Pregnancy Ecologies as Teachable Moments for the Lifecourse: Changing the mHealth Design Paradigm

Tamara Peyton
College of Information Sciences and Technology
Pennsylvania State University
University Park, PA 16802
tspeyton@ist.psu.edu

Abstract
I investigate the potential for mobile health communication and social collaboration technologies (mHealth) to have a positive impact on pregnancy for lower-income American women. Recognizing that pregnancy is more than medical health, I set out to understand what pregnancy is for this population and how the embodied experience of pregnancy impacts women’s lives. I have initiated a mixed methods study, which uses focus groups, interviews, information landscape analysis and social media discourse analysis. From the preliminary focus group and interview data, I have created a structuring health concept that I call the pregnancy ecology, accounting for the multi-faceted experience of pregnancy as a transformational event. The future work will incorporate all of the data into a holistic health ecology concept for pregnancy. Using this concept, I intend to design and build a mHealth app that treats pregnancy as a teachable moment for health, wellness and social support throughout the lifecourse.

Author Keywords
mHealth; pregnancy; design paradigms; life course management; health and wellness; mixed methods

ACM Classification Keywords
H.5.m. Miscellaneous

INTRODUCTION
Appropriate pregnancy management for lower income women in developed nations is part of the Millennium Goals for Maternal and Child Health [1] from the World Health Organization (WHO). Recognizing that maternal health impacts mother and child, the WHO suggests that a way to address healthy pregnancy is to treat it as a social issue. They further suggest that this issue is addressable through the design of appropriate health information and health social support networks, delivered via mobile devices [5].

In order to design appropriate mHealth interventions for this period of life, the WHO suggests the use of approaches that account for the network of people, health issues, informational needs and social support required for a women to have healthy pregnancies and produce healthy offspring. Healthier pregnancies mean less risk of pregnancy-related health complications (e.g.: gestational diabetes, pregnancy-induced hypertension, caesarean delivery, post-partum obesity) and lower fetal and infant mortality rates [10].

Despite the multiple touchpoints, influencers and forces that impact a woman’s pregnancy management practices, pregnancy in the United States is often treated as a medical issue, stemming from the way the period of pregnancy is dominated by medical care. Women and their partners are expected to turn to medical practitioners for advice and information. Consequently, the care and treatment given to pregnant women focuses narrowly on health activities like diet, exercise and medical planning. But a gap in care exists. In American medicine, care for pregnancy often does not begin until the end of the first trimester, particularly among the lower income demographic [8,12]. Yet women often turn information immediately upon finding out they are pregnant, and like many current health consumers, women turn to the Internet for information, using mobile devices [4]. The structural gap in care results in women turning to their social networks, to the Internet, and to ‘for profit’ mobile apps for pregnancy advice and information.

Following the WHO recommendations, I am working to address the reality of pregnancy for lower income women within a new paradigm for mobile health application design and information provision. This is intended to provide more appropriate pregnancy management interventions, through technology as well as through clinical care. To approach pregnancy from this perspective, my methods and design guidelines were directed by three research questions:

1. What does pregnancy look like and act like for lower-income American women, when I consider pregnancy to be a major transition within the life course of a woman and her family?
2. What happens to design planning if I shift the understanding of pregnancy, away from the strict medical realm of knowledge and intervention, towards a more holistic and ecological account of pregnancy as a life event?
3. What does an ecological approach to pregnancy do to change the design paradigms of mHealth initiatives for my target group?

APPROACH & METHODS
To direct my research and design activities, I am working with two medical doctors specializing in women’s health, and two other HCI researchers, all four of whom are faculty members at my university. Because we understand that health interventions and mobile UX design efficacy are both shaped and determined by users’ subjective experiences, we have designed a mixed methods approach to understanding the pregnancy ecology of our target population of lower-income pregnant women. We started with a qualitative study of lower-income women served by Women and Infant Care (WIC) federal assistance clinics in Pennsylvania. We conducted four focus groups of 4-6 women each. Drawing on what we learned in those focus group interactions (Figure 2), we recruited 6 additional women for design-directed interviews. In those interviews, I met

Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage, and that copies bear this notice and the full citation on the first page. Copyrights for third-party components of this work must be honored. For all other uses, contact the owner/author(s). Copyright is held by the author/owner(s).
GROUP ’14, November 9–12, 2014, Sanibel Island, Florida, USA.
ACM 978-1-4503-3043-5/14/11.
http://dx.doi.org/10.1145/2660398.2660438
with 6 pregnant women in their homes, with their husbands or partners where possible. I led them in a series of exercises around current app and website use. I solicited their feedback on GUIs, information paradigms and appropriateness of existing systems for their informational and support needs.

As a concept, the pregnancy ecology is influenced by a fusion of social science [12,13], information science [7] and HCI [3]. The concept accounts for the forces, influences and events that shape the experience and health of pregnant lower-income American woman. Based in our participants’ stories, the pregnancy ecology has five major facets: medical; social; informational; technical; and intangibles; each with corresponding actors. Each of the ecology facets acts as influences on a woman’s subjective experience of pregnancy, as a health event, as a social event and as a life event. The stories we heard from participants about the multi-faceted experience of pregnancy (see Figure 2 for examples) underscores for me that pregnancy should be understood by mHealth designers as a bounded experience within the life course of a woman and her family, as opposed to a medical health issue.

FINDINGS
There are four preliminary findings from the initial research activities, which shape what I have called the ‘pregnancy ecology’ (Figure 1):

1. Women reject medical guidelines for pregnancy, seeing them as too broad and not specific enough because “every pregnancy is different”.
2. Women’s bodies rule them during pregnancy, as a result of waning energy levels, food aversions and cravings, hormone spikes, and a variety of unanticipated discomforts.
3. Women turn to “Dr. Google” for advice, because medical advice is not available immediately, family members live too far away, and work and family schedules leave little time for socializing with other women; but Dr. Google confused and scared them with misleading stories of potential serious issues.
4. “Husbands” are key drivers to healthy sane pregnancies, rather than physicians or online social media networks (e.g. Facebook).

DESIGN IMPLICATIONS
This means that an ecologically-aware pregnancy mHealth design should incorporate, for example:

1. information and support on strategies for improving sleep;
2. maintaining healthy relationships in times of stress and transition;
3. downplaying the negative effects of food aversions and cravings through appropriate exercise; and
4. supporting healthy emotional and social states despite hormonal changes.

All of these aspects of life are variable during pregnancy, and women and their significant others have a vested interest in appropriately managing the life variability.

The social support aspect of pregnancy is recognized in prior HCI work as a core part of health management [6,9,11], yet often in design work about pregnancy and early parenting, the father is curiously invisible. Because women expressed a decided interest in enabling their spouses to be fully involved in pregnancy management, as well as solicit assistance and share key milestones in an effective manner to a trusted group of close confidantes, a pregnancy app should enable appropriate social support, so that the social cohesion of a woman’s life is respected during the period of change that is pregnancy.

FUTURE WORK
Ongoing research work includes a landscape analysis of the existing information and social support apps, websites and literature for pregnancy, alongside an investigation into pregnancy talk on Twitter.

For my future work, I intend to create a design prototype for a pregnancy mHealth system for lower-income American women. To do so, guided by value-based design principles from Action Research and Participatory Design, I foresee conducting design workshops with pregnant women and their spouses. I anticipate that the app would incorporate aspects of the pregnancy ecology. I forsee the app presenting health information, providing behavioural ‘nudges’ [2] and offering social support avenues for pregnancy. The meta-goal of the app would be to frame a woman’s pregnancy as a “teachable moment” that scaffolds better life-long adaptation to embodied health, social and emotional support, and improved feelings of wellness capacity.
CONTRIBUTION
I expect to realize the overall goal of my dissertation project through the design of a mobile-enabled health and wellness approach to pregnancy management support skills. This approach would move pregnancy mHealth design away from medical information, diet and exercise tracking, and risk discourses, toward the use of pregnancy as a teachable moment in encouraging healthy life management practices generally.

REFERENCES

Participants talk about: Doctor versus Dr. Google
“Like, my … my doctor didn’t tell me about round ligament pain, until … gosh! Maybe four weeks ago… but I was having it from you know, like, 13 weeks on…so I was having this severe cramping, and like, there is something wrong! What’s going on? I am freaking out…”
“Two weeks ago, I was having pain around my belly button then I started to spot. Well I googled it… it asked if I was showing signs of ectopic pregnancy, and all that, so that’s where sometimes googling is not a good thing.”

Participants talk about: Importance of spouses
“Cause my husband, like, for example, he comes off work and…he goes off to do something with the kids and leaves me by myself. That helps me because if he didn’t do that, I will be sitting in the kitchen, eating … bingeing and just being so mad! He just gives me time.”
“I was trying to make pancakes, using a new recipe. And they weren’t turning out right. My pan was burning them… And so I was getting mad and … the kids are getting yelled at, and all of a sudden my husband disappears… and then I ask… ‘Where is your dad?’ … ’He went out in the car’… ‘ohhh well he’s really going to get it!’ … But he comes in, with a brand new griddle! He went out and bought me a griddle! And I just started bawling! I plugged in the griddle and the pancakes are saved… like, he saw what the real issue was, was all my pancakes were burning, so he went out and took care of it…you just get in a really bad mood about stuff and that totally defused it. So that’s the best thing he could have done, when he bought me a griddle.”

Figure 2: Participants talk about pregnancy support from doctors and spouses