commercial Websites (Heirman, Walrave & Ponnet, 2013) and used to understand online game playing among Malaysian undergraduate students (Alzahrani et al., 2017).

# Chapter 3

## 3 The Life of a Milk Matters Donor Mother

### 3.1 Introduction

Milk Matters sources their donated breastmilk from local, lactating women in Cape Town. In this chapter, my aim is to understand the Milk Matters donor mothers as more than just milk donors. I want to create an image of their daily life and analyse the relationship they share with the milk bank, the technology they use, their support and social network. In relation to prior HCI work on breastfeeding mothers, this chapter aspires to contribute knowledge on women in the early stages of motherhood who are also donor mothers. For this initial, explorative study, I have made use of Cultural Probes, left with three donor mothers for a month. My intention was to use the feedback gathered in this stage to identify the role of technology in a breastfeeding mother's life and the purpose it serves for interaction between Milk Matters and their donors. This chapter also influenced how I proceeded with the co-design and development of the Milk Matters chatroom in the next chapters.

### 3.2 Related Work

#### 3.2.1 Cultural Probes

Cultural probes are small packages which can include tools, artefacts and tasks that are given to participants to prompt them to record specific events, feelings or interactions. The Presence Project in the European Union is an early example of where probes were used to understand elderly involvement in different communities, by encouraging the participants to capture their daily interactions with probe activities (Gaver, Dunne & Pacenti, 1999).

Probes are often used in research to address developing projects for groups or users that are not well known to the designer (Gaver, Dunne & Pacenti, 1999; Paulos & Jenkins, 2005). As such, when working with unfamiliar users, it is often difficult to acquire intimate and inspirational insights about their behaviour, thoughts, cultures, attitudes, preferences, concerns and desires from common methodology (Visser et al., 2005). Techniques such as questionnaires or observation might lack depth if the users are guarded or untruthful in their answers and actions (Boyce & Neale, 2006). Probes are intended to encourage the user to look and think about their environment in a new way (Boehner, 2007; Gaver et al., 1999). They can also provide the researcher with insights into the lives of their participants, helping to identify unknown problems, highlight new opportunities, reveal design constraints and inspire a new way of thinking about design.

Gaver et al. (1999) and many of those that came after, have used probes to identify user needs in sensitive settings (Crabtree et al., 2003). Probes give participants full control over how much or how little they want to share. Where ethnographic or 'normal' methodologies are too intrusive, Cultural Probes promote active participation from the end-users. More than that, probes are used to encourage the users to enjoy themselves, play and partake in activities that are meaningful and valuable to them as well (Gaver, 2001). To some, the answers received from probe material may seem trivial, but in many studies the returned

probes have provided an enjoyable focus to spark discussion with participants in subsequent workshops.

Based on the different kinds of activities, probes can elicit different kinds of responses. Cultural Probes are meant to engage the participant in the design process, by having them answer or fulfil a set of open-ended questions or tasks. Technology Probes, much like Cultural Probes, are designed to elicit design feedback by exploring the use of low-fidelity technological applications or inventions. Lastly, Informational Probes are designed to return specific insight on the needs of a novel domain or population.

### 3.3 Approach

Co-design is an approach that fosters collective creativity amongst participants of varying levels of expertise throughout a design process (Sanders & Stappers, 2008). Co-design promotes an equal relationship between the end users and designer, inducing a shared sense of ownership for and the sustainability of an artefact (Schuler & Namioka, 1993; Greenbaum & Kyng, 1992; Muller & Kuhn, 1993). These ideals were pivotal in the choice of methodology throughout this research, specifically when deciding what would give the mothers the most freedom to express their ideas, thoughts and opinions.

This approach was used to confirm my commitment to feminist HCI practice, which has similar values such as agency, fulfilment, equity, inclusivity, empowerment, diversity and social justice (Bardzell, 2010). As a researcher this meant having an empathetic relationship with the mothers, sharing information about myself with them and then reflecting on my actions and results in each stage of the research (Bardzell & Bardzell, 2011).

In this initial stage I took a deliberate approach to get a more intimate understanding of both Milk Matters and their donor mothers. The Cultural Probes coupled with my ongoing participant observation provided a holistic picture of the donors away from the milk bank, as well as how they interacted with the milk bank

#### 3.3.1 Recruitment

After discussing it with Milk Matters, we decided that the best way to recruit participants for this study would be through their existing donor network. A Milk Matters staff member emailed all their donor mothers (14 mothers at the time), to see if they would be interested in partaking in a master's study. She wanted to engage with their current donors first, because they would be going through the donation process at that time and be able to provide relevant feedback. I also chose to approach their current donor mothers, as I believed they would be most likely to complete the activities while they were still in the process of donating to Milk Matters. To emphasize this, all of the probe activities incorporated a section for mothers to log their daily milk expression. I included this to remind the participants to refer to the probe book, to add a pumping log and complete the activities in the book. Admittedly, it was also easier for the milk bank to contact the mothers they had been in recent contact with first.

Those who responded were asked if their information could be passed on to me, the researcher. I then contacted them, introducing myself and sharing what participating in the study would entail. The consent form, detailing their rights and responsibilities as a

participant, was also sent to them, to be signed during the interview session. An introductory meeting was then organized with each mother, at a location chosen by them.

Three of Milk Matters' current donor mothers responded, indicating their willingness to participate in a month-long probe study. There may have been some selection bias in this process, as we were choosing participants who were proactive and responded to the email within a reasonable time period. However, we do not foresee this as an issue, because they would also be the same type of users to use the chatroom initially. We also only approached Milk Matters' most recent donors, to evaluate the milk bank's most recent efforts, which excludes feedback on Milk Matters' past actions. Lastly, the nature of the probes may have seemed relatively time consuming to the busier moms who may have ignored the call, in addition to donating milk. Similarly, the chatroom may also be ignored for similar reasons, which is something to consider for the long-term sustainability of the intervention.

### 3.3.2 Probe Packages Content

Prior to assembling the probe package activities and materials (shown in Figure 1), I took some time to identify specific goals for each probe activity (Visser, 2005). I designed the kits to provide instructions to direct the user towards this goal, but I also wanted the instructions to not be so specific that they hindered any inspired insights that might arise from the probe (Gaffney, 2006). Smith (2008) was used as a source for identifying creative and fun activities that would encourage the mothers to reflect on their daily lives.

The probe packages included various activities and materials, meant to elicit different responses. I included three postcards with a question on each (What is something really good about donating milk? What do you wish was different with donation or Milk Matters? What is your relationship with other donor mothers?) and a fourth containing an introductory biography of myself, the researcher. I used postcards to encourage the mothers to provide informal responses about their relationship with the milk bank and other donor mothers. I also wanted to introduce myself in an informal way. The mothers were encouraged to fill them out and return them to me with the activity book during another house visit at the end of the month (or on completion of the activities, whichever they preferred).

The probe packages also included a booklet that had activities for the mother to complete every day for a month (described in Table 2 below). The activities were two-fold: a daily log to capture how much and how often she expressed milk and what mood she and her baby were in; and fun activities to be completed over two days, which prompted the mother to make observations and capture information about her daily experiences as a mother and milk donor. The aim of the daily log was to establish how much of the mother's day was spent breastfeeding or expressing (for her baby or for Milk Matters). I also wanted to use the activities to find out about the mother's social interactions, struggles and pursuits in a day. I included activities about the mother's information and communications technology (ICT) use, such as what sites or online forums she was using, what information she was looking for and what kind of WhatsApp (a direct messaging service) or Facebook groups she belonged to.

Name	Activity	Objective
Right where you're sitting	Write 10 things about where you are sitting right now that you hadn't noticed when you sat down. Do not censor and do not think too much about it (write down the first 10 things that popped into your head).	Have the mother evaluate her surroundings from a new perspective and describe what she sees.
Daily walk	Send me pictures (via WhatsApp) of items from your daily route or tasks. Capture the first things you see and decide on what the connection between the objects may be.	Identify items mothers interact with on a daily basis.
Archaeological dig	Imagine you are an archaeologist. Describe or send me pictures of objects that relate to motherhood (Anyone who found it would know it came from the life of a mother). Give each item a brief story or description.	Identify items essential to "motherhood". Have the mother describe their purpose and significance.
World of colour	Find colours that you respond to in the world. Use the samples, colour-in or take a picture! Match it to your memories, experiences or things that you saw or relate to (things you are reminded of when you see that colour).	A fun, creative way to identify things, feelings and events in the life of a breastfeeding mother.
World wide web	Jot down all of the web searches you did this week.	Identify what topics of information mothers go online to search for.
Mom knows best	Share your favourite life hack or mom's tip.	Demonstrate types of breastfeeding mother, self-curated content.
Mom connect	What kind of WhatsApp or Facebook groups are you in? List them here.	Identify the social networks of a breastfeeding mother.
Curiosities	Describe things that you did not understand immediately (as a mother/donor). If you tried to make sense of it, describe how you did that.	Identify what topics of information mothers need help with. Describe current resolution practice.
One thing	Choose an everyday object that you use often. Look at the top half of the object for 15 minutes. Record everything you see and think in detail (purpose, shape, colour etc.). Do the same for the bottom half.	A fun, creative way to identify an object used regularly in the life of a breastfeeding mother.
Twenty things	Write down (or document) twenty things about one of the following: a trip to a depot location, a trip to the grocery store, or a walk with your baby.	Identify how daily activities alter once you've had a baby.
Sound map	Sit in a location for an hour. Document all the sounds that you can hear and when you heard them. Draw the	Reflect on the spaces a breastfeeding mother inhabits.

	approximate location of the sound in relation to you on a map.	
Busybody	Record everyone or everything you interact with in one day/week	Describe a breastfeeding mother's support network and interactions.
Small thoughts	Make a list of placid small thoughts you have throughout the week (for instance, what were you thinking just now).	Have the mother reflect on her life as a breastfeeding mother.
Your favourite place	Describe, draw or take a picture of your favourite place.	Get a sense of things/places that bring the mother joy.
Combinations	Write about what it is like to combine two different activities, such as pumping and reading, or driving and talking. How does the one activity affect the other?	Understand the mother's daily activities and workload.
Invisible City	Using your imagination, create an image or story where everything you use or encounter in your daily routine is magical, exaggerated or slightly altered from reality. Use whatever documentation method you prefer	Have the mother brainstorm an ideal world for herself, or something that could help her.
Self-ethnography	Use yourself as a subject for documentation. Document in detail all of your movements, activities, behaviours and conversations while donating your breast milk or expressing.	Have the mother describe her experience with expressing, breast milk donation or the milk bank
Life in pictures	Create icons for your life activities	A creative way to describe the life of a breastfeeding mother.

Table 2: The objective for the probe activities included in the activity book

The participants could write/draw in the booklet, or send pictures, texts, voice notes or videos to the first author via WhatsApp (a direct messaging service). Stickers, colouring pens and post-it notes were included in the pack to help the mothers complete the booklet.

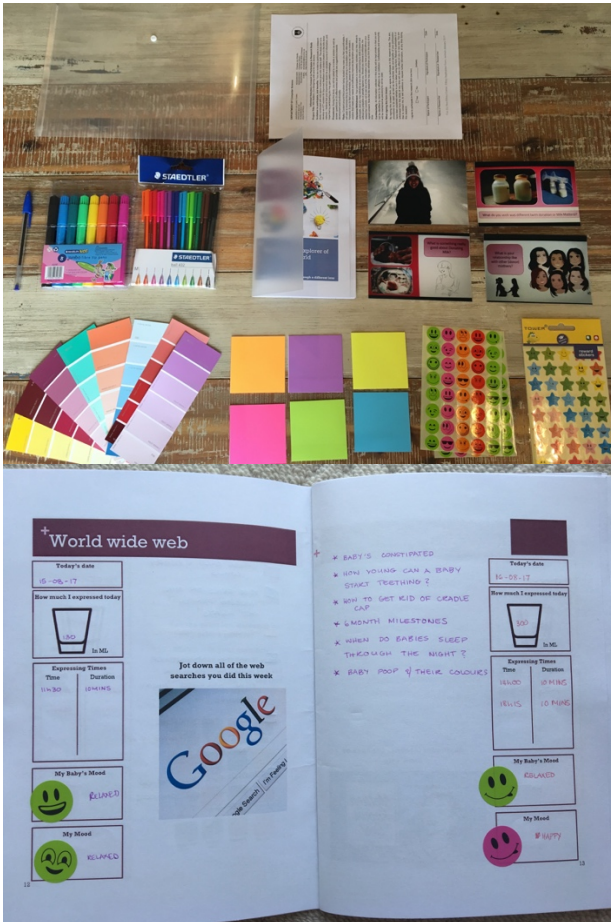


Figure 1: The Probe Packages given to three donor mothers

### 3.3.3 Probe Package Deployment

I chose to deliver the probe packages to mothers at their home at a time convenient to them. I wanted to be accommodating to their schedule and their limited resources as a mother. After contacting the mothers initially via email, WhatsApp (a direct messaging service) was used to confirm meeting times and venue right before the appointment.

Upon arrival at the mother's home, I introduced myself and engaged in polite conversation to establish trust and comfort with the mother before explaining the probes in detail.

Each participant was left with the package which they were instructed to complete over a month in any way they felt comfortable with. I also asked them if they would like to be directly messaged once a week, reminding them to complete the probe activities and checking on their progress. All three mothers said they were happy for that to happen.

## 3.4 Findings

### 3.4.1 Cultural Probe Participants

Three donor mothers said they were willing to participate in the cultural probe study.

#### 3.4.1.1 Participant 1

P1 is an educated, middle-class, working first-time mother. In the age category 30 – 35, she currently works as a travel agent. This suits her personality as an outdoors, adventurous

person. She has one son, who was *“an unexpected surprise, as I’m generally a very organized person”*. Her son was premature and because of this she

*“was put on to medicine to help me start producing milk. This is what the hospital told me, but it also fights the post-natal depression and has another effect. I tried to take myself off it when I came home, by going cold turkey, which dramatically decreased my milk supply and changed my moods”* (P1).

In the initial interview with P1, she said she had gone back on to the medication and some other natural products. Unfortunately, this is not approved by Milk Matters and so for the time being she cannot donate any of her milk.

I met P1 at her house in the southern suburbs (a middle-class residential area in Cape Town, Western Cape) four times after work over the entire study. Twice her nanny was there to care for the child during the session. P1 has a full-time nanny who takes care of her child while she is at work. Her husband is also very supportive when he is at home from work. During one session he was at home, cooking dinner and distracting the baby, so she could focus on our session. Her husband is a software developer and as such had a greater technical understanding of and curiosity about the Milk Matters application and chatroom. P1’s father-in-law is a doctor and she said she also received a lot of help and support from him as well.

P1 became a donor because her baby was premature and *“there was a scare that he would need donated breast milk”*. P1’s milk did eventually come in, however, her doula still insisted that she become a donor. P1 was also motivated by an altruistic desire saying that she *“always wanted to help, and little babies are so helpless”*

As a technology user she is knowledgeable and willing to try new platforms, applications and online sites.

#### **3.4.1.2 Participant 2**

P2 is an educated, middle-class, working mother of two, a daughter and a son. In the age category 30 – 35, she currently works as a lecturer at the University of Cape Town. Presently, she only works part-time, going home at midday to care for her children.

P2 gave birth to her second child, her son, at home. She had a doula and a midwife come over, which according to her made the whole child-birth vastly better: *“I felt comfortable in my own home, I was even able to grab a snack from my fridge later that evening.”*

I met P2 at her house in the southern suburbs (same area as P1), after work the first time and on her day off the second time. She does not have a nanny and instead drops her children at day-care and a nursery (creche). Her husband is also a lecturer at the university and he works during the day.

P2 learnt about donating milk from her lactation consultant in response to a comment she made about having a surplus of milk. Because her maternity leave was fairly short, she needed to pump milk for while she was at work *“so that there would be milk available for*

[her son] at day-care". She had an excess of milk, which she decided to donate so that it would not be wasted and instead used to help save lives.

As a technology user she is knowledgeable, having to use email and her computer for work regularly.

#### 3.4.1.3 Participant 3

P3 is an educated, middle-class mother of three. In the age category 30 – 35, she is currently unemployed after being retrenched from her previous job at an environmental firm. She grew up in Somerset West (a town near Cape Town, Western Cape) and received a degree from UCT. She was very interested in sailing and as a result has travelled a lot.

I met P3 at her family home in the southern suburbs, a house she thinks is "*not the house [she] would have bought given the option*". I met her initially in the afternoon while her two older children were napping, so that we would not be distracted from the session until they woke up. When they did wake up, distractions included her middle child whispering in P3's ear about needing to go to the loo. She needed to break from our session and accompany him to wipe his bum. When her oldest child woke up, the session became partially unmanageable, as I had to assist her by holding the baby while the other two children had numerous requests for their mother. The second time we met was in the morning when both children were at pre-school. P3's mother was visiting, and she took care of the participant's youngest child, so that P3 could focus on our session.

P3 learnt about breast milk donation through her friends and family who had previously been involved as donors as well

*"They've always really made me aware of it and then I sort of spoke to the Midwife to find out how to donate, and the first time I went to Milk Matters I saw a postcard with my cousin's name on it and I was like cool 'that's so cool'."* (P3)

As a technology user she is knowledgeable and eager to try new applications or platforms.

#### 3.4.2 Participating in the Cultural Probes

Of the 14 mothers Milk Matters contacted, three indicated their willingness to participate in the probes. By using house visits to deploy the probes, I had a lot more flexibility to plan sessions, which I found was necessary as participants asked for sessions to be moved for bath time, a sick baby, a participant who had just gone back to work and needed to meet later in the evening, and a participant who wanted to get her child to nap before I visited her. I also found the home setting more relaxed and could discuss the participants' relationship with Milk Matters openly in a stress-free way, usually while sipping tea.

At the end of the month, upon collecting the packages I found only two participants (P1 and P3) had managed to complete the majority of the activities. P2 said:

*"I was super enthusiastic, and it was interesting. I started off really well in August but then it was just too difficult. I guess since I've been teaching, every 15 minutes at work I have something to do, I've been flat out. The list of things I have to do. It's been impossible, and I*

*haven't been expressing that much at work, because I've been coming home a bit earlier. And then I would look at my task and I just thought oh this will take me too long."* (P2)

She showed remorse at not completing the activities but suggested that there perhaps should have been a lighter version, with fewer activities: *"As a working mom expressing, I just did not have to time to do the tasks justice. If anything, when I got to doing them, I felt a bit overwhelmed."* (P2)

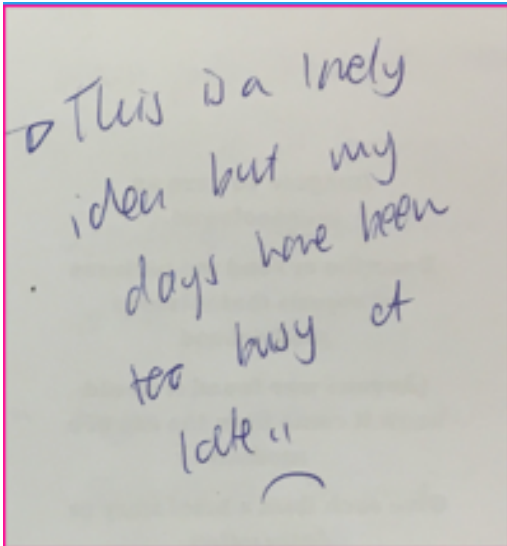


Figure 2: "This is a lovely idea but my days have been too busy at late"

However, unlike P2, P1 and P3 were very enthusiastic about the activities: *"I love the concept of exploring and doing things differently."* Upon hearing about the activities, P3 even asked where the inspiration for the various activities had come from, so that she could continue doing similar things once she had completed the activity book.

P1 said she enjoyed doing the probe activities. It made her feel very in touch with her emotions, and what she was feeling at the time: *"I felt completely out of touch, but then with the probes, you look deep down inside, as to how you're feeling and your emotions. It has a huge part to play in expressing"*

She said it was challenging at some parts, so she would do a bit the next day and then go back to it and touch up.

### 3.4.3 The Life of a Breastfeeding Mother

The cultural probe findings provided a holistic view of the donor mothers' daily lives. I have grouped the participants responses from the probe study into several themes, each theme having an effect on and influencing the other.

#### 3.4.3.1 To raise a healthy and happy child

When asked about what made them feel good as a mother, all of the probe participants said they wanted to raise a healthy and happy child. For one participant this meant being able to provide enough food for her baby, while another wanted to teach her children to be *'independent and confident'*:

*"Watching [her son] grow and feeling his weight in my arms makes me feel confident as a mama, as it gives me the sense that I am able to feed him well. The way he looks at me with his loving eyes, melts my heart. Like he is my biggest fan. The giggles we have together make me feel so warm and fuzzy."* (P1)

*"Seeing my two older kids who are independent and confident (in an age-appropriate way), and who I enjoy spending time with as they are good company... I feel like they are well-rounded little people who are building the tools to be able to survive in this world. That's what makes me feel confident in being a mother."* (P3)

It was common amongst all three participants to base their children's success on their abilities to raise a healthy and happy (independent and confident) child: *"How do you instil the values you want him to grow up with? Such as instil values of face-to-face communication in an age of social media?"*

### 3.4.3.2 Supportive tools for the early stages of motherhood

In the probe activities the participants described various tools that they used to support their child or themselves.

#### 3.4.3.2.1 Tools for the child

The participants shared pictures with me over WhatsApp (a direct messaging service) of the toys they used to keep their babies entertained, such as *'Jo Jo the giraffe who plays lullabies and keeps [her baby] calm and entertained'* and tools they used to support their children, such as a baby carrier or yoga ball.



Figure 3: Baby books and toy giraffe

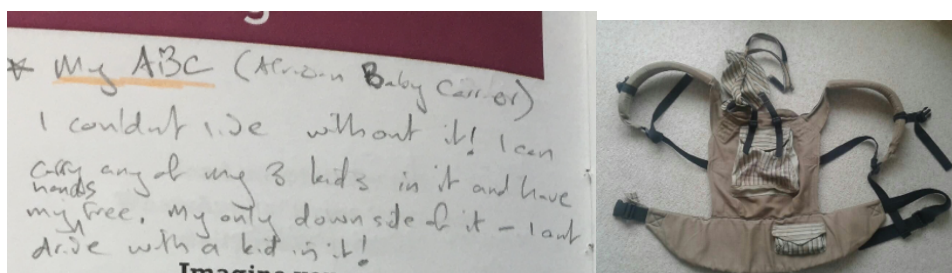


Figure 4: "My ABC (African Baby Carrier). I couldn't live without it! I can carry any of my 3 kids in it and have my hands free, my only downside of it - I can't drive with a kid in it!"

YOGA BALL  
 PURPLE & SMOOTH WITH  
 EVENLY SPACED RIDGES  
 HELPS BOUNCE BABY TO  
 SLEEP OR HELP CALM HIM  
 SAVES YOUR ARMS FROM  
 THE HEAVY WEIGHT OF  
 BABY  
 ALSO VERY GOOD FOR  
 MOM/DAD'S CORE

Figure 5: "Yoga Ball: Purple and smooth with evenly spaced ridges. Helps bounce baby to sleep or help calm him. Saves your arms from the heavy weight of baby. Also very good for mom/dad's core"

### 3.4.3.2.2 Tools for breastfeeding mothers

Breastfeeding equipment the mothers mentioned included: a freezer to store the expressed milk; bottles for storing the milk in; a pump (electronic or manual) for pumping milk; material to cover themselves while breastfeeding in public; feeding pillows and yoga balls to support themselves while nursing; nipple cream to prevent dry and cracked nipples; and nursing bras, tops and breast pads to cover leaky breasts.

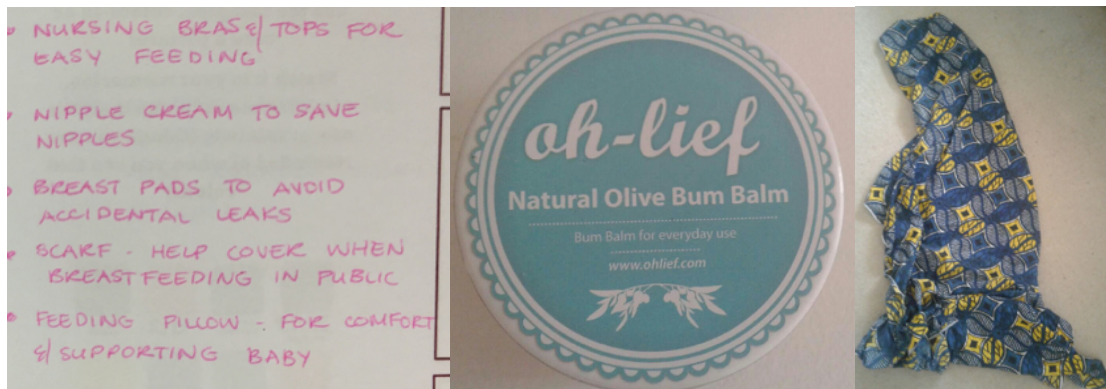


Figure 6: "Nursing bras and tops for easy feeding. Nipple cream to save nipples. Breast pads to avoid leaks. Scarf - help cover when breastfeeding in public. Feeding pillow - for comfort and supporting baby"

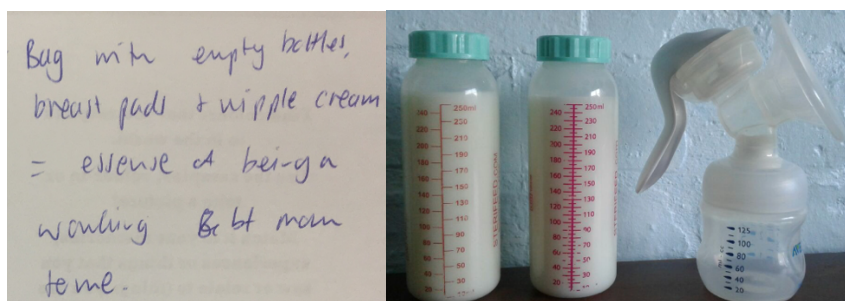


Figure 7: "Bag with empty bottles, breast pads and nipple cream = essence of being a working breastfeeding mom to me"

### 3.4.3.3 Supportive technologies for the early stages of motherhood

The three participants reported that their phone was the technological device they used most often, as opposed to a laptop, tablet or computer. I have grouped the type of support

they use their phone for into: accessing parenting applications, social networks, entertainment and to search for information.

A photograph of a piece of light-colored paper with handwritten text in pink ink. The text is arranged in five lines and reads: "CELLPHONE - GOOGLE, MOMMY SUPPORT GROUPS, WAY TO CONTACT FAMILY FOR SUPPORT. HELPS PASS THE TIME WHILE NURSING".

Figure 8: "Cell phone - Google, mommy support groups, way to contact family for support. Helps pass the time while nursing"

#### 3.4.3.3.1 Online Resources

**Parenting Applications:** Parenting applications and platforms were a popular topic in the participants' responses. The donor mothers said they had used services like Baby Feed Timer (Thomson Reuters Corporation, 2017), Babycentre (Fehners Software LLP, 2010), Adventure Baby Grower (Ovuline, Inc., 2017), The Milk Matters application (UCT Centre in ICT4D, 2016) and the Wonder Weeks services (Domus Technica BV, 2015): *"The Wonder Weeks is fantastic. I used a feed tracker and a sleep tracker at various points."*

The participants described the Milk Matters mobile application as a source of positive reinforcement for the donor mothers. They said they felt motivated, seeing how much of an impact they had made as a donor in terms of the number of babies they had fed (and lives they had helped save). Specifically, one participant said how she used it to record how much milk she was expressing and keep the recorded amount on her phone via the application, for future reference: *"It helps when trying to remember which boob baby last fed on and it helped track the duration of [her child's] feed."* (P1)

The Babycentre application was also mentioned as an aid for record keeping:

*"We registered [their son's] birth date. Every week we get updates on what milestones and developmental progress he should be making. It is a great feature as it has several articles and a forum where one can post questions."* (P1)

**Social Networks:** Using their phones, the participants said they were able to access Facebook and WhatsApp (a direct messaging service). They use Facebook to connect with friends and participate in mommy support groups, much in the same way as they use WhatsApp. However, they prefer to use the direct messaging service for communicating with moms they are more familiar with in more intimate groups. They also use these platforms to stay connected with family.

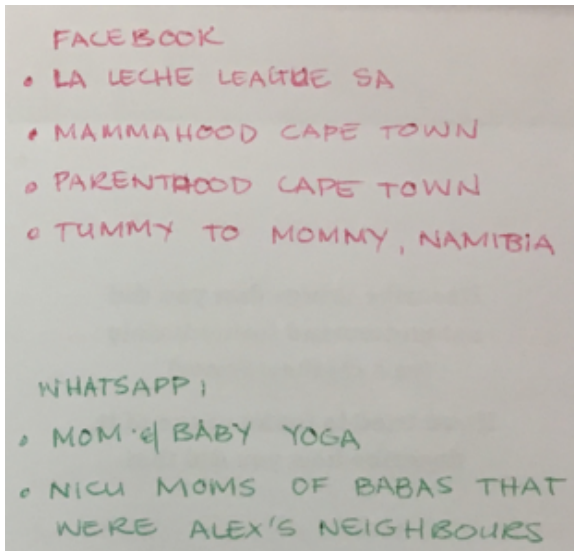


Figure 9: "Facebook: La Leche League SA; Mammahood Cape Town; Parenthood Cape Town; Tummy to mommy, Namibia. WhatsApp: Mom and baby yoga; NICU moms of babas that were [her son's] neighbours"

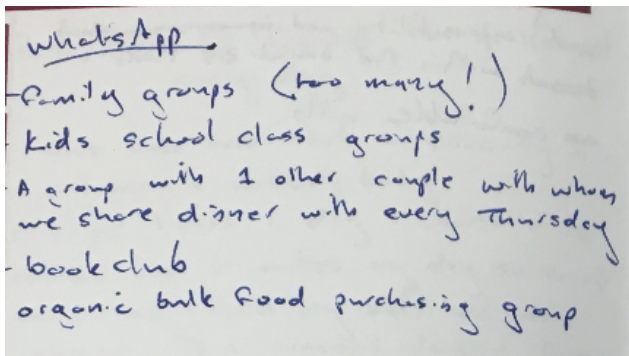


Figure 10: "WhatsApp: Family groups (too many!); kids school class groups; a group with 1 other couple with whom we share dinner with every Thursday; Book club; organic bulk food purchasing group."

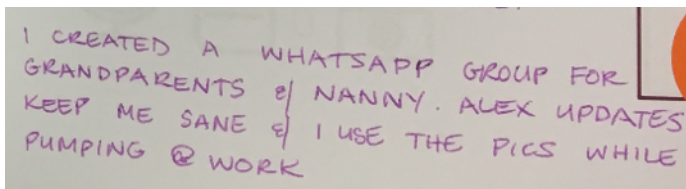


Figure 11: "I created a WhatsApp group for grandparents and nanny. [Her son's] updates keep me sane and I use the pics while pumping at work"

**Entertainment:** The participants mentioned using their phones to entertain themselves and their child during activities that take a long time, such as "feeds [which] could take up to 45 minutes". P2 said she relied on her phone "to listen to podcasts which was a life saver", while she fed her baby or was expressing milk for Milk Matters.

**Information Searching:** The participants said they went online when they needed medical or parenting guidance immediately, or at an odd time of day when they didn't want to bother a partner or close family member. However, information searching was also reported for non-parent-related things like holiday destinations and for booking weekend trips.

The topics that donors used online searches to learn about can be grouped as: expression (milk supply); nutrition and medication; health (constipated baby, cradle cap, “baby poop and their colours”); milestones (“When is the teething going to end; six-month milestones (“When do babies start to sleep through the night?”, “When is he going to start crawling?”); hobbies (crochet projects); education (“Should we look at home-schooling more seriously?”); events (accommodation booking); and miscellaneous (weather).

### 3.4.3.3.2 Online Experience

All three mothers reported that although they often referred to and found the Internet incredibly useful, they had each experienced some negative aspects that deterred them from referring to it more regularly. This included receiving “too many notifications” from too many groups. Additionally, some of the participants said they felt even more anxious after using interventions on the Internet: “These made me obsess about feeding intervals and how much sleep we were all getting. I’m better off without them.”

### 3.4.4 Supportive people in the early stages of motherhood

The participants were asked to describe their support structure and the people that they interact with in a week. The type of relationships that result from these can be described as expert and social, and they are not mutually exclusive.

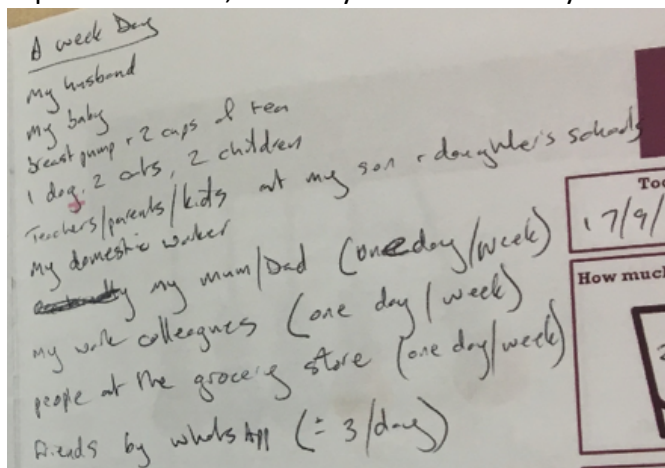


Figure 12: “A week day: my husband; my baby; breast pump and 2 cups of tea; 1 dog, 2 cats, 2 children; teachers/parents/kids at my son and daughter’s schools; my domestic worker; my mum/dad (one day/week); people at the grocery store (one day/week); friends by WhatsApp (+ 3/day).”

#### 3.4.4.1 Expert support

The participants said they relied on experts like Milk Matters, doulas, nannies and lactation consultants for parenting or medical support.

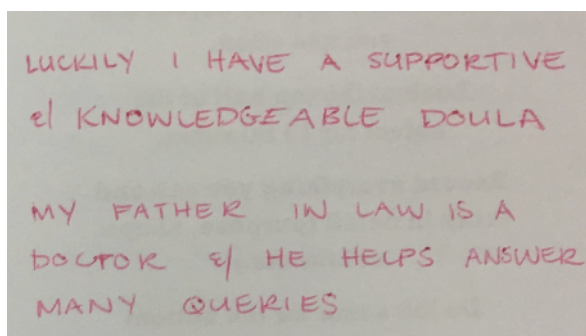


Figure 13: “Luckily I have a supportive and knowledgeable doula. My father in law is a doctor and he helps answer many queries.”

One participant mentioned the positive reinforcement and emotional support she received from Milk Matters after her milk supply decreased and she felt anxious about expressing enough milk for her own baby and the babies in the NICU that Milk Matters supplies to:

*"There was an original dip in my supply when I went back to work. Now I have a new panic that I won't have enough for my baby (after going back to work). I contacted [a Milk Matters staff member], who said I must put [her child] first." (P1)*

#### 3.4.4.2 Social support

The participants described the different types of emotional and physical support they received from their social relations to help them through the early stages of motherhood:

*"The biggest appreciation is support and love, knowing that I can count on them when I feel low or unhappy."*

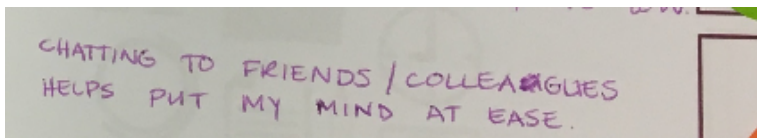


Figure 14: "Chatting to friends and colleagues helps put my mind at ease."

However, as another participant pointed out, too much support can become overwhelming: *"I appreciate the help but sometimes it's just too much, everyone thinks they have a solution and they don't know my experiences with him." (P6)*

**Family:** P1 reported on receiving support from her in-laws who *"make an effort to pop in to help out"*. The donor mothers also re-iterated how important the support of a loving partner is: *"He is very involved as a Father and enjoys being one. So, I'm very blessed with the amazing support from everyone."*

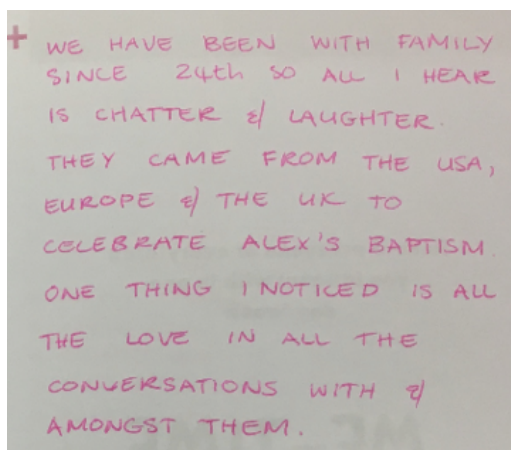


Figure 15: "We have been with family since 24th so all I hear is chatter and laughter. They came from the USA, Europe and the UK to celebrate [her son's] baptism. One thing I noticed is all the love in all the conversations with and amongst them."

The participants with other children (P2 and P3) talked about also receiving support from their older children:

*"My children give me big cuddles and kisses and are always extremely happy to see me. My husband thanks me for taking care of the kids, especially with baby [her son] at night. My*

friends without children have said our kids are sweet and nice to be around and other mom friends often ask me for advice." (P3)

In the Cultural Probes, P3 described the act of her child bringing her flowers from the garden, to show her love and appreciation.

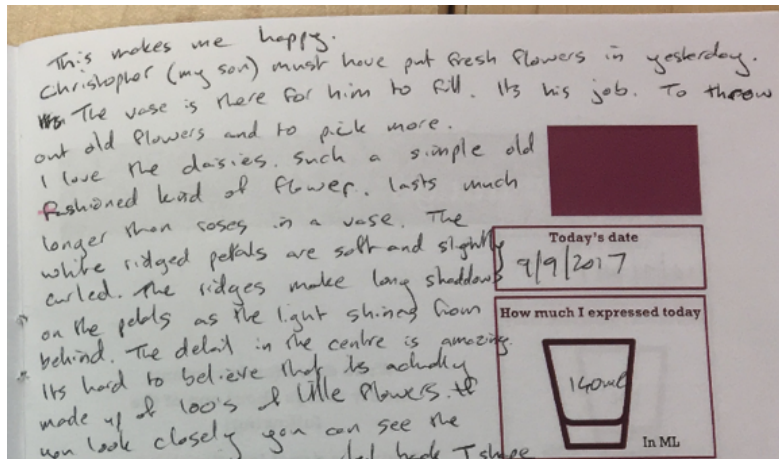


Figure 16: "This makes me happy. [Her son] must have put fresh flowers in yesterday. The vase is there for him to fill. It's his job. To throw out old flowers and to pick more..."

The participants emphasized that partners are important not only to help with household chores and child-rearing, but to offer support to a mother while she is breastfeeding or expressing.

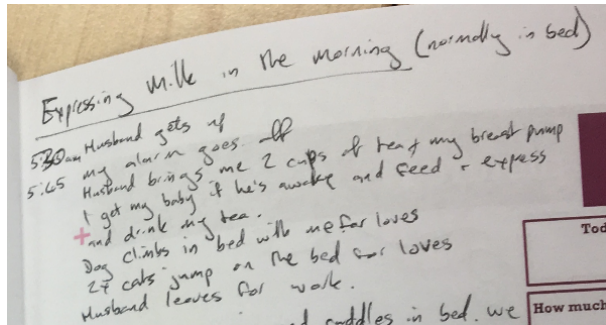


Figure 17: "Expressing Milk in the morning (normally in bed). 5:30AM husband gets up. 5:45AM my alarm goes off. Husband brings me 2 cups of tea and my breast pump. I get my baby if he's awake and feed and express and drink my tea. Dog climbs in bed with me for loves. 2X cats jump on the bed for loves. Husband leaves for work."

Many of the Milk Matters donor mothers rely on their partners for other aspects of the breast milk donation, such as delivering their expressed milk to a depot or to Milk Matters.

P3 mentioned how her partner supported her by looking after the children while she took a much-needed break from motherhood: "Going away with my best friend and leaving all 3 kids with Dad (and sleeping through the night till 7am!)"

**Friends:** The participants also mentioned how their friends were very helpful during the early stages of motherhood and offered support:

*"Some prepared food or bought food for us in the first weeks of [her child] being home with us. It was great not having to worry about cooking with a young baby. Another friend offered her domestic to help clean our flat once a week." (P1)*

**Other mothers:** The participants mentioned their *"mama and baba support groups"* they were part of, as playing a supportive role during the early stages. This support came in the form of personal anecdotes and advice from other mothers.

**Other donors:** Presently there is a lack of support for donors from other donor mothers.

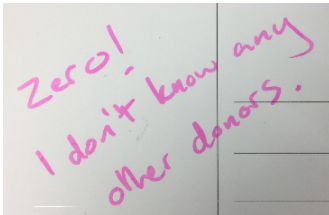


Figure 18: "Zero! I don't know any other donors."

### 3.4.5 Adjusting to being a mother and a donor

The participants used the probes to describe the various changes a woman goes through during the early stages of motherhood: *"It's a massive change of everything, of life basically."* Being a donor mother may introduce additional constraints or duties to a mother's life: *"Accepting that this is who I am and being in the world in this new role. Going with the flow."*

**Medicinal and Nutritional Adjustments:** Pregnancy and childbirth is plagued with medical and health issues such as post-natal depression, traumatic births, children with medical conditions, premature babies and many others not listed but experienced by women who didn't participate in this study (Melender, 2002). One participant relayed her traumatic childbirth experience:

*"The first one was getting over the trauma I had when I had him. It was quite a hectic process. I was in 19.5 hours of posterior labour. I had a midwife, because I wasn't going to go to a hospital. 13 hours later they had to put me in an ambulance and rush me off to hospital, I had to have an emergency caesarean, emergency blood transfusions. My husband and my child had to be sent out of the room while they fought for my life. I wasn't breathing. It wasn't fun. That was my main thing to get over and I really battled with that. And it took a long time." (P8)*

The participants also spoke about the need for donor mothers to adhere to very strict medication rules. Their milk won't be used if they take certain medication that will affect their milk, because it is donated to sick and fragile infants and may harm them. One participant found this challenging, given that she had been put on medication in hospital to help her body to start producing milk for her own premature baby and to fight her post-natal depression. She tried to take herself off it when she came home *"by going cold turkey"*, which dramatically decreased her milk supply and changed her moods. She said she has now gone back on to it and some other, natural products, but unfortunately these are not approved by Milk Matters. Until she stops taking this medication, she cannot donate

any of her milk. It bothers her that her body needs additional nutrients and medication to produce enough milk, and that this medication prevents her from being able to donate:

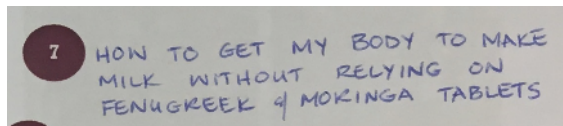


Figure 19: "How to get my body to make milk without relying on Fenugreek and Moringa tablets."

**Behavioural Adjustments:** The participants described needing to adjust their behaviour when becoming a parent. They talked about modelling good behaviour for their children:

*"To model the behaviour you want your child to see. It's like the work you have to do for yourself. You can't lose your temper; you have to have fantastic self-image. All the things you want for your child you have to do yourself. I find myself snacking on dinner while I'm standing up still, but I want to be the family that sits down for dinner. And so, I have to catch myself, sit down, eat with her. Babies are very observant; they pick up things very easily."* (P5)

This change also applied to how they use their technological devices: *"I try not to use my phone in front of my kids, so it lives out of sight most of the time."*

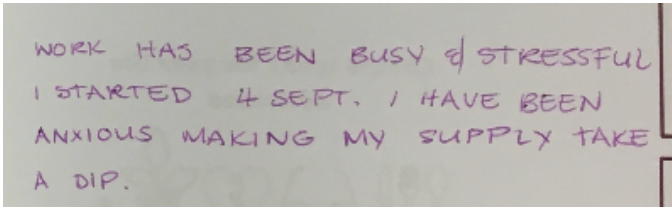
*"In the early weeks of feeding [her son] my lactation consultant actually banned me from fiddling on my phone while feeding, too distracting for me!"* (P2)

**Financial Adjustments:** Having a child introduces a new financial burden on to parents and all of the participants confessed to being anxious and stressed by this. The donor mothers found they had to be more considerate about their expenses and what was important to them. P1 cited finances as a deterrent to not purchase the full version of an application (a baby-feed timer), given that there were so many other free products she could download that were similar to the one she wanted.

**Work-Life-Baby Adjustments:** P1 and P2 also mentioned the difficulties of going back to work after maternity leave:

*"As I went back to work, you're so out of touch. I dipped [her milk supply dropped] because I was stressing about how I am going to pump and work and where am I going to pump at work. And still cram it in a day with reduced hours."* (P1)

*"I think the biggest challenge is finding that work-life balance. Especially when you work from home. Trying to find time for yourself, to meet your baby's needs and work to get an income. Juggling all that and fitting time in for your relationship, friends and family. That's been the biggest thing to learn, or challenge."* (P7)



WORK HAS BEEN BUSY & STRESSFUL  
I STARTED 4 SEPT. I HAVE BEEN  
ANXIOUS MAKING MY SUPPLY TAKE  
A DIP.

Figure 20: "Work has been busy and stressful. I started 4 Sept. I have been anxious making my supply take a dip."

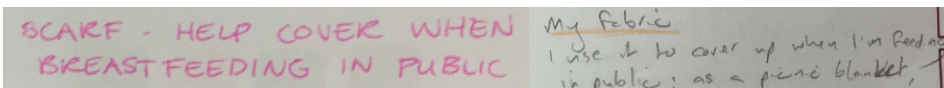
**Sleep and Feeding Adjustments:** The participants talked about adapting to their new baby's regime and having to cope with incorporating feeding times into their daily lives: "Having a new-born is this endless treadmill of feed and sleep. With both of them I feel a little bit trapped with that."

When asked what was the biggest issue faced by all of the participant mothers, sleep was most commonly cited: "I think everyone says sleep, that's the biggest one.", "With [her son] the biggest challenge has been sleep, at night he's woken every two to three hours. Which means I haven't slept for more than two to three hours for a year. So very rarely we get a block of four hours sleep." Not getting enough sleep also has an impact on the perceived difficulty of other aspects of life, such as participant four pointed out:

"Maybe work's a bit of an issue. I think everything is worse if you have no sleep. When you start out you only have a couple hours [sleep] and you have to go to work for 8 hours, even small things become hard because you're tired. And then you think if I was rested, this wasn't even an issue before." (P4)

#### 3.4.5.1 Expectations on a mother

All of the participants brought up instances where their behaviour was dictated by societal expectations, such as covering up when breastfeeding in public.

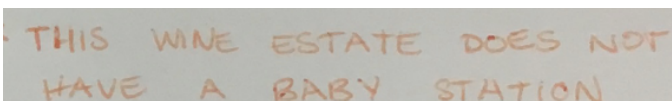


SCARF - HELP COVER WHEN  
BREASTFEEDING IN PUBLIC

My fabric  
I use it to cover up when I'm feeding  
in public; as a picnic blanket.

Figure 21: "Scarf – Help cover when breastfeeding in public"

P1 talked about the expectation that breastfeeding mothers do not visit wine farms and are not allowed to drink. She experienced this pressure and guilt when she visited a wine farm with her baby and could not find a station to change him.



THIS WINE ESTATE DOES NOT  
HAVE A BABY STATION

Figure 22: "The wine estate does not have a baby station"

All of the participants felt that this additional pressure put on a woman in the early stages of motherhood was unnecessary and should be ignored.

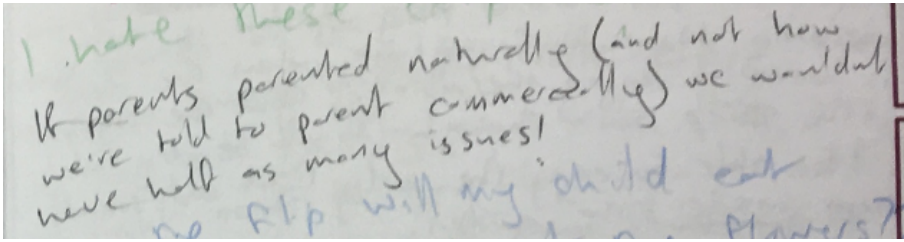


Figure 23: "If parents parented naturally (and not how we're told to parent commercially) we wouldn't have half as many issues!"

### 3.4.5.2 Anxiety about Breast Milk

The participants spoke about feeling anxious about how much milk their bodies would produce and whether they'd be able to feed their child. As a donor mother, the anxieties around breast milk can be even greater, as a donor mother is not only concerned about producing enough to feed her own child, but also enough to feed the sick and premature infants in the NICU. P2 mentioned how having to pump her milk into bottles for donation made her a lot more aware of how much her body was producing compared to when breastfeeding her child, which in this case made her feel a sense of accomplishment rather than anxiety:

*"When you're just breastfeeding, you aren't aware of how much milk is being expressed but being able to actually see it fill up bottles makes you feel pretty proud of yourself and your accomplishment as a woman."* (P2)

## 3.5 Discussion and Analysis

### 3.5.1 Using Cultural Probes with Breastfeeding Mothers

The probe packages provided inspired, creative responses from the mothers. By using this approach, the participants were able to timeously reflect on their environment as a mother and provide thoughtful responses. From the probes, I have tried to understand the life of a women in the early stages of motherhood.

Creating the probe packages was a lengthy task, as it required careful consideration on what activities to include and what would provide insight on the donor mother's environment. Consideration was also needed to find a balance between informative activities and those that would be fun and easy for the participants, so they would continue doing them and complete the probe book. Unfortunately, this was not the case for P2. WhatsApp (a direct messaging service) messages were used as an additional reminder for the mothers to complete the activities. The messages were a channel for a continuous conversation between the participants and myself, the researcher, creating an empathetic relationship where I used personal anecdotes to sympathise with the donor mothers.

The amount of work required by the participants for this approach was a deterrent for other donor mothers to partake in this study. Those that rejected this approach were not willing to do a month-long activity book above their existing responsibilities as a mother and in some cases, an employee.

The data gathered from this method provided interesting reflections on the donor mothers and their environment but lacked focused design implications. At the end of the probe

deployments, during debrief sessions at the participant's houses, the activities and donor responses provided good points for inspired discussion.

In this study, where compensation was not provided to the participants, the donor mothers said they felt the probes were compensation enough. Especially in times of anxiety and stress, like going back to work, they said the activities helped with personal reflection and made them feel better about their role as a mother. This feedback was positive for the probe study, as a lack of confidence is a key element identified in a mother's life (Warren, 2005). However, in one case, the probe activities had the opposite effect, adding to the stress of a mother who was unable to complete the activities while keeping up with her other responsibilities. A lot of reassurance was needed to let the participant know that not completing the activities was not problematic as most of the questions were repeated in an interview session, which she responded more positively to.

### 3.5.2 The life of a woman in the early stages of motherhood

The probe activities were used to get an understanding of the donor mothers in their capacities as women in the early stages of motherhood. I have looked at how the participants want to raise a healthy and happy child. The participants demonstrated how they felt the need to make good parenting decisions to achieve this outcome. This research illustrates how the mothers rely on support from online sources, such as parenting websites, books, mommy groups, and baby equipment. The participants also highlighted the different types of support that they receive from their social circles. Lastly, they described the need for adjustment in their life as they transitioned into this new role, and the pressures put on to women in this role.

Not mentioned, but something to be aware of, is the presence of **external influences** on the life of a breastfeeding mother. Milk Matters aims at 'delivering pasteurised donor milk to all babies in need, while educating parents and health workers to facilitate breastfeeding for all babies and provision of the mother's own milk to vulnerable babies whenever possible' (<http://milkatters.org/about/>). The Milk Matters objective can be heavily influential on the donor mothers as mothers that interact with the milk bank are more inclined to breastfeed over using formula (Eidelman et al., 2012). In situations such as the one P1 was in, where she needed to take medication to overcome her postnatal depression and increase her milk supply, she was prevented from being able to donate her milk due to influences from the hospital.

Another aspect of the donor mothers' lives is the **multi-voicedness** of it. The collective communities which influence the mothers are of different and diverse backgrounds, and this will have an effect on the way that they interact with the donor mothers. This was evident with P1, whose partner works in technology and because of this they have used a lot of parenting websites and applications during the early stages of motherhood. Similarly, by accepting the help and advice from a nanny or friend, the donor mothers will be influenced by these people's background and personal bias, how they have been raised or have raised their own children.

The introduction of online support, such as social media and mommy groups, has had an influence on modern parenting (Duggan, Lampe and Ellison, 2015; Mangold and Faulds

2009). As one participant said, many of these platforms are contradictory to '*natural parenting*' and since the increase of such forums, certain expectations around nurturing a baby have been disrupted (Radesky et al., 2016; Radesky et al., 2015).

The final principle that the probes demonstrate is the **possibility of expansive change**. The introduction of technology has transformed the activity of raising a child (Duggan, Lampe and Ellison, 2015; Mangold and Faulds 2009). In the past, mothers looked to their mothers for help and advice (Barclay, 1997), information which can now be found by a Google search. Likewise, the introduction of an ICT intervention into the donor mothers' lives may transform the donation network and change how Milk Matters achieves their goal to deliver pasteurized milk to all babies who need it.

### 3.5.3 Limitations

A limitation on the implications to design resolved from this work is **historicity**. Historicity contributes to the way the participants raise their child/children and it is important to note that the life of a donor mother in 2018 will be different from lives in the past and what lives in the future will look like. For example, by introducing technology such as cell phones as more depended-upon devices in the mothers' lives, it has also created the need for rules to govern the use of such devices around a baby or amongst the family (Hiniker, Schoenebeck & Kientz, 2016). All of the participants spoke about the societal expectations around breastfeeding in public and having to cover up when doing so. In the future this pressure may disappear and the need for fabric to cover up when breastfeeding in public may become redundant. Financial constraints were cited for participants not using paid-for parenting platforms; this may change in the future if the participants' finances increase and they feel comfortable and willing to purchase premium applications.

### 3.6 Conclusion

This chapter looks at the life of a women in the early stages of motherhood. I have touched on how mothers use online resources and technology in their daily lives. I have also discussed how the way women raise their children has been influenced by computer-supported aid and other socio-cultural interjections. I have used a qualitative approach, deploying Cultural Probes with three donor mother participants for a month, to create a complete picture of their environment and influences in the early stages of motherhood.

This transition period requires a mother to adapt to a lot of change. Working with this population can be challenging as they have limited availability to participate in a long-term study, such as Cultural Probes. There are thus three things to consider when designing cultural probe studies for women in the early stages of motherhood: 1) to create activities that are fun, easy to complete and reflective, 2) to set tasks that can be completed at any time of the day and anywhere (i.e. the mother doesn't have to walk around or do something physical for it), 3) to set up a reminder or prompt to remind the participants to complete the activities (such as sending them a direct message, or having a daily log activity that will encourage them to address the Cultural Probes daily).

This stage of research will influence the continuation of this work, to evaluate how Milk Matters and milk donation fits into this environment, working towards a solution to improve the lives of these mothers, assist donor communication and increase motivation in milk

donors. By using Cultural Probes as an approach, I have also been able to evaluate using this method with breastfeeding mothers, and how effective it was in providing sufficient and creative responses. I will look at more of the findings from the Cultural Probes, complemented by findings from semi-structured interviews with the donor mothers, in the next chapter.

# Chapter 4

## 4 Donor Mother Motivation

### 4.1 Introduction

Milk Matters' available resources to motivate breastfeeding mothers to begin and continue donating their surplus breast milk is limited. In this chapter the aim is to understand why potential and existing donor mothers are motivated to donate their milk, using the Theory of Planned Behaviour (Ajzen, 1991). I believe that answering this question will provide a guideline for areas to address, potentially with an Information and communications technology (ICT) solution or by adding to the existing Milk Matters application.

### 4.2 Related Work

#### 4.2.1 Motivation to Donate Breast Milk

Studies have found that milk donors are motivated by an altruistic desire to help somebody and that they feel they have a social responsibility to donate their excess breast milk (Perrin et al., 2014). In the case of donations to human milk banks, donor mothers are frequently motivated by their knowledge of a particular infant's need for human breast milk. Other mothers are motivated by the hope that somebody else would do the same for them if their own children were in need of human breast milk (Gribble, 2013).

Mothers consider their breast milk to be a valuable resource, as they are aware of its nutritional properties and ability to sustain life. Furthermore, mothers who express milk for their own or other peoples' children invest significant time and energy into doing so, which adds to their perceived value of their milk (Perrin et al., 2014). Many mothers who have an excess supply of breast milk do not want to waste what they consider to be a precious resource. These mothers would like to know that their milk benefits a sufficiently needy and deserving recipient (Gribble, 2013).

There appears to be little in the literature pertaining to the use of mobile technology to motivate and facilitate the donation of breast milk to human milk banks. However, there is research into the use of mobile applications to facilitate and promote blood donation (Sundarde, Jain & Shaikh, 2015; Vanitha & Divyarani, 2013; Yuan, 2016; Jenipha & Backiyalakshmi, 2014). ICTs have played an increasing role in providing additional motivation, support and feedback for blood donors. Ishema (2014) describes the impact of a mobile application that enabled blood donors to receive news and notifications. Foth et al. (2013) employed a combination of mobile application technology and social media in order to enhance the loyalty rates of young blood donors.

#### 4.2.2 The Theory of Planned Behaviour

The Theory of Planned Behaviour (TPB) was defined by Ajzen and Madden in 1986. TPB has been used as a framework to explain the motives of individuals, who intend to engage in a given behaviour at a specific time or place. The theory attempts to explain the various aspects that ultimately lead to a person's actions, to do something or not do it. These variables may be within the subject's self-control or perceived to be out of their control.

TPB is an extension of the earlier Theory of Reasoned Action (Ajzen & Fishbein, 1980), which although worked in some scenarios, failed to acknowledge that the ability to perform some behaviour is not necessarily within the subject's control, such as breastfeeding.

TPB has often been used as a framework to understand the intention to breastfeed. Participants in these studies include pre and post-natal women (Swanson & Power, 2005; Wambach, 1997), adolescents (Melanie Giles et al., 2007), women living in economic hardship (Mcmillan et al., 2009) and women from different ethnic groups (Lawton et al., 2012). Until now, the TPB has not been used to analyse women who are breast milk donors. Common to both Mcmillan et al. (2009) and Lawton et al. (2012) was that moral norms, self-identity and attitude are strong influences on the intention to breastfeed, however Swanson and Power (2005) reiterate that this and social normative pressure vary over time.

### 4.3 Approach

#### 4.3.1 Objective

Semi-structured interviews were used for this stage, as I believed it would promote improve participation from the donor mothers, because it would be less time consuming for them. I also believed that the rough structure of asking questions in a one-on-one situation would allow for some divergence that might lead to critical incidents or knowledge being shared unknowingly (Ayres, 2008). Unlike the probes, the objective for using an interview approach in this stage was so that I could expand on interesting answers during the session or probe further on a particular topic that appeared interesting, unlike the probes, which were left completely in the donor mothers' hands to complete on their own.

Furthermore, the interview sessions were used as another chance for the participants to get to know me, the researcher. It provided a platform for a more empathetic relationship to develop, through self-disclosure. The nature of the semi-structured interview approach was also used to allow for discussion on the probe findings, in an informal way.

#### 4.3.2 Recruitment

I emailed 12 of Milk Matters current milk donors, including those who had replied positively to the probe emails but had not been able to participate in them. This was done using the same approach as for the probe study. The email stressed that the interview sessions would be less than 90 minutes and I carefully created a schedule to keep to, during the session, in case a participant only had that specific amount of time available.

A time and meeting place for the interview sessions was organized with the donor mother after she had responded positively to the email. WhatsApp (a direct messaging service) messages were used on the day to confirm meeting times and place.

#### 4.3.3 Questions and Answers

The semi-structured interviews consisted of 10 questions (see appendix section 1). Before initiating the interview, participants were asked to describe themselves, their baby and background. If asked, the researcher would reciprocate.

Questions 1 and 2 enquired about the donor mother's relationship with the milk bank, how they became a donor, why they continue donating and what their relationship with Milk Matters was like.

Question 3 was about the existing Milk Matters application and whether they had used it.

Questions 4 and 5 asked about the donor mothers' support network and how she kept in contact with it, both on- and off-line. Question 6 was purely about her ICT interaction, specifically what kind of devices she made use of most regularly and why.

Questions 7 and 8 were about the donor mother's communication preferences, both with her support system and with the milk bank.

Questions 9 and 10 were about the life of a breastfeeding donor mother, specifically what was the most challenging about it and the most rewarding.

Answers were audio recorded during the session, so that I could be fully engaged and not worry about taking notes. Afterwards, 9 hours of audio recordings were transcribed into 40 pages of transcripts. I used NVivo software to code these transcripts, using terms from the Theory of Planned Behaviour.

#### 4.3.4 Using the Theory of Planned Behaviour to Understand Milk Donor Behaviour

TPB was chosen as a framework to explain the donor mother's behaviour and what motivated her to begin and continue donating her milk. TPB outlines six attributes that contribute to a person's intention to complete a specific behaviour (Ajzen & Fishbein, 1980). These are:

- *Attitude* - the subject's positive or negative feelings towards a certain behaviour.
- *behavioural intention* - how motivated the subject is to perform a specific behaviour.
- *subjective norms* - whether they perceive their peers to be favourable towards a given behaviour.
- *social norms* - how people in society behave in relation to a given behaviour.
- *perceived power* - factors that aid or impede performing a specific activity that are within and out of the subjects control.
- *perceived behavioural control* - how hard or easy the subject perceives the behaviour to be.

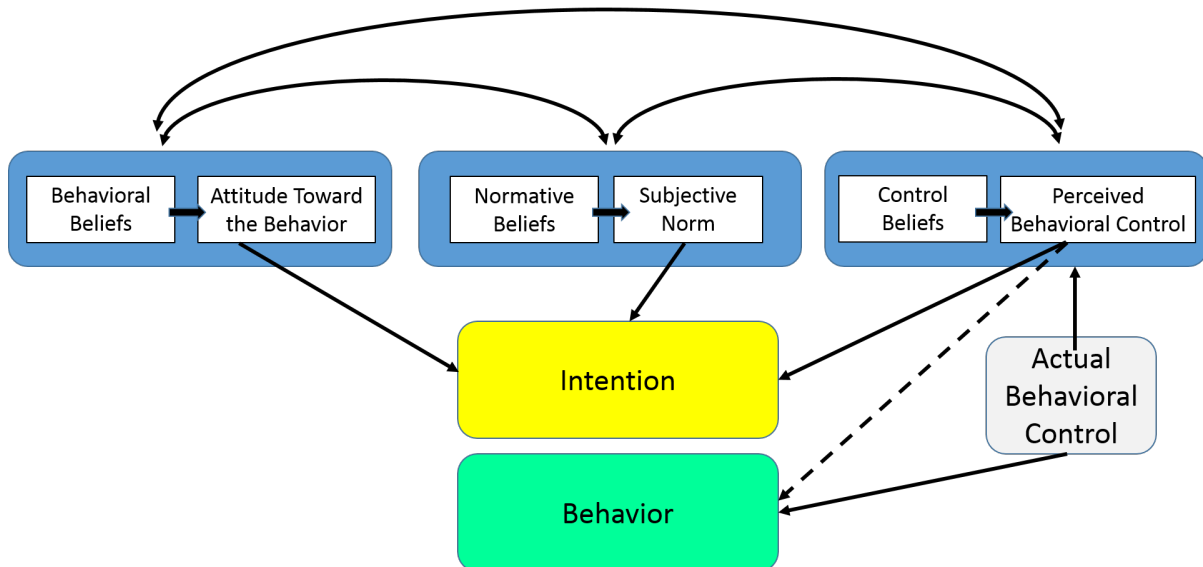


Figure 24: A diagram representing influences to perform a certain behaviour (Ajzen & Fishbein, 1980)

I have chosen to use TPB to explain donor behaviour, much like it has been used in past work to explain how attitudes, subjective norms and perceived behavioural control predict health behaviours such as smoking, drinking and breastfeeding (Swanson & Power, 2000). I have chosen to look at the TPB in relation to the act of breastfeeding over bottle-feeding, as this is closely linked to the decision to donate breast milk. A donor mother would need to be expressing milk to be able to donate it, which means she would have chosen to breastfeed her own child rather than restricting her baby to a formula-only diet.

The limitation present in this theory is the exclusion of economic and environmental factors that may hinder the subject's behaviour, even if their intention is strong. Similarly, the theory does not account for a time frame separating the conception of the intention and completing the behaviour. I will be accounting for both of these in my model.

## 4.4 Findings

### 4.4.1 Participants

Nine donor mothers said they were willing to answer some interview questions about their relationship with Milk Matters:

Participant	Age Category	Number of Children	Occupation	Working	Meeting Venue	Income Bracket
1	30 - 40	1	Travel Agent	Full-time	Her house	Middle
2	30 - 40	2	Lecturer (Geology Department)	Part-time on campus	Her house	Middle

3	30 - 40	3	Unemployed (Used to work as a secretary until she was laid off)	Stay-at-home mom	Her house	Middle
4	30 - 40	2	Light Engineer	Full-time	Her house	Middle
5	30 - 40	1	Lecturer (Immunology Department)	Full-time on campus	Medical Campus	Middle
6	30 - 40	2	Full-time mother	Stay-at-home mom	Her house	Low
7	30 - 40	1	Journalist (Lifestyle writer)	Part-time from home	Café in Gardens	Middle
8	40 - 50	1	Special-needs Therapist	Part-time at patients' homes	Her house	Middle
9	30 - 40	1	Accountant for her and her husband's mobile coffee-truck business	Part-time from home	Her house	Middle-Low

Table 3: A table describing the semi-structured interview participants

#### 4.4.2 Participation

The semi-structured interviews were fairly easy to organize, especially once the mother had connected to me over WhatsApp (a direct messaging service), sessions could be rescheduled easily. During the sessions, the mothers were engaged and happy to share personal anecdotes while answering questions. Sessions ranged from between an hour to two hours and were kept at a pace chosen by the mother. For example, the longer sessions began with tea and a general discussion about the mother's life, her child/children and interests. Thereafter the question and answer session would begin.

Some of the participants had limited time available, needing to meet other appointments or get back to work, and the questions were asked more timeously. Once I was aware of the time pressure, sessions were also more strictly directed to keep the conversation on topic and complete the questions in a timely manner.

Out of the nine participants, two mothers chose to meet away from home, without their child present. P2 is a lecturer at the same university as I, and meeting during a lunch break appeared to be logistically easier to arrange. P7 chose to meet away from home because she said she needed a break from her child: *"I left now because he was screaming"* and she had left him with the nanny.

Of the nine participants seven had their child or children present. The younger children, mostly just slept or breastfed and were not disruptive. For three of the sessions, where there was more than one child present, the interviews tended to be interrupted by an older child vying for the participants attention. With P6, she asked for the interview to be moved to the other room, while her husband watched both children, because she said she was distracted by them. Even so, her eldest kept running up to our interview and eventually just sat in her mother's lap, eating an apple while we continued the enquiry. With P9, all three children were present, and the session was fairly disruptive as the middle child kept whispering in the participant's ear. Near the end of the session, the interviewer was asked to hold the youngest child while the participant took her middle child to the loo. This provided a good opportunity to get a snapshot of the life of a mother.

#### 4.4.3 The Theory of Planned Behaviour

##### 4.4.3.1 Attitude

All nine donors had a positive attitude towards donating their breast milk to the sick and preterm babies in the NICU. Their attitudes towards donation can be grouped as guilt, altruism and wastefulness.

**Guilt:** 5 of the participants said they donated their excess milk because they felt guilty that they had additional milk, while other mothers didn't have any:

*"[Donation] had always been on my mind as something that might be important for me, because I was always so worried that I might not be able to breastfeed, so you know either I'm going to need the milk and if I don't then I'll be able to donate. I was aware of the organization and it was just something I was interested in."* (P5)

For one participant, she felt guilty because this had happened to her friend: *"My friend last year also had a premature baby, so [donating her excess breastmilk] was something I just felt like I needed to do"*. (P9)

**Altruism:** The participants expressed a desire to *'help [premature] babies'* and mothers of premature babies, by donating their excess breast milk to them:

*"Knowing that I'm making a difference in children's life. It can really mean giving them a healthy start and the best possible start that they can have."* (P9)

*"It is nice to know that you are helping other people and like I said life is very hard for premie moms and because [her child] had so many medical issues, so I know the stress of being in the hospital and having to go through that worry."* (P4)

**Wastefulness:** The participants also spoke about knowing how valuable their milk was, and especially how important it is for a premature baby's survival. As such, they didn't want to waste their extra milk by throwing it down the drain: *"I've got the good stuff, so I better start sharing."*

*"It's satisfying, it makes you feel like you're doing something for somebody. If I wasn't donating, I don't know where I would have put all of that milk."* (P6)

#### 4.4.3.2 Behaviour

The donor mothers illustrated different behaviours towards donating their breast milk, and how they made it fit into their lifestyle.

P3 spoke about there being two kinds of donors, those that donate because they have excess milk and do not want it to go to waste, and those that make a conscious effort to donate and work at expressing a larger quantity of milk:

*"So with my middle child, because my oldest drank a lot, for my second one I stockpiled like a little squirrel and then she didn't drink it so then I donated it. But with [her youngest child] I decided that this was something I was going to do, so I decided right from the beginning, from I think about day three, I decided I was going to slot in a feed for the babies at the hospital, a Milk Matters feed. My body thought that [her son] had one more feed a day, because that was expressed for him, but that was not milk that he was ever going to drink, he's never ever going to drink it. So I think I've almost had the experience of being both kinds of moms and the one is fine, like I dropped the milk off and who cares, that's what was left over and my baby didn't drink it, but with [her son] I consciously made an effort to donate milk and I donated a lot. According to the application I put in about 35 litres which I think is a lot of milk, it's more blood than I've donated in like 15 years."* (P3)

**Donating milk that is left-over:** Three of the participants mentioned that they had been pumping a large quantity of milk for their own child and storing it, to be used while they were at work. They chose to donate the excess milk to Milk Matters, when they realised it wouldn't be consumed by their own child.

**Actively pumping milk to donate:** Two of the donors expressed how they wanted to donate their milk regardless of how much they had available. These participants actively worked towards pumping enough to donate to the milk bank. P8 decided early-on in her pregnancy that one of her pumping sessions a day would *'belong to Milk Matters'*, and whatever milk was expressed in that time would be donated regardless of her own child's needs:

*"I expressed for him all the time when he was underweight, so I had a lot of milk. All I did was make one of my pumping sessions belong to Milk Matters. That would be the drive home. I pumped in the car and I still pump in the car on the drive home from work."* (P8)

#### 4.4.3.3 Perceived Behavioural Control

##### 4.4.3.3.1 External Factors

The participants felt that there were certain aspects in their lives that were within their control and out of their control, which made donation possible.

**Medication:** The participants spoke about medication or medical issues as a factor they felt they had no control over. For example, P9 had had a necessary eye procedure that prevented her from being able to donate her milk. P8 also cited medical factors that were out of her control, which caused her body to produce only enough milk to feed her underweight child.

**Transportation:** Participants felt they had no control over the distance to a depot location to drop their milk off at and the ease of being able to find transport to and from that location: *“It's not very far, Medi-clinic, from me, but going to get bottles and come back, it's not that easy.”*

**Awareness:** P6 talked about her experience with her older child, whereby she had had a lot of milk but wasted it by throwing it away. She felt that it had been out of her control, because she was unaware of the alternative option, whereby she could have donated her excess milk to Milk Matters:

*“In the government hospitals they don't (tell you about Milk Matters). I looked for that information, they don't tell you. Groote Schuur, they tell you – you have a lot of milk, you should donate.” “At Somerset hospital, it's hard to get that information. It took me more than two weeks to get that information. It's a lot of milk wasted and its important.” (P6)*

**Lactation:** Two participants mentioned how their bodies began producing less milk over time, as their child aged, which was out of their control. Another participant mentioned how she did not have enough milk to feed her own child and was unable to continue donating to Milk Matters:

*“I was always short on milk because [her child] has low muscle tone and so [her child's] suction wasn't very good. So I just didn't make as much milk.” (P4)*

*“I'm not donating anymore because I'm not even pumping enough for him right now. I'm still pumping as much but I'm not producing as much. It's not fun.” (P8)*

#### 4.4.3.3.2 Internal Factors

The participant mothers expressed how they felt in control of certain aspects of their lactation and donation, such as how much they chose to pump, how much time they could allocate to pumping and how often. Two of the participants talked about choosing to express more than their child needed, straight after giving birth, because they were anxious about their supply dropping when they returned to work. Another said she had chosen to not give any more of her ‘time’ to donating breast milk as she felt she had already done enough and doing more was beyond her capabilities as a working mother.

P3 shared her belief that the amount a woman is able to express is within her control, and there are things she can do such as drinking more water to increase milk production and be able to donate more:

*“There are certain things I can do and it's not taking medicine, it's just about to sleep and about drinking liquid, I can make more milk and so you can manage it. But as soon as I decided I'm not going to donate anymore and I'm not going to drink that extra litre of water every day, my milk dropped off so that I can now not express that extra 50 ml's so easily.”* (P3)

#### 4.4.3.4 Subjective Norm

The perception of breastmilk donation in South Africa varies depending on who you ask, and over which medium you are communicating. The participants brought up a few different channels where they've learnt about breastmilk donation in South Africa.

**Family and Friends:** Most of the participants reported becoming donors because they had close family and friends who had previously been donors as well. By witnessing the positive contribution relations who they respected had made by donating, the participants reported feeling persuaded to contribute their milk as well:

*“It caught my heart. My mom with my brother, who was two months premature also donated milk 37 years ago. And my friend last year also had a premature baby, so it was something I just felt like I needed to do.”* (P9)

One donor was particularly motivated by her sister-in-law, who was a donor 15 years ago (with one of her kids), and continued donating even after her son stopped breastfeeding:

*“She donated all the time and she was amazing. Her son stopped breastfeeding after a year and she continued donating for another year. She expressed, she is a huge inspiration.” “I always said to [her husband] that if we have kids, I want to do this, it's just one of those things. Then we fell pregnant and I told [her husband] from the beginning that from the moment I am able to donate, or I'm producing more than I need, I will.”* (P8)

Alternatively, another participant who originally comes from Europe, where the norm is to only breastfeed for a few months, was surprised by her family's response towards breastfeeding and breast milk donation:

*“The French crowd is mostly surprised that I'm still breastfeeding, they haven't commented one way or another, like I said the French are very non-judgmental it's very much a woman's decision and they mostly don't last long, but you know that's their prerogative. The Belgian family I have is very surprised that I'm still breastfeeding and my aunty who's 75 year, she's very impressed. She tells my cousin that they also should breastfeed, which I feel puts unfair pressure on them.”* (P4)

**Social Media:** Several participants talked about social media being a source of inspiration to donate. One was indirectly influenced by the political discourse happening online in South Africa at the time, and perceived donation as a way to give back:

*“This all happened during a time when there was a lot of shit in the country, there was a lot of racism and the whole white privilege debate, and I thought that this is one way that I can actually resolve this for myself. Doing something that doesn't really take much energy or*

*effort on my part. As a privileged South African I want to help those who can't. And that was a big incentive.” (P7)*

Another donor talked about directly being influenced by users of the Facebook group La Leche league posting about their anxieties about their supply dropping when going back to work:

*“I’m on the La Leche league Facebook page, and you see these women, who keep basically a whole freezer full for when they go back to work. You know you’re still going to be producing milk, when are you going to have time to drink all of that. You can see there is a lot of anxiety about what’s going to happen. But it’s understandable, I was also nervous about what was going to happen. I’m lucky that it’s all worked out so well, it could have gone wrong, you never know.” (P5)*

This prompted her to store a large excess of milk in the beginning, which she ultimately donated to Milk Matters because her baby didn’t drink it all. Another participant mentioned being inspired by celebrities who were new mothers and were also going through the struggles of breastfeeding, making it culturally accepted: *“Pink, who is breastfeeding now, and her house has all these things lying around and if she needs to feed or pump, she just does it.”.*

All of the donors were also inspired by seeing posts on the Milk Matters Facebook page of babies who had received milk: *“You know what I love, is the posts saying what they do about the 3-year-olds and 4-year-olds who received donor milk, and how far they have come”.*

**Hospitals (Maternity Wards):** The donors mentioned subjective norms around donation and breastfeeding that were mostly positive, however there were some that gave a negative impression. In many of the public hospitals, breast milk donation is not common knowledge. The nurses, who tend to be the biggest informants to mothers in the hospital wards (Heermann, 2005) are unaware of the milk banking process and as a result a lot of mother’s own milk is wasted in public hospitals:

*“in the government hospitals they don't (tell you about MM). I looked for that information, they don't tell you. Grootte Schuur, they tell you – you have a lot of milk, you should donate.”, “At Somerset hospital, it's hard to get that information. It took me more than two weeks to get that information. It's a lot of milk wasted and its important.” (P5)*

**The general public:** Being a donor means having to pump a lot of milk, at all times of the day and in all kinds of places depending on what your work-life situation is. The donors reported that the current subjective norm around breastfeeding in public and at the office in South Africa is not a positive one: *“My experience now pumping at work, because I pump in our lab, so the guys kind of ask like oh are you still doing that.”* This donor said she had to ask for a space and a key: *“because people tend to barge in, not intentionally but it happens.”.* Another participant commented on a news article<sup>2</sup> of a woman being kicked out of the

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<sup>2</sup> Francke, R. (2016, March 9). *Store bans breastfeeding mother*. Daily Voice. Retrieved from <https://www.iol.co.za/news/south-africa/western-cape/store-bans-breastfeeding-mother-1995356> on November 1, 2018 - a breastfeeding mother was kicked out of a South African clothing store for trying to

Edgars at a local shopping mall, for trying to breastfeed in public: *“If someone stopped me, I would say something – come bring your plate of food into the bathroom and tell me if you still want to eat it there.”*

#### 4.4.3.5 Intention

The participants’ intentions that led to their behaviour to donate their excess breast milk can be grouped into four categories.

**Being prepared for the unexpected:** The participants reported their intentions in the early stages of motherhood were to pump more milk than their babies were consuming in case of any situations where their supply dropped (such as when they went back to work): *“You never know what’s going to happen”, “You try to plan for every scenario”*. This intention led to many participants having an excess of milk in their freezers that they donated to the milk bank so as not to be wasteful. This intention is discussed in more detail below.

**Relieving Guilt:** As mentioned above, P7 felt guilty about her status as a privileged white South African at the time. She intended to use breast milk donation as a means to alleviate some of these feelings of being *‘a privileged South African’*<sup>3</sup>.

P2 also mentioned feeling privileged for her milk coming in and being able to breastfeed so easily, compared to other mothers whose reported struggles she had read about:

*“Everything went so well for me, I feel like I have to do something to show how that I don’t take it for granted, how lucky I’ve been”, “I’ve got the good stuff, so I better start sharing”*.

**To help other mothers and babies:** some of the participants had experiences with their baby being in the NICU in the early stages and relying on donated milk: *“Like the first few days I also didn’t have milk, so they donated for him”*. Their intention, by donating, was to help other parents who went through similar experiences but were unable to do anything and desperately needed the help:

*“[Her child] was only in for one night and it really broke my heart, to think of other moms, you see them there. The babies are this big (using her hands to show how small they are) and they’re going to be there for so long. It must be very difficult”* (P5)

**To not be wasteful:** with the intent of pumping more than necessary in preparation for unforeseen circumstances that could have affected milk supply, a lot of participants reported having excess milk that they did not want to waste by throwing it down the drain:

*“After you fill one drawer in the deep freeze you think you have to get rid of it. And then I googled it (how to donate) and thought that I want to donate it.”* (P4)

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breastfeed her baby in the store. Following the incident, a group of breastfeeding mothers held a protest outside the store to promote the normalization of breastfeeding in South Africa - Isaacs, L. (2016, March 13). *Breast-feeding moms strike back at Edgars*. Retrieved from <https://www.iol.co.za/capetimes/news/breast-feeding-moms-strike-back-at-edgars-1997275> on November 1, 2018

<sup>3</sup> Wale and Foster, 2012

*“[A Milk Matters staff member] made a plea – we need milk – and I said, I have so much milk in my freezer, my boy’s not going to get through all of it because I’m still at home and I’m still feeding him and it was after 3 months. I don’t need it, you can have it. She came and she collected the milk and she dropped off the bottles for me.” (P6)*

## 4.5 Discussion and Analysis

### 4.5.1 Using Semi-Structured Interviews

By using semi-structured interviews in individual sessions I was able to gather a lot of information from the donor mother participants. This format provided an opportunity to explore topics around breastfeeding, donation, social networks, social media and the mother’s technology usage in more detail. Much like the probe deployment meetings, using house-visits at the donor’s leisure made participation a lot easier. Although it does take longer to visit each donor in person, I believe the quantity of data collected this way provided us with an in-depth view of the donor mothers and their relationship with the milk bank.

### 4.5.2 Donor Mothers Motives to Donate their Excess Breast Milk Explained Using the Theory of Planned Behaviour

I have used the Theory of Planned Behaviour (TPB) as a rough framework to explain donor mothers’ beliefs and attitudes towards breast milk donation. Specifically, I am only looking at mothers who have already chosen to donate their milk, as I had access to them as participants in my study. A more balanced TPB would have incorporated mothers who do not donate their milk.

Regardless, the model (as shown in Figure 25) illustrates how attitude, subjective norms and perceived behavioural control contributes toward a donor’s intention to donate her breast milk.

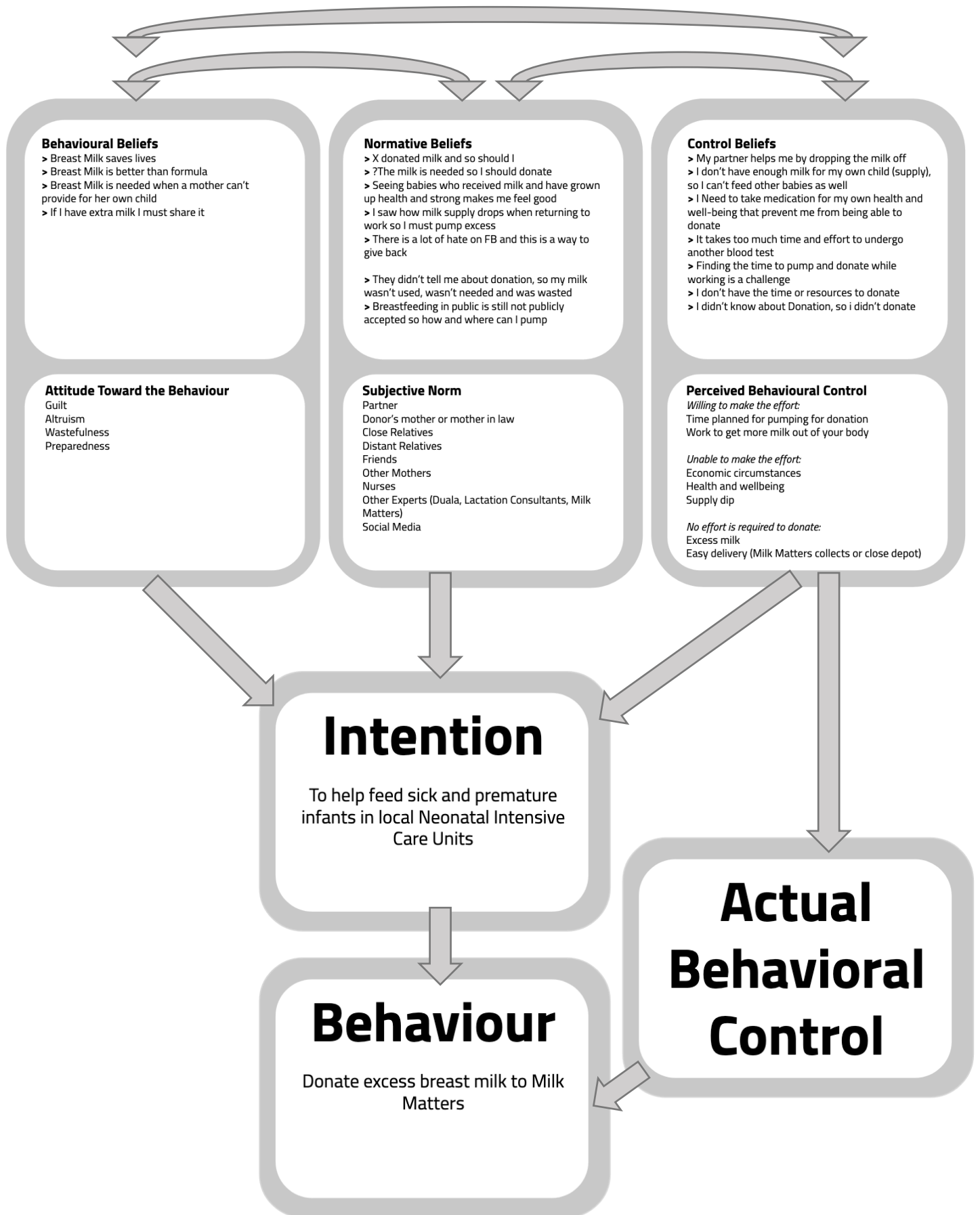


Figure 25: A diagram illustrating the influences the participants felt on the intention to donate their breast milk

**Attitude:** The participants described four attitudes towards donating their breast milk which all come from the understanding of how valuable their milk is for the sick and premature babies in the NICU:

1. The high value placed on their own milk meant that they either reported feeling guilty if they were wasting that milk by not donating it
2. They felt good knowing they had been able to help other parents and babies
3. They felt like they were wasting their milk and the luck they had received by being able to express problem-free if they weren't donating it
4. They felt prepared for going back to work or their supply dropping by pumping more than their own child needed and then being able to donate the excess that wasn't used.

**Normative Beliefs:** The mothers reported having different beliefs about donating their breast milk and why they should do it. Much of this comes from the shared opinions of people in their lives. Those closest to them, such as their partner and immediate family, seem to hold the most weight, as do experts whose knowledge they trust and respect (Spillius, 2014). Although their opinions still affect the participants, relations perceived to be further away, and members of social media, are less valued by the participants. Positive social norms from the participant's inner circle included having relatives who also donated and reported it as a positive experience. Many participants also reported donating because their doula or lactation consultant said they should.

**Subjective Norms:** Positive norms towards breast milk donation displayed by people in the participants' outer circle were most prominent on social media. Donors reported being moved by posts of babies who had received milk. They also reported being prompted to pump more than necessary because of seeing a lot of anxious parents on the Internet whose supply had dropped when going back to work. Because of this donor were prompted to pump excess, which they could then donate.

Negative norms came from the perception of breast milk, or lack thereof, in public hospitals, as reported by P5. Due to a lack of awareness, she ended up wasting much of her milk. Another indirect influence on the perception of breast milk donation is the social stigma surrounding breastfeeding in public. Witnessing how public breastfeeding is still not socially acceptable in all places makes pumping in public a logistical issue thus making donation more of a logistical issue.

**Perceived Behavioural Control:** From the participants' responses, I have grouped their attitude about how much behaviour control they think they have into three categories: those willing to make the effort, those unable or unwilling to make the effort and those who believe it is no extra effort. Those willing to make the effort believe that it is within their control to find time to express their milk for donation. One donor even reported on her perception of being able to express more milk by making the effort to drink more water. The participants reported having no control, and thus were unable to make the effort, over the economic cost of donating (buying a pump and the cost of transport to deliver the milk), health and wellbeing (being on medication for necessary reasons, such as a surgery or post-

natal depression, that prevent donation) and a supply dip (as their baby consumes less and grows older). The last type of attitude expressed by three of the participants was that donation required no effort as they didn't have to control how much milk they were pumping, because they were pumping excess and they didn't have to worry about dropping off the milk because Milk Matters was making an exception for them and could collect the milk from their house.

#### *4.5.2.1 Limitations of the Theory of Planned Behaviour*

**Time:** The TPB does not account for the time delay between forming the intention to complete a given behaviour and actually performing it (Ajzen, 1991). Most of the participants reported being willing to donate their milk prenatal, however due to issues during the birth (such as depression, or a preterm babies) were unable to donate their milk for some time post-natal. Additionally, the act of donating is a long and tedious process, it takes some time to collect enough milk to be able to deliver it and during this time other hindrances emerged for the donors, such as having to redo the blood test or going back to work. These interim activities were reported to deter the donor's capabilities to be able to donate and reduced the convenience of it.

**Pre-existing constraints:** Another factor not explained by the TPB are pre-existing constraints that make milk donation behaviour less accessible, such as economics. For participant 5, due to her economic situation she could only attend public hospitals. She reported that there was no knowledge of breast milk donation in these institutions, even though the mothers visiting these hospitals, such as herself, had an excess of milk that could be donated. A contributing factor to this could be the financial burden attached to donating milk, such as having to buy a pump to express milk easily (hand expression does also work), in some cases, needing a big freezer to store the milk and paying for transport to deliver the milk to a depot.

#### *4.5.2.2 Implications for future design phases*

These findings will be used to inform the design and development of the proposed chatroom in the next stage, so that the donor mothers' attitudes toward donation may be improved and thus increase their intention and resulting behaviour of beginning or continuing to donate their excess breast milk. I aim to design an artefact that influences the mother's attitude, subjective norms and perceived behavioural control in a positive manner. Based on the findings from the semi-structured interviews previously discussed, this could be by:

**Improving Donor Attitude:** To positively influence the attitude of present and potential donor mothers, there should be more visibility of and conversations about the impact that any quantity of milk donated has in a sick or premature baby's life. The NGO, Milk Matters, may be too under-resourced to make this a priority but for improved visibility, more people need to have conversations and share media linked to breast milk donation online and offline. This will not only help create awareness but also improve the present donor mothers' attitude about their own contribution and hopefully alleviate any guilt over quantities. Mothers should be reassured that even a small contribution makes a big difference, which should simultaneously convince those who do not already, to donate rather than 'waste milk' by throwing it down the sink.

**Improving Donation Subjective Norm:** Similar to the aforementioned suggestions about improving attitude, there needs to be a large-scale conversation around breast milk donation to improve the subjective norm. By increasing awareness of the positive impact donation and breast milk has in a child's life, hopefully more potential donors hear about Milk Matters and are influenced by the positive subjective norm to donate their excess milk.

In this stage of the research, it was also made clear how important supportive partners and breastfeeding experts are in a donor mothers' life. These people should be included in correspondence centred around breast milk donation (Ammari & Schoenbeck, 2015) and be included so that they may feel just as responsible for donation as the mother does. They should also be provided with a channel to connect with each other and offer their wisdom on how they have been supportive to donor mothers in their own capacity.

**Perceived Behavioural Control:** Findings from this stage have shown that there is a disparity in donor mothers' opinions on what is within their control with respect to breast milk donation. Due to a lack of communication amongst donors, there presently exists no means of rectifying these views through collective experience. To make it clearer what behaviour is within the donors' control, they should be provided with an online forum to connect to, from anywhere, so they can share their experience. Starting a global conversation on the difficulties and effort required to donate breast milk should also provide a space for problem solving and collective creativity. This channel could also be used to provide strict guidelines for what is out of the mother's control (such as medication), so that there is no confusion around this issue and Milk Matters doesn't need to be directly contacted every time something arises.

#### 4.6 Conclusion

This chapter illustrates why potential and existing donor mothers are motivated to donate their excess breast milk. By using concepts from the Theory of Planned Behaviour I have endeavoured to create a rough framework of the attitudes and factors that contribute to the mothers' intentions to donate and their resulting behaviour of actually donating breast milk. Semi-structured interviews with individual house visits were used to ask nine participants about why they donate, and based on their answers and discussion, I have identified several factors that contribute to donor behaviour.

By analysing donor behaviour using the TPB, I am able to identify where existing and potential donor mother attitudes towards donation and continuing to donate can be influenced. In the next chapter, I will look at prototypes for a donor mother chat room, which was suggested by existing donors to improve these attitudes.

# Chapter 5

## 5 Connecting Breastfeeding Mothers

Brainstorming, Prototyping, Development and Cognitive Walkthroughs

### 5.1 Introduction

The transition to motherhood can be a very isolating time for women, even after having a child, mothers need additional support and help. In this chapter I also describe my experience of co-designing and developing a donor mother chat room, with milk donors, for milk donors in Cape Town, South Africa. I first investigated how they make use of existing parenting social networks, using semi-structured interviews. I then performed iterative brainstorming and prototyping stages, which led to the development of the donor mother chatroom, which has been evaluated using cognitive walkthroughs.

I have investigated the implications of using a donor mother chatroom to improve engagement between a non-governmental organization (NGO) that collects and distributes breastmilk and their donor mothers. Subsequently, I look also at the possibility for creating supportive communities through online connection and communication as well as curating knowledge through donor mother and breastfeeding expert collaboration.

My contribution to the Human Computer Interaction (HCI) community is 1) a greater understanding of how breastfeeding mothers use social networks, in addition to how mothers with small children use it, and 2) implications for designing a chatroom that offers support for donor mothers. Mothers in general seek a chatroom without ‘troll behaviour’ or bullying; that offers privacy but has enough users to form a community and curate content; and offers valid and specific information. Specifically, for donor mothers, they are seeking an intervention that allows for communication between mothers who share a common cause with the NGO enacting that cause. My results indicate that making that chatroom a private, regulated channel specific to the NGO can help to achieve these goals by 1) balancing privacy against participation, 2) supporting participation through tailored content, 3) ensuring proper moderation of discussion and 4) leveraging familiar chatroom design patterns.

### 5.2 Related work

#### 5.2.1 Applications for Breastfeeding Mothers

There has been limited work in HCI focusing on breastfeeding mothers and how they interact with technology, specifically mobile applications and social networks. Existing applications address the need for creating safe spaces to breast feed in public (Balaam et al., 2015), track nursing (Amila, 2018; Compass Apps, 2018; Standbridge, 2017), receive updates and information on the health and growth of a baby (ABQ App Source LLC, 2018; Technica, 2018), sleep and baby monitoring (TMSOFT, 2018) and to motivate mothers to donate their breast milk (Wardle et al., 2018). There is a gap in our understanding of how mothers would interact with and utilize a mobile application designed specifically for donor mothers to socially connect with and support each other.

My previous work on the Milk Matters application targeted the Milk Matters donor mothers. During this initial work, I considered appropriate methods for interacting with the busy and distracted mothers, and proposed several implications for design, including the importance of empowering mothers through positive reinforcement. In this chapter, I build on this work by empowering mothers to participate in conversations with Milk Matters and to share useful educational content with other mothers, rather than only presenting static educational content, as the existing application does.

### 5.3 Methods

In this stage, following on from the previous stages, I have used an iterative design cycle – evaluate (E), design (D), prototype (P), as seen in Table 4. In the initial evaluation stage, as discussed in Chapter 3, I used Cultural Probes to get an understanding of the donor mothers and what their interaction with the milk bank entailed. The initial design stage included individual interviews with nine donor mothers, where each session ended with a brainstorming activity. Suggestions from the participants were combined and voted on by the same participants in an online questionnaire. In the prototyping stage, a low-fidelity sketch was created from the feedback received from the brainstorming session and online questionnaire. This was then evaluated by the same donor mothers in a second round of interviews with Wizard of Oz-style prototype evaluation. Their feedback was incorporated into a redesign of the prototype to produce a high-fidelity, interactive prototype. A link to this prototype accompanied by a questionnaire was forwarded to the same participants, who were asked to evaluate it online. Again, this feedback was incorporated into a redesign of the donor chatroom and developed into a working mobile application. The chatroom was evaluated with individual cognitive walk-throughs.

	Method	Participation	Duration	Start date
E	Cultural Probes	3 Mothers	1 Month	Aug 2017
D	Individual Interviews and Brainstorming	9 Mothers	2 Months	Sep 2017
D	Online Questionnaire	7 Mothers	2 Weeks	Nov 2017
P	Low-fidelity Sketch Evaluation	8 Mothers	1 Month	Dec 2017

E	Online Questionnaire on High-fidelity Prototype	4 Mothers	2 Months	March 2018
D	Build Chatroom Application	First Author	3 Months	June 2018
P	Cognitive Walkthrough	6 Mothers	2 Weeks	Sep 2018
P	Application Logs		Long-term Deployment	Sep 2018

Table 4: A timeline showing the methods used to co-design and develop the donor mother chatroom (E = Evaluate, D = Design, P = Prototype)

## 5.4 Findings

### 5.4.1 How Mothers Interact with Existing Chat Functionality

From the interview and probe discussions (discussed in previous chapters), I learnt that seven of the nine participants use Facebook parenting groups, all nine use WhatsApp (a direct messaging service), five refer to parenting sites, such as BabyCenter (BabyCenter, n.d.) or Kelly Mom (KellyMom, n.d.), four use parenting applications and all nine use search engines for parenting-related queries.

I have classified their experience with these channels into common themes relating to mothers and donor mothers:

#### 5.4.1.1 Using chat functionality makes donor mothers anxious

All of the participants spoke about how chatrooms or social networks sometimes make them feel more anxious about their parenting abilities, similar to Lupton (2016):

*“I was on a WhatsApp group with my doula. She says she does that with most of her clients post-natal. But I left it, it was making me too anxious” (P7)*

*“Google and googling childhood things is a little bit terrible because you can freak yourself out quite easily” (P2)*

The participant mothers said they felt anxious because they would compare the bad experiences other mothers had had in similar circumstances to them and believe that it might happen to their child. One participant shared how she had read a story about a mother with a premature baby who weighed only 1 kg at birth and was now experiencing issues at a similar age with her own child, which made her feel very anxious. Another mother experienced a similar ordeal after posting a question:

*“I also find that if you go into a WhatsApp group or going to an online group and you put a question out, everyone's going to come up with all their horror stories. You don't actually want to hear horror stories, you don't need it and I don't need to carry that baggage.” (P3)*

Most of the participants felt that the anxiety and pressure mothers feel is unnecessary, and should not be part of the experience when going online to receive support and encouragement from other parents:

*“It's unrealistic and puts a lot of pressure on you and if you're not happy then your kids aren't happy either. Things didn't used to be this hectic 20 years ago, I can't imagine my parents stressing about half the things we stress about.” (P4)*

One of the donor mothers shared the story of how she was “bullied” through a private mom’s group on Facebook. Her milk had taken a very long time to come in and because of this she was unable to feed her child. She was concerned about her child’s lack of nourishment and food to grow so she turned to the channel for support and guidance, asking if they thought mixing formula and breastmilk would at least prevent her child from starving. She was met by several very outspoken mothers, who had been able to successfully feed all of their children and were of the opinion that she just was not trying hard enough. Sadly, she was not the only mother to experience this:

*“If you start to read the comments, there are moms who are obsessed with breast milk and who are very harsh on moms who struggle. They'll post about that [their struggles] and then you'll have people who comment that it's your duty and you have to. That's a bit harsh.” (P4)*

Donor mothers can be even more sensitive to online discussions on how much milk other mothers are able to produce, as they are acutely aware of the amount that they are able to express for Milk Matters and their own child, on a daily basis. This is illuminated in the constant queries Milk Matters receives from mother asking about how much milk they should be expressing and donating (to be discussed in chapter 5.4.3).

#### **5.4.1.2 Chat functionality can be educational**

The participants said they had ‘learnt a lot’ from posting to or reading content in online chatrooms:

*“I find that very useful. If you have a specific issue you can scroll or search for that term. You can see what issues other people are facing and you think oh ya, that applies to me so then you read all of the responses.” (P5)*

If not able to get support from family or a partner, the mothers said they would turn to online sources: *“If I'm not sure of anything I just search for it.” (P6)*

Unfortunately, this cannot be said for information relating to donation. As donation is not a globally adopted process (Tully, Jones & Tully, 2001), the Milk Matters donors are limited to getting information from the milk bank’s website, Facebook page or by directly messaging/emailing them. Information online can also be misleading or contradictory to

Milk Matters' donation guidelines/adherences, such as a mother taking Moringa to increase milk expression will not be able to donate to the milk bank.

#### 5.4.1.3 *Breastfeeding mothers seek resources to pass the time*

The participants talked about how they enjoyed using their phones to entertain themselves during long periods of 'sitting', while feeding or caring for their young child: *"I used my phone to listen to podcasts which was a life saver, feeds could take up to 45 minutes"* (P8)

*"When you spend endless hours breastfeeding and [her baby] is a terrible sleeper, so for his daytime naps he likes to sleep on my chest or with me, so I have spent hours and hours pinned beneath a sleeping baby and my phone has been an absolute saviour to have the Internet in my hand."* (P2)

This entertainment, similar to what Wardle et al. found, should not be disruptive for their child (i.e. noisy or flashing videos), easy to pick up and put down and at times access with one hand.

#### 5.4.1.4 *Chat functionality is usually catered to different geographies and cultural norms*

A deterrent to the mothers was that most of the sites and applications they made use of were catered towards an American audience, so products or units used would be foreign to them and required some thought, conversion or research to understand.

Another barrier they experienced was a cultural difference, and finding it hard to relate to the American parents:

*"The negative feedback generally comes from the Americans. It's weird though you see the different countries and I lived in France and I have a big family so some of my cousins also have babies and they stopped breastfeeding like after a month and in fact were very surprised that I'm still going. So it's very difficult to relate."* (P4)

In the context of the comment above, this difference is particularly apparent for donor mothers who tend to be more conscious about their milk supply and cannot relate to some of the mothers they encounter online.

#### 5.4.1.5 *Donor mothers can feel overwhelmed by too much information on chat functionality*

The mothers found that the sites they visited or chat rooms they subscribed to could become very overwhelming:

*"I mean that FB group just got terrible, like 20 messages in like 10 minutes and even if you put it on mute."* (P7), *"There are millions of parenting websites. It's a bit of a rabbit hole of online advice."* (P2)

Sites that are not segmented and allow all kinds of posts can become very crowded and make it hard for the mothers to find specific information:

*"I searched for one group of premature mothers and babies, but then I lost interest because there are too many problems and when you get to read about people's problems it's tiring."* (P6)

For a donor mother it can be extremely hard to sift through all of the information available online and find out what applies to their circumstance as a breastfeeding mother and donor mother.

#### *5.4.1.6 Share very personal and private things on social media*

The participants said they enjoyed receiving ‘personal’ responses from other users on chatrooms: *“I don’t just want to feel like a number, but I want to know that someone is answering me.”* (P1)

Although most of the participants felt that chatrooms were not private enough to post all of their personal issues, they said that they felt comfortable using WhatsApp or other direct messaging services to communicate individually with someone. Especially in relation to donation, mothers often have private questions which they relay only to Milk Matters or a trusted expert:

*“What I like about WhatsApp is that it’s nice for sharing photos and you can see when the person you’re messaging has read your message which is reassuring. Especially with [lactation consultant], the voice notes were great.”* (P2)

For those that did participate in online groups liked that there was some moderation on who could view or access the group: *“I like that it’s personal and private because I wouldn’t want everyone to know about my issues.”* (P5)

#### *5.4.1.7 Making social connections through chat functionality*

All of the donor mothers said they used Skype and WhatsApp to stay connected and socialize with family and friends:

*“I like wasting time on FB, and it’s a nice opportunity to look at pictures and catch up with people and send messages on WhatsApp and keep my mom and mother-in-law in the loop with pictures of the grandchildren.”* (P2)

One mother even felt confident enough to attend a physical meeting and socialize with other mothers she met on a Facebook group in person.

#### *5.4.1.8 Donor mothers use chat functionality to offer and receive help or support*

The donor mothers said they felt encouraged by the support shown by other mothers through these online chat rooms:

*“specifically, in terms of breastfeeding and La Leche league (La Leche League, n.d.), you feel very motivated. How proud other mothers are of the same achievements. They put up awards for like ‘yay I’ve breastfed for 6 months’, ‘yay I’ve breastfed for a year’ and stuff. Everyone gets huge congratulations and stuff. Not that I think I would post that but to see that that is something to be proud of. I think that’s quite motivating and empowering.”* (P5)

Or as another mother said, she joined the chat room to also support other mums. This sentiment was echoed by all of the donor mothers I spoke to, who said they would be willing to share what they learn from their donation experience with others.

#### 5.4.1.9 Donor mothers want to use chat functionality at any time

An important aspect, especially to ‘mums with little babies’, was being able to access information at ‘any time of the day or night’:

*“I think as a first-time mom there comes a point when you need that support at 2 o’clock in the morning, like oh my gosh he’s not sleeping.” (P1)*

This is most applicable during the early phases of motherhood, when the baby is still small, and the mothers are up at all hours. They want the opportunity to chat or post questions to other mothers who are also awake at that time.

#### 5.4.2 Findings from the brainstorming exercises and online questionnaire

At the end of each individual interview session with the nine donor mothers, I asked them to brainstorm potential solutions that could improve the donation experience and were within Milk Matters’ limited resource capabilities to address. All of the suggestions were then collated and sent to the same participants to vote on, in an online questionnaire. Besides wanting a more efficient way to deliver their donated milk to a depot location, or have it collected from them, all of the participants expressed a desire to be able to connect with other donor mothers calling it *a big issue* because presently there is ‘zero’ interaction and they *‘have no idea how many moms donate’*. Main themes around the suggestions are as follows:

**Privacy:** The participating donor mothers expressed concern about who would have access to the chat room, who could see their posts and how private their information would be kept. This is a valid concern, especially in this context where the participants want to feel safe and free to talk about any of their issues, as opposed to how they tend to feel about existing forums where they have been shunned for their posts. Therefore, five of the participants voted online to have anonymous profiles separate from Facebook.

A participant suggested that users should: *“be able to select if a particular question or post is submitted as anonymous or with your profile”*. This would potentially make users feel even more comfortable to use the chat room and discuss hard-to-ask questions privately. However, the posts would still need to be monitored and moderated: *“I think Milk Matters should be able to see who the post is from (i.e. if its selected as anonymous, Milk Matters should be able to see that it is from me)”*, to ensure that anonymity does not lead to malicious behaviour.

**Accessibility and Relevance:** We also discussed how the posts would be ordered, and what would make them more relevant for users of the chatroom. There was a suggestion to present posts, ordered by the most recent post, in their relevant topics. All of the participants responded positively to this idea, as it was pointed out that mothers are often constrained by time, they need a faster way to have access to answers related to their questions and do not want to spend a large amount of time searching for an answer.

**Authority and Regulation:** The participants agreed that a chat room like this would need to be moderated, to prevent exclusion or malicious behaviour. There were several suggestions for who should act as the authority. The participants rated Milk Matters the most important

to have as the authority, followed by a lactation consultant and a breastfeeding specialist. Given the context, it would be expected that Milk Matters moderate the chat room, especially any posts related to donation, as they are the experts. When asked about the inclusion of a lactation consultant and breastfeeding specialist, the donors said it would serve as additional moderation and to make the chat room more attractive to mothers looking for expert opinions from specialists trusted by Milk Matters.

**Usability:** When asked about how the participants wanted the chat room to look, their answers were split (3 votes each) between having a familiar Facebook-like feed or including a topics page, where posts are grouped into themes, presented in a Facebook-like feed.

The participants wanted all of the same functionality that they were already familiar with in other chat rooms, such as commenting on or liking posts and directly messaging a user. They also wanted to be able to tag posts, to make searching for specific topical posts easier.

**Personalization:** Unanimously all seven participants said they wanted autonomy to choose what kind of notifications they would receive from the chat room. This is important in the early stages of motherhood, as soon after giving birth most mothers said they felt unsure about themselves and relied on online forums for help and support. However, the participants also wanted the option to deactivate their account or mute notifications, as they believed this would become an annoyance over time, as they matured as a mother and required less support.

### 5.4.3 Feedback from the Milk Bank

I had a formalized interview with one of the Milk Matters staff members, to brainstorm the proposed donor chatroom, as well as get her feedback on the donor mother suggestions. She is a qualified dietician and has been working at the milk bank from 2011, initially as a volunteer and then permanent employee. Her role varies from running the office daily, ensuring milk is processed and dispensed while maintaining quality control of the milk. Several themes emerged from the brainstorming discussion, which I will discuss in more detail below.

#### 5.4.3.1 Feedback and Engagement

Milk Matters said they'd like to engage more with their mothers, by being able to share regular updates about the babies being supported by their efforts:

*"I would probably make it more interactive [in response to what they would change with the existing Milk Matters application], like news and stories. I find what moms like to hear is stories of babies who are receiving donor milk, so it's much easier if I could just tap it in on the day, when it's happening. We don't have to put the name, just a baby X or baby G, and then the grams and kind of the situation of the baby, so they know who they're feeding today for example, it wouldn't have to be immediate."*

Milk Matters keeps a record of all of the babies who receive their milk. Some mothers are happy to share this information and indicate their consent when they submit a testimonial.

The milk bank would also like to receive feedback from the donor mothers, about their donation experience:

*“We'd like to have a feedback form, just say you know what's been difficult or challenging, what's been good, what's worked well, and any recommendations they have.”*

#### **5.4.3.2 Information Dissemination**

Milk Matters would like the ability to communicate better with their current and potential donors. According to them their donors sometimes get ‘confused’. One such situation is when they are:

*“not getting the message across, in that they first have to express one batch of milk before they can get the Pathcare test. So that's what I'm most often explaining.”*

Other most frequently asked questions are about how much milk the mother needs to donate, can they top up the bottles they express into if there is only a little bit of milk in them, can they donate milk that isn't stored in the Milk Matters bottles and then how much have they donated overall.

Because these ‘questions are very much repeated’ one Milk Matters staff member admits to not answering them immediately but waiting till there are a few of the same queries, and then repeating the same answer to them all at once. This goes against Milk Matters policy and is not the case for all Milk Matter staff members.

#### **5.4.3.3 Moderation and Expert Advice**

One of the suggestions from a Milk Matters staff member was about using other interested parties to help them moderate the chatroom: *“What about using a donor mother to moderate, someone we really trust? If they were willing obviously”*.

Additional to using a donor mother to moderate the donation related queries, she also suggested including ‘experts’ on the chatroom as *‘they will know better what to say’* especially with regards to health care advice.

She also suggested that including these users on the chatroom be beneficial for both Milk Matters and their donors, by responding to donor mother questions faster, by giving them a safe space to connect with each other and by freeing up Milk Matters’ time to focus on other activities rather than responding to repetitive emails:

*“I like that idea, because they don't have to wait for me after they ask a question. Sometimes I can't respond to people for three days, that just means we're busy. Especially if it is a basic question. And also, then they can connect with each other.”*

However, other [Milk Bank NGO] staff members expressed dissent with this feedback, as the milk bank would be held responsible for any advice given on the chatroom and does not have the resources to recruit and maintain a pool of experts to contribute to a chat room.

#### **5.4.3.4 Privacy**

One of Milk Matters main concerns about the chatroom was to do with privacy, specifically who would have access to it. Their suggestion is that *“It should only be registered donors who are using it”* and as such the login functionality should ask for donor numbers.

#### 5.4.4 Findings from the paper prototype sessions

A month later I presented each participant with a hand-drawn, low-fidelity prototype of the chatroom (shown in Figure 26), which was demonstrated to them in Wizard of Oz style (Green & Wei-Haas, 1985), whereby I manually changed screens to replicate the functionality of the application.

After the demonstration, all of the hand-drawn screens were laid out and discussed with the participating donor mother. Post-it notes were used to capture specific suggestions for parts of the chatroom. Writing it out allowed me to confirm that I had understood the mother's feedback.

The feedback given was related to Privacy (e.g. who has access to the chat group), Usability (e.g. including a start screen for easier navigation between pages), Functionality (e.g. notifying Milk Matters when you have milk available), Topics (e.g. including topics like 'what's happening with my milk'), Relevance (e.g. when was the last topic updated), Authority (e.g. stating what kind of user you are, like a leader, donor or receiver), Autonomy (e.g. what kind of notifications the app sends you) and Access (e.g. a centralized location for all of the starred messages).

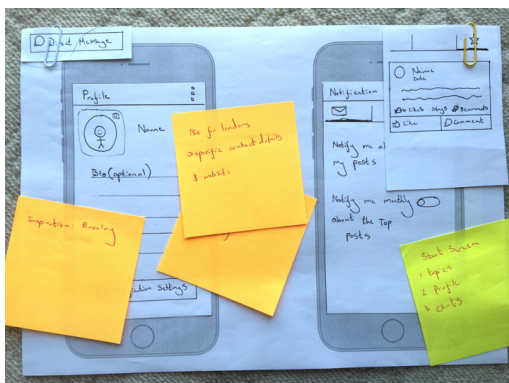


Figure 26: The low-fidelity paper prototype of the chatroom with participant suggestions

#### 5.4.5 Findings from the high-fidelity prototype and online evaluation

The paper prototype was altered with the participants feedback and replicated using Sketch (Sketch, 2017). InVision (InVisionApp, n.d.) was used to add functionality to the high-fidelity prototype, which the donors were able to test on their mobile phones or computer at home (shown in Figure 27). The prototype was sent to each participant with an accompanying online questionnaire with questions related to their experience of the prototype.

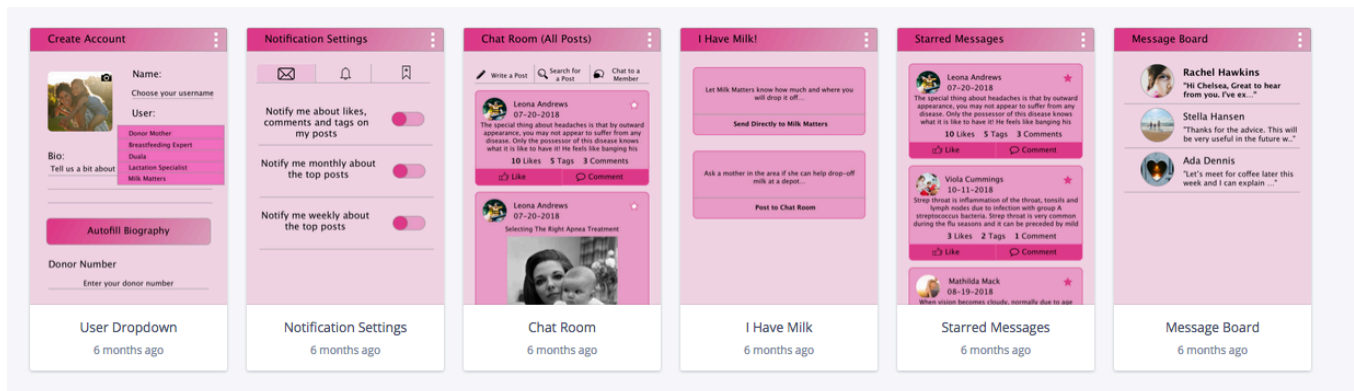


Figure 27: Chatroom Prototype: create an account, change settings, view all posts, I have milk, view starred messages and message a user screen. All names that appear here are for demonstration purposes only and do not represent actual users.

**Missing Elements:** The responses from the participants varied, and were mostly about minor edits, such as spelling or accuracy of labels, such as using ‘Expressing’ rather than ‘Pumping’. One participant pointed out a user journey flaw, specifically: *“how can they receive email notifications if nowhere asks for their email.”* The last concern was related to functionality (after creating a profile, the users should still have the option to edit it).

**Positive Functionality:** When asked what needed improvement two participants said that they liked that the chatroom was designed to be a social tool rather than a means for more donor tracking or competition amongst donated amounts, as they had been experiencing on Facebook.

The participants said that they were excited to connect with other donors. The depot aid functionality also received a positive response. It does not completely solve the issues around transportation but may help some mothers alleviate the present inconveniences around donation. It was also agreed that this functionality would promote the formation of a donor community, by influencing them to come together to deliver the much-needed breast milk.

The last comment was about their appreciation of the chat room’s usability and the personalization it offered to its users, unlike other channels the donor mothers had previously used: *“I think the app is easy to use and has nice functionality and options in terms of whether you want to be contacted or not and how often”.*

#### 5.4.6 A chatroom co-designed with and for South African donor mothers

In June 2018 I began development on a donor mother chatroom co-designed with South African donor mothers (shown in Figure 28). The application has been developed using Ionic, so that it will be available to both Android and iOS users. The chatroom includes features for donor mothers and experts using it to: login and create a personalized profile (what kind of user they are, how many kids they have, how long have they been donating); settings to allow for other users to directly contact them; the ability to write posts and tag the topic they relate to; view or search for posts in their respective topics and like or comment on posts; notify Milk Matters when they have milk that they are going to drop-off

at a specific depot; and notify other mothers if they have milk that they need help dropping off at a depot.

The aim of the donor mother chatroom is to provide a private channel where donors may feel safe to share personal issues and learn from the shared experiences of other South African donor mothers. The chatroom endeavours to promote a sense of donor community, offering opportunities for collaboration in their donation efforts. By allowing for the tagging of posts, and topic searches, my goal is to provide the donor mothers with a chatroom where they can find relevant information easily and at any time.

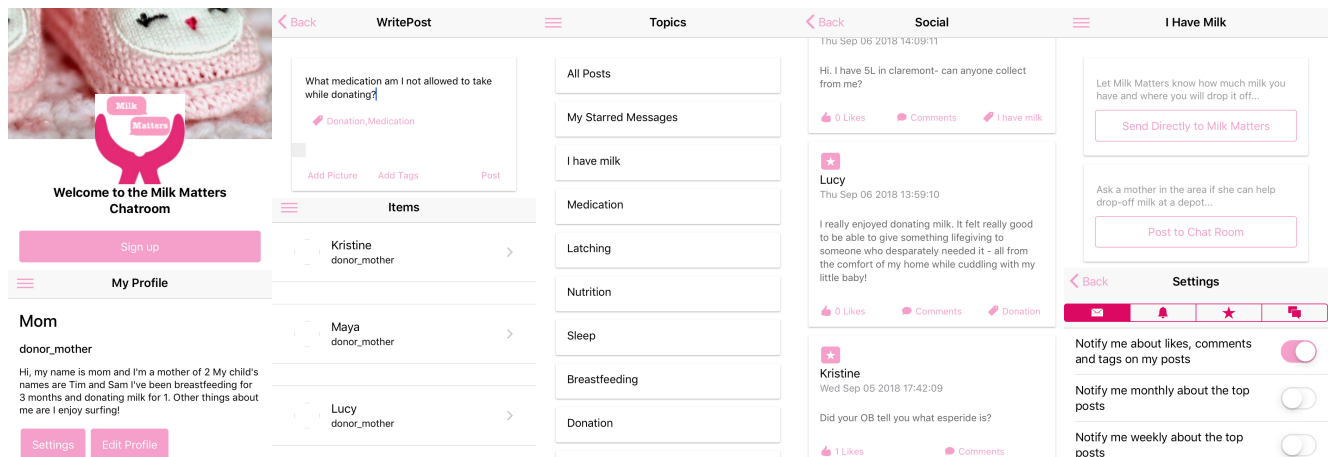


Figure 28: Donor Mother Chatroom: login, profile, write a post, message a user, pick a topic, view all posts, I have milk and settings screen

#### 5.4.7 Findings from individual cognitive walkthroughs of the chatroom

In a similar fashion to the previous chapter, I individually met with the participant mothers in a location of their choice. Each mother was presented with the Milk Matters donor chatroom, on either an android phone or iPhone, depending on the participants preference (shown in Figure 29). Each participant was then presented with a list of tasks to perform, such as logging in, creating a profile, changing their settings, writing a post, tagging their post, finding, liking, commenting on and starring other users' posts, directly messaging other users and notifying the milk bank or other mothers that they have milk to donate. The participants were encouraged to talk aloud as they completed each task and make note of which aspects they struggled with or enjoyed.



Figure 29: Participants performing Cognitive Walkthroughs on the Donor Mother Chatroom

The participants found writing a new post the hardest task to perform because the interface lacked a prompt indicating where text may be inserted. Besides this, all of the participants

said that they found the chatroom fairly simple and easy to use. Words used to describe the chatroom were: 'nice', 'impressive', 'intuitive', 'user friendly', 'simple' and 'cool'.

Discussion with the donor mothers on their experience of the chatroom can be grouped into several themes:

**Forming a Donor Community and Attracting New Donors:** Each participant said that they felt the chatroom would 'build a community of donors' where there previously was none:

*"You sit here by yourself and you don't know if you're the only person in Cape Town donating or if you're one of fifty thousand donating. So I think that's pretty cool." (P3)*

Additional to uniting existing donors another participant said that 'it could conceivably be a positive thing and could attract new donors', which was confirmed by another participant who had previously posted on Facebook about the existing Milk Matters' application and received a very positive response:

*"It's actually pretty cool because the one time I actually posted about your app when I did the recording of how many babies I had fed, it actually piqued a lot of people's interests. And I don't think there are a lot of apps for any donors." (P1)*

**Provide support and entertainment to users of the chatroom:** Especially in the early stages of motherhood, the participants felt that the chatroom would be a source for entertainment and support:

*"Every time I breastfeed I'd probably open it up and read something and chat. When I was working on it I was thinking of some moms that would probably be on it all day." (P3)*

**Curating knowledge and content:** The participants felt that through the sharing of experiences and donor knowledge, the chatroom could become a trustworthy and reliable source of knowledge:

*"Sometimes the [the existing Milk Matters app educational section] was my go-to. For example: how do I increase milk for him, that's what I kind of looked at, so I think to have this as well [included in the chatroom] as being able to all ask questions, it'd be a bit more interactive than just reading an article." (P1)*

However, there is a concern that this information could be incorrect which is why moderation would be needed to manage the chatrooms content.

**Reducing pressure, anxiety and isolation:** The participants felt that the chatroom would work to help alleviate some of the isolation mothers experience in the early stages of motherhood: *“I used to sit on the La Leche League WhatsApp group because that's the only way you can feel connected to people while you are breastfeeding.”* (P3)

They also felt that it would help to reduce the anxiety and pressure mothers feel, especially for donor mothers who feel responsibility for not only their own child, but all of the babies in the NICU:

*“I think it will help because there's obviously a lot of pressure on you as a donor mom and at the same time, trying to feed your own child. So just having that extra support system will definitely help.”* *“We're already so conscious about everything and so paranoid about everything so I think it'll definitely be a good platform for people to be in touch.”* (P1)

**Improving donation and milk drop-offs:** All of the participants were very impressed with the inclusion of the 'I Have Milk' page, whereby users can post about needing help with collections or letting Milk Matters know when they are going to drop-off their milk at a given depot. A participant felt this was her favourite feature of the application and that *“this is something I'd probably use the most”*. (P8)

They felt that the inclusion of this feature *‘would really help from a donation perspective’*, by offering alternative options for milk drop-offs and feedback. This feature would also assist the milk bank, whose current practice involves calling depots on a weekly basis to enquire if milk has been left with them, before sending a Milk Matters volunteer driver to collect it.

Unaccounted for was the concern of malicious users, which was raised by Milk Matters. The sharing of the mother's location online, or handing over of their milk to a 'stranger' could be misused, and would need to be accounted for in the final implementation of the application.

**Improving communication and feedback between the milk bank and its donor mothers:**

Based on the experience one donor had with Milk Matters, she felt that the chatroom could be a way for them to improve and: *“pull up their socks in a big way, all round, and if this is a way that they can do that then that's great.”* (P3)

The participants liked having an alternative means to contact the milk bank, which is not as personal as WhatsApp: *“WhatsApp is just very personal sometimes. So, it's nice to separate that.”* (P3)

They felt the chatroom would increase feedback from the milk bank and so allow them to *“engage with the organization, being able to message them directly and say I've got milk.”* (P8)

**A younger generation of donor mothers:** Two of the participants, although admitting that they would use the chatroom, commented that it might be better suited towards a younger generation of mothers: *“Younger mothers will be really into it. Younger mothers who are like social butterflies, who will maybe make friends.” “I still find it a bit weird to send messages to people that you don't actually know, but that's just me. Maybe the Millennials won't mind.”* (P4)

**Concerns about negative users:** Based on their experience with existing social networks, three of the participants were concerned about judgemental behaviour, and asked about how the application would be moderated:

*“Is there any sort of monitoring that's going on from Milk Matters or can you register a complaint if someone posts something that you don't agree with?”* (P4)

They were reassured that the milk bank had the authority to remove posts and users. Additionally, the inclusion of expert users on the chatroom would serve as additional moderation on posts that may be malicious or untrue.

## 5.5 Discussion and Analysis

I have found that the donor mothers' experience with chat rooms and social networks, is very similar to that of mothers in Australia (Boehner et al., 2007). They also value immediate, regular, detailed, entertaining, customized, intimate, practical, professional, reassuring and unbiased sites (Gribble, 2013). I have attempted to provide them with these features in the donor chatroom, in addition to the donor-specific functions.

### 5.5.1 Co-designing and developing a chatroom with donor mothers

Through an iterative process of co-designing and developing the chatroom I have learnt about the current experience donor mothers in South Africa have on social networks and, specifically, on chat rooms. I have taken this beyond evaluation, by iteratively co-designing a new, donor-specific chatroom with these mothers. In this section I discuss my experience of co-design methodology with these participants.

#### 5.5.1.1 Brainstorming, Prototyping and Wizard of Oz

In prior work, I identified individual sessions to be the easiest way to obtain donor mother participation (Wardle et al., 2018). Unfortunately, this limits the ability for brainstorming with multiple participants at the same time and have them discuss ideas with each other (Paulus & Nijstad, 2003), as D'ignazio et al. (2016) experienced. To overcome this, I used the online questionnaire and the paper prototype to allow them to evaluate each other's suggestions and provide feedback on them.

The questionnaire gave the participants an opportunity to see all of the suggested functionality for the chatroom in one place and rank them in order of importance, as you would in a brainstorming workshop (Faure, 2004). Similarly, by presenting the participants with the paper prototype and other participants feedback, they could comment on what

had already been suggested and offer new or alternative feedback, unlike my experience in the individual sessions when many of the mothers presented the same feedback when asked to brainstorm ideas for a donor mother chatroom. Often it was the case that the participants found it easier to comment on other people's suggestions than provide new or novel feedback. Research says nominal group idea generation is more effective if each person selects their top ranked ideas individually, after seeing the groups ideas (Faure, 2004). Lamm and Trommsdorff (1973) also found individuals to be more effective at brainstorming on their own then in a small group.

During the preliminary study (Wardle et al., 2018), organizing a group session was challenging, and it was easier to obtain participation through an online survey and in individual sessions. I also believe that Wizard of Oz was an effective tool to evaluate how the donor mothers would interact with the chatroom, early in the development stages (Molin, 2004).

#### *5.5.1.2 Cognitive Walkthroughs*

To evaluate the application, I used cognitive walkthroughs in individual sessions with the participants. By using this approach, I was quickly able to assess which tasks were easier or harder for the mothers to perform (Kushniruk & Patel, 2004). Cognitive walkthroughs work well in individual sessions, as the participant is prompted to talk aloud and describe their un-filtered impression of each feature or screen, as they experience it. It also provided me with a good opportunity to ask questions as they worked through the tasks.

During the cognitive walkthroughs, it was also very interesting to see how the donor mothers reacted to the use of real data. The participants were very interested to see what the previous mother who had tested the chatroom had posted. This gave me an indication of what the participants felt about the kind of posts on the chatroom, how useful they found the content and got an opportunity to see what they could add from their own experience.

Unlike the preliminary study (Wardle et al., 2018), where the donor mothers were asked to test on a Samsung device, by providing them with a choice of Android or iPhone they could choose the device they felt comfortable with. This allowed the participants to feel comfortable using the device, so that the only "new thing" that they were testing was the donor mother chatroom. They didn't need to familiarize themselves with the native features of a different device.

Additionally, cognitive walkthroughs were used to get the most feedback from the participants in short period of time. As many of the original participants in this study were concluding their time as a milk donor, there was a concern that they may start losing interest in the project. The cognitive walkthroughs provided the best opportunity to get feedback on usability, functionality and user experience on the chatroom, in a single session. By involving the same donor mothers who had been part of the original brainstorming sessions, they were also able to see the progression from their ideas into a

functioning application. Many felt validated by this knowledge, and also commented on how educational it had been to experience the co-design process from conception to completion.

### 5.5.1.3 *Continued Participation*

I have included the donor mothers throughout the design and development process, as I want them to have full autonomy over how the chatroom looks and functions, confirming my feminist HCI commitments (Bardzell & Bardzell, 2011). With their continued input, I believe we not only produced a chatroom that may help connect and support donor mothers but I gave the participants an opportunity to experience being a developer and see the full design and development of the chatroom from start to finish. This is in line with the intention of using co-design, to make the end-users the expert of their own domain and experiences (Sanders & Stappers, 2008). The same participants were involved in each stage, and by doing this, I gave them ownership of the chatroom, demonstrating how their suggestions from each iteration were incorporated into the final, functioning chatroom. The same concept also applies to the content of the chatroom, which will also come predominantly from the donor mothers and only through their continued participation will it grow to become a reliable source of information for other donor mothers. The limitations to this approach, is that by only working with past donors they may not necessarily be representative of all future donors and the question is yet to be answered as to how participation will be affected by the arrival of new donors over time.

## 5.5.2 *Implications for design of a donor mother chatroom*

It is evident that the Milk Matters donor mothers' experience the same feelings as most new mothers of 'realizing', 'unready', 'drained', 'aloneness', 'loss' and 'working it out' in the early stages of motherhood (Barclay, 1997; Paris & Dubus, 2005). As literature suggests, they turn to online communication to relieve some of the 'aloneness' and 'unreadiness' that they experience.

The bespoke things I found that the donor mothers were lacking on existing social media was access to information that was relevant and reliable to their situation, a private, non-judgmental channel to connect with like-minded mothers, a place to connect to at any time of the day and be able to find entertainment for lengthy pumping sessions. Specific to the issues they were experiencing as donor mothers were a lack of assistance to help with collecting and delivering their donated milk to a nearby depot location, and a lack of feedback and engagement with the milk bank or in relation to milk donation activities.

A summary of the design implications for a tool that will assist breastfeeding mothers in Cape Town, who are also breast milk donors, is to 1) design something that offers donor mothers a place to quickly and easily find and curate milk donor related content, that does not rely on the milk banks input all of the time (which has been implemented in the chatroom by tagging posts and sorting them into topics, which are moderated by the milk bank), 2) design something that can be used at any time of day, as this population tends to spend a lot of time in the middle of the night looking for entertainment during lengthy feeds, 3) design a tool that can assist with milk drop-offs, that does not rely on the milk bank.

### *5.5.2.1 Privacy and Participation*

Unlike the current experience the donor mothers reported on having on existing channels, where they may feel bullied, overwhelmed or anxious, the aim of the Milk Matters chatroom is to offer a private, regulated channel for donor mothers to be able to connect and encourage each other.

It can be challenging to design interventions for such a small community (Milk Matters estimated they have on average 20 active donors at one time). This is especially difficult when a large number of users is needed to curate content and to attract more donor mothers to the chatroom. During the brainstorming stages of this study, all of the participants expressed the desire for a private channel, which also limits the number of users to those given access by the milk bank, as most of the participants said they would feel uncomfortable posting to a larger group. This sentiment was also emphasized by the milk bank, who wanted a private forum for their donors to feel safe using.

Additionally, because there are so few donors in South Africa and they commonly donate for 3 - 6 months, I needed to design something that would capture them during the early stages of motherhood and being a donor, by being specialised to fit their situation. Because mothers do not have a lot of time or energy to find the answers to what they are looking for, rather than having to rely on Milk Matters to respond to them, the donor mothers needed a channel that could offer them more access to accurate resources and immediate answers. This is emphasized by the tagging functionality, so that answers, or similar questions related to the mother's query which are curated and approved by Milk Matters, can be found extremely easily.

The nature of the proposed chatroom alleviates some of the pressure on Milk Matters to respond to repeated questions immediately. The tagging functionality means that similar questions will be automatically grouped, and generic answers can be posted within specific topics.

### *5.5.2.2 A Common Cause as a Framework for Moderation*

Like existing parenting websites, which are usually sponsored by a company trying to promote their product, the implications for designing a chatroom for the mediation of communication between mothers who share a common cause and the NGO enacting that cause, are similar. There is an underlying tension that Milk Matters may moderate all discussion to push their own agenda; however, as evident from the participants' experiences on other social networks, without moderation there is a possibility that trolling behaviour or bullying could occur.

As demonstrated in Milk Matters answers relating to moderation, there is still a lot to consider when entrusting this duty to approved experts or donor mothers. If Milk Matters decided to include these roles in the chat application, these women would make up the chatroom's core group (Ren et al., 2007). Mockus et al. (2002) emphasises that these users, the channel's experts, play a large role in promoting an ordered and productive attitude

amongst users of the platform. Additional to this, members of the core group often perform tasks such as maintaining the chatroom by writing and reading messaging, moderating posts and policing behaviour on the site (Butler et al. in press).

In this instance, the site's core group would need to keep updated on posts in case responses given are incorrect or against donor guideline, such as taking certain medicine or topping up bottles with more milk. Their duty would be to keep conversation on-topic, so that newcomers are not deterred from joining the chatroom by a lack of content (Ren et al., 2007), but to also allow for self-disclosure and personal off-topic discussions that may lead to friendship and community building (Preece and Maloney-Krichmar, 2003; Collins and Miller 1994).

### 5.5.2.3 Familiarity

A shared sentiment from the participants was the desire to have something they are familiar with and find easy to use, as is the case for most design work (Nielsen, 1995). Most of the suggestions for features of the chatroom came from functionality they had experiences before, such as tagging blog posts. This makes sense, especially for new users who open the chatroom in the early stages of motherhood and do not have time to learn how to use something new. Other familiar design patterns the donors accepted was being able to personalize their profile and settings, like and comment on posts and contact other users directly, because this would make the chatroom more attractive and accessible to them. However, the participants rejected design patterns of linking their profile to other social networks, because they wanted the chatroom to be separate from the networks where they had previously had negative experiences.

### 5.5.2.4 I Have Milk

The conception of this functionality illustrates that as HCI researchers, through collaborative creativity, we are able to find uncommon solutions to common problems (Hilliges, 2007). In this scenario, the problem relates to the NGO not having enough resources to finance transportation to collect donated breast milk. The solution presented by the 'I have milk' channel on the chatroom does not solve this problem but offers an alternative solution to donor mothers who previously had very little control over this. Not only does it offer the opportunity for mothers to receive or offer help with donations, it also promotes the formation of a united community of donors. Unfortunately, it could also present the opportunity for malicious behaviour, and will require more thought and design before being implemented.

## 5.6 Conclusion and Future Work

In this chapter I describe my experience of co-designing and developing a donor mother chat room, with milk donors, for milk donors in Cape Town, South Africa. Through the use of semi-structured interviews I learnt that the donor mothers' current experiences with social networks can make them anxious, can be entertaining, educational, foreign, overwhelming, personal and private, social and supportive.

Linked to the previous chapter, in order to improve the potential and existing donor mothers attitude towards breast milk donation, I have worked with these donors to co-

design and develop a donor specific chatroom to improve engagement between the NGO and donor mothers, offers support for donor mothers without judgement; offers privacy but has enough users to form a community and curate content; and allows for communication between mothers who share a common cause with the NGO enacting that cause.

Design considerations that became evident during this co-design process was to: 1) design something that offers donor mothers a place to quickly and easily find and curate donor-related content, that does not rely on the milk bank's input all of the time 2) design something that can be used at any time of day, as this population tends to spend a lot of time in the middle of the night looking for entertainment during lengthy feeds, 3) design a tool that can assist with milk drop-offs that does not rely on the milk bank.

By including the same participants throughout the design and development process, I have tried to leave them with more than just the donor chatroom but also an understanding of the design and development process. By seeing the inclusion of their designs and ideas in a fully functioning mobile application, I have given them agency over the design, empowered them to design tools in the future and provided them with a chatroom which allows them to express their identity as a donor and a mother, as per the central themes of the feminist HCI agenda (Bardzell & Bardzell, 2011).

# Chapter 6

## 6 Reflection and Conclusion

### 6.1 Reflection

Human Computer Interaction (HCI), if going by the name alone, is the study of how humans interact with computer-supported devices. A further exploration of the work done under the banner of HCI reveals that it is so much more than that. HCI work stems from a marriage of fields such as computer science, psychology, anthropology and design. An important branch of HCI work is to look at social issues, inequality (Unwin, 2009), human behaviour (Millen, 2000) and technological innovation (Ackerman, 2000). Where HCI has a lot of potential and has made an effort to be more inclusive, is to do work with under-represented populations (Kumar & Dell, 2016). Similarly, in this work I have tried to give a voice to an under-represented population of milk donor mothers, and simultaneously tackle a social issue that I hold very dear to my heart.

Pregnancy is described by many as an iconic moment in a woman's life and the moment of child-birth signifies the transition into motherhood (Nelson, 2003; Barclay et al., 1997). For some, like my aunt, this journey is difficult and unpleasant (Olde, van der Hart, Kleber & Van Son, 2006). When my aunt was pregnant with my younger cousin, she was diagnosed with breast cancer. Scared and worried about the safety of her baby, she opted to have a mastectomy. When my cousin arrived prematurely, my aunt was unable to feed her. Afraid of the health complications that may arise when feeding a sick or premature baby formula (Perrin, Goodell, Allen et al., 2016), for the first two months of my baby cousin's life she relied on donated breast milk to survive.

Although I was fairly young at the time, I instantly came to the realisation that conception (which is the issue my mom experienced), child birth, the early stages of motherhood and childrearing, are not easy tasks. Anyone looking at my aunt, holding my cousin while hooked up to an IV bag, going through recovery herself, could evidently see that she had not chosen the path that was given her. Unfortunately, many parents have had similar experiences. Prematurity accounts for 40% of all neonatal deaths worldwide (Lawn et al., 2005). Of those, between 41 – 72% neonatal deaths could have been reduced by inexpensive and cost-effective interventions, such as the use of breast milk (Darmstadt et al., 2005).

When this project was suggested by my supervisor, who had been a breast milk donor herself, I was instantly drawn to it. I saw this as not only an opportunity to improve breast-milk donation so that more parents like my aunt could get help like she did, but also as a chance to give back and help the donors who give so heroically of their time and precious breast milk during an already very difficult period. Going beyond the immediate implications of doing a study like this, I also wanted to teach the fellow HCI researchers about the sensitivities when working with women in the early stages of motherhood. I hope this work is able to inspire or help anyone looking at any of the other issues breastfeeding mothers face on a regular basis.

## 6.2 Conclusion

In this HCI study I have endeavoured to understand women in the early stages of motherhood, who are also milk donors, as users of computer-supported devices. Specifically, I have tried to understand how social networking has influenced modern parenting in relation to making and maintaining social connections, communication, entertainment and information searching. By working with these donor mothers, I have also endeavoured to understand the motives and lifestyle of mothers who donate their breast milk and how technology may be used to improve this experience, while also helping them as a mother.

I began this work by deploying Cultural Probes with three donor mother participants for a month, to get an understanding of the daily life of a breastfeeding mother in South Africa, in both her capacity as a mother and a milk donor. Considering that women in the early stages of motherhood have limited time and resources to participate in such studies, three things to bear in mind when designing cultural probe studies are to: 1) create activities that are fun and easy to complete, and reflective activities, 2) set tasks that can be completed at any time of the day and anywhere, 3) set up a reminder or prompt to remind the participants to complete the activities.

By forming a complete picture of the donor mother's environment and influences during the early stages of motherhood, from the cultural probe studies, I was able to broaden this understanding to include her behaviour as a breast milk donor. Using feedback from semi-structured interviews to complement that gathered from the Cultural Probes, I have endeavoured to create a rough framework of the attitudes and factors that contribute to the mothers' intentions to donate and their resulting behaviour of actually donating breast milk, using the Theory of Planned Behaviour as a framework to explain this behaviour. This analysis helped highlight how existing and potential donor mother's intentions, attitudes, social norms, and perceived behaviour control all contributed towards and influenced both the decision to donate and continued donation over time.

From engagement with the donor mothers and brainstorming sessions, it was agreed that a donor mother chatroom would meet the aforementioned criteria and improve potential and existing mothers' attitudes towards breast-milk donation. Upon examination of their current interactions on social networks, I learnt that the donor mothers' current experiences on social networks could make them anxious, could be entertaining, educational, foreign, overwhelming, personal and private, social and supportive.

Hence the final stage of this work saw the co-design and development of a donor mother specific chatroom, which would improve upon the donor mothers' negative experiences on existing social networks. Design considerations which became evident during this co-design process were to 1) design something that offered donor mothers a place to quickly and easily find and curate milk-donor related content, which does not rely on the milk bank's input all of the time, 2) design something that could be used at any time of day, as this population tends to spend a lot of time in the middle of the night looking for entertainment during lengthy feeds, 3) design a tool that could assist with milk drop-offs which does not rely on the milk bank's efforts.

The resulting donor mother chatroom application has been built to improve engagement between the NGO and donor mothers; offer support for donor mothers without judgement; offer privacy but has enough users to form a community and curate content; and allows for communication between mothers who share a common cause with the NGO.

Through the implementation of co-design practice, I have endeavoured to give the milk donor mothers agency and ownership over the chatroom. Although it may have taken longer to do, I believe the inclusion of their input was very beneficial. Not only have I empowered the donor mothers to express their own design ideas about what they would value in a social network designed for them, I have also led them through the process of design and development of a mobile application and achieved my goal of contributing to the feminist HCI domain (Bardzell & Bardzell, 2011).

Future work will involve combining the existing Milk Matters' application and the donor mother chatroom, so that it can be accessed through one application. This complete platform, along with all of the administrative software and usage documentation, will be handed over to the milk bank, whose staff will be trained on how to maintain it. Future research in this area may evaluate the long-term usage and engagement with the donor chatroom; make an analysis of the curated content on a chatroom specifically designed to address breast-milk donors and breastfeeding mothers; an investigation on the NGO's usage and maintenance of a donor chatroom; and study the impact the community milk collection feature has on the donor's donation behaviour and the milk bank's collection responsibilities. It would also be an interesting study to see if the findings from this work are applicable to other donor spaces.

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# Appendix

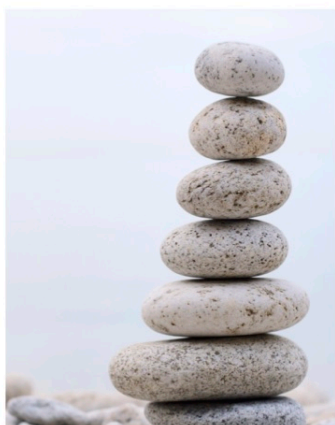
## 1 Interview Questions

1. Describe how you became and continue being a donor?
  - a. How did you find out about them?
  - b. Why were you initially motivated to become a donor?
  - c. What motivates you to continue donating your milk?
  - d. What deters you from donating further?
2. Describe your relationship with Milk Matters?
  - a. Are you satisfied with how it works currently?
  - b. What would you improve?
    - i. Specifically, what would you want changed or added?
3. Have you used the Milk Matters application?
  - a. What works for you?
  - b. What doesn't?
4. Describe your support system (people, forums or experts you refer to when you need advice or help)
  - a. Who or what do you refer to when you have problems?
  - b. What has been the most useful tool in such situations?
5. Do you use any online support groups or chat rooms, such as a Facebook page, Whatsapp group or online forums?
  - a. Which group, chat or service do you use?
  - b. What do you like about it?
  - c. What do you wish they would do differently?
6. What computer-supported device do you refer to often?
  - a. How do you use your phone, computer or any other device?
  - b. What do you use it for with regards to being a mother?
  - c. How does that help you (encouragement, motivation, empowerment, information)?
7. What is your preferred method of communicating with family, friends and other mothers?
  - a. What do you communicate about?
  - b. How do they show you appreciation?
8. How would you like Milk Matters to communicate with you?
  - a. What medium should they use?
  - b. What feedback would you like to receive from there?
  - c. How would you like them to show you appreciation?
9. What are the three biggest challenges you face as a mother?
10. What is the most rewarding thing about being a donor mother?
  - a. What is rewarding as a mother?
  - b. What is rewarding as a mother and a donor?



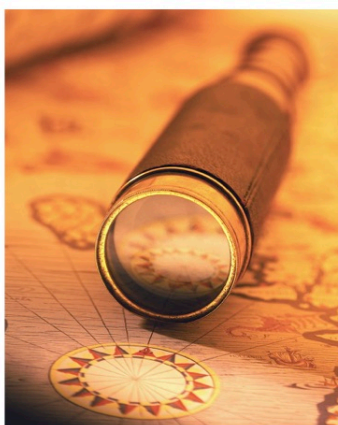
## How to use this book:

There are no rules, merely suggestions



### Objectives:

- This book can be read and completed in any order
- Use extra space at the back or other material to capture anything that doesn't fit on these pages
- Everything is open to your interpretation
- Feel free to add, alter or ignore content
- Everything is experimental, so have fun with it and do what peaks your interest



### Mission:

Your mission is to observe the world around you as if you've never seen it before.

Document everything, take notes and collect things.

Notice the patterns.

Focus on one thing at a time and record ideas or thoughts that you are drawn to.



### How to explore:

- Always be looking
- Everything is interesting if you look closer
- Notice patterns and make connection
- Use all of the senses in your investigations
- Notice the story, your story, going on around you
- Record all your findings in a variety of ways (pictures, drawing, recording)



## Documentation: Methods and Tools.

To be an observer of your environment you don't need any fancy tools or equipment.

All of the activities in this book can be done using whatever you have at your disposal.

Remember there are no wrong answers.

Have fun with it!

Example methods:

- Writing
- Sketching
- Voice recording
- Taking photos/videos
- Colouring
- Tracing
- Using stickers
- Collecting objects

# + Right where you're sitting

Date:

How much I expressed today



In ML

Expressing Times

Time

Duration

My Baby's Mood

My Mood

**Write 10 things about where you are sitting right now that you hadn't noticed when you sat down.**

**Do not censor and don't think too much about it (write down the first 10 things that popped into your head).**



# + Daily walk

Date:

How much I expressed today



In ML

Expressing Times

Time



Duration

My Baby's Mood

My Mood

**Collect items from your daily route or tasks.**

**Gather the first things you see and decide on what the connection between the objects may be.**



*"It is up to you to see the beauty of everyday things"*

# + Archaeological dig

Date:

**How much I expressed today**



In ML

**Expressing Times**

Time

Duration

**My Baby's Mood**

**My Mood**

**Imagine you are an archaeologist.**

**Describe or collect objects that relate to motherhood**

**(Anyone who found it would know it came from the life of a mother)**

**Give each item a brief story or description**

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**"I'm the Clutter Fairy. I'll come back ...  
I'm gonna need a much bigger wand!"**

### 3 Post Cards



What is something really good about Donating Milk?



What do you wish was different (with donation or Milk Matters)?

What is your relationship like with other (donor) mothers?



