Design Within a Patriarchal Society: Opportunities and Challenges in Designing for Rural Women in Bangladesh

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ABSTRACT

This paper examines the opportunities and issues that arise in designing technologies to support low-income rural women in Bangladesh. Through a qualitative, empirical study with 90 participants, we reveal systemic everyday challenges that women face that form the backdrop against which technology design could potentially happen. We discuss how technology is already impacting women's lives, sometimes by reinforcing their subservient role in society and sometimes used tactically by women to gain a measure of agency. The issues raised by our participants concerning technology's place in their lives provide HCI researchers with valuable guidance about what might (or might not) be appropriate to design for them. We also show how prevalent HCI research and design strategies may fit more poorly than expected into rural women's lives, and we discuss possible alternative design directions, and the ethical and pragmatic trade-offs that they entail. Our contribution is not to "solve" the problem of designing for low-income rural women, but to expand the HCI community's understanding of technology design within deeply patriarchal societies.

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HCI4D; ICTD; women; rural; gender; feminism; Bangladesh

INTRODUCTION

This paper elucidates challenges and issues facing rural, low-income women in Bangladesh that are relevant to design. We began this work intending to follow HCI for Development (HCI4D) best practices to identify opportunities for new technologies that might improve the lives of women in rural villages. In particular, we thought that by spending time in the field to understand the context and intricacies of their lives, we would uncover opportunities for design to provide some straightforward benefit to them. In the field, we found a different story. The sheer weight of the problems that these rural

Bangladeshi women face are beyond the scope of design interventions of the scale and forms we are used to in HCI. The idea of some kind of simple intervention for rural women became laughable, but we did not want to just give up. The question of what to do instead is a core issue that animates our paper.

Our work is at the intersection of HCI for development (HCI4D) and feminist HCI. Drawing on empirical data collected through a qualitative study with 90 rural women, we explore the complex landscape facing designers that seek to address women's issues in cultural situations that have a different valuation of women than those we are committed to (for clarity: two of the four authors are from developing countries, including one from Bangladesh; we are all currently based in the West). Our work identifies opportunities and constraints for design for rural, low-income Bangladeshi women. As it does so, we seek to better illuminate how to approach design for women's empowerment in strongly patriarchal cultural situations. One of the key issues we ran into is that, although the authors, like much of the HCI community, are motivated by feminist orientations to empowerment, the women we worked with are not. What is more, proposing to make significant changes to their roles could actually end up endangering them. This raises significant practical and ethical dilemmas through the course of design.

In this paper, we do not solve this dilemma; perhaps it is fundamentally unsolvable. Instead, we seek to sensitize the community to it through four contributions. First, we reveal systemic challenges that rural Bangladeshi women face in daily life, forming the backdrop against which design could potentially happen. Second, we explain the role that technologies already play within these challenges, and how women see the possibilities and limitations of introducing new technologies. Third, we build on these empirical insights to analyze why common HCI4D design strategies may fit more poorly than expected in these women's lives and the deeper challenges this reveals in marrying HCI4D and feminist HCI. Fourth, we explain a framework for approaching design in this context that we term "design within the patriarchy," and explore the ethical and pragmatic trade-offs involved. The goal of our work is not to definitively "solve" this design problem, but to provide some footholds into moving forward constructively in a complex and charged design situation.

BACKGROUND

HCI has a longstanding interest in designing technologies to aid, empower, or otherwise support women. Research with

Western women has focused, e.g., on gender stereotypes [26], sexual harassment [18], domestic violence [15, 22, 29], health and wellbeing [5, 12, 21], and gaming or online environments [37, 39]. Building on but not limited to concerns around gender, researchers are developing feminist frames for HCI research [8, 9, 33]. These encourage us to be aware of how we may be unintentionally supporting inequitable power structures, consider carefully the concepts of gender we are deploying [33], and develop feminist design sensibilities such as encouraging participation and valuing pluralism [8].

A growing amount of research in HCI4D specifically looks at technology and women's empowerment in the Global South, in which strongly patriarchal societies are prevalent. Much of this work is focused on urban, high-income, and/or more educated women. For example, a cluster of papers examine technology interventions that aim to reduce the harassment women experience in urban environments [1, 3, 4, 25, 49]. Wyche [44] describes similar challenges with harrassment faced by urban low-income women in Nairobi, Kenya. Such studies reveal much more significant structural challenges than those generally faced by women in the West, as well as opportunities to use design to begin to address these challenges.

The story is likely to become even more challenging, however, when we leave the city for rural villages. Kumar [27] and Ahmed et al. [2] draw on a range of different research projects to discuss the gendering of technology in HCI4D and gender-imposed limits on designing technologies for women. Both of these studies discuss the difficulties of accessing rural communities and gathering empirical data from women in patriarchal societies. They highlight a need for research that successfully engages with rural women and reveals women's experiences, challenges, and desires for technology design. In this paper, we respond to this call with an empirical study of the needs and desires of women in rural villages in Bangladesh.

In so doing, we build on other work to understand and design for rural women in the Global South. One way in which HCI4D practitioners do so is by working through NGOs and other grassroots organizations. Because access to ICTs is often mediated by other stakeholders, interventions with third parties can be effective for reaching underserved populations [36]. For example, Shroff and Kam [40] develop a model for how NGOs and women can engage with each other to help women escape from poverty, the Projecting Health project provides health information to pregnant women through community-created videos [28], and a variety of projects focus on (primarily female) community health workers [17, 30, 32].

But third-party-based interventions cannot directly reveal the needs and desires of rural women; this may require empirical research engaged with women in their communities. Some such work is emerging in studies on rural women in Africa. For example, Burrell [14] studied shared mobile phone use and non-use by rural women in Uganda, revealing how access to mobile phones was structured through and reinforced systems of inequality. Pal et al. [31] studied gender and disability in rural communities in Rwanda and Malawi and showed how systems of disadvantage layer over each other to structure how and whether people can access technology. Wyche studied

the effectiveness of using videos to teach device literacy to rural women in Kenya [46], and found that the design of many mobile phone services benefited network providers to the detriment of rural women [45].

These studies suggest that, at least in Africa, rural, low-income women live within complex systems of disadvantage, and that technology design needs to grapple not simply with financial barriers to technology use but also with (gendered) social ones. Here, we build on these ideas and insights to explore how these challenges play out and what to do about them in rural Bangladesh. We use results from a qualitative field study with 90 women in 12 villages in Jessore, a district in southwestern Bangladesh, to identify local opportunities for and challenges to design, and to inform a more general approach to designing for women in strongly patriarchal contexts.

STUDY DESIGN
The goals of our study were to: (1) gain a nuanced understanding of the economic, social, and cultural challenges faced by rural Bangladeshi women; (2) examine how these challenges impact women's use or non-use of digital technologies; and (3) identify barriers and opportunities for designing new technologies to empower rural women. Bangladesh is a low-middle income country in South Asia with heavily patriarchal cultural and societal norms [6, 23]. The majority of the population in Jessore, where our study was held, is Muslim (85.5%) and primarily employed in small-scale farming and related agriculture [7]. This section details the IRB-approved, qualitative methods we used to engage rural women, including semi-structured interviews, focus groups, and observations.

Participant Access and Recruitment
Access to women in rural villages was facilitated by the Rural Reconstruction Foundation (RRF), a non-profit, non-political, non-sectarian global development organization [34]. RRF runs a range of projects in Bangladesh, including microfinance, education, health, and agricultural programs. To provide services to target communities, RRF employs front-line workers who make weekly visits to rural clients' homes. These workers helped the first author to reach participants by taking her to villages where they work. After arriving in the village, RRF workers organized a public community meeting with their clients there. At this meeting, the first author introduced herself to the entire community, explained the purpose of the research study, and asked community members if there were any questions, concerns, or objections.

After publicly explaining the study to the entire community (male and female), the first author stayed in the village and recruited adult female participants through snowball sampling with the help of RRF workers. The first author, who conducted all the fieldwork, is a Bangladeshi woman who was born and raised in the region in which the study was conducted. As such, she may have been viewed as an insider [19] and was able to obtain permission from participants' families (e.g., husbands) to observe, interview, and speak with women. All interactions with participants were conducted in Bengali, the local language, which the first author speaks fluently. We chose to obtain consent from participants orally, since many

women were low-literate and would have had trouble reading and understanding a written informed consent form.

Interviews and Observations

We conducted one-on-one semi-structured interviews with 50 participants. Each interview lasted approximately 30 minutes and was conducted wherever was convenient for the participant (e.g., in their homes). We asked participants questions regarding their education, daily life, work and household responsibilities, experiences and treatment by their families (e.g., husband, in-laws), experience with technology (such as mobile phones), and challenges they face in their lives. We took detailed notes and audio-recorded the interviews.

In addition to interviewing women, we also observed them as they went about their day. Each observation lasted between 30 minutes and several hours and took place at a variety of locations in each village, including general meeting spots, community centers, market places, and participants' houses. The first author accompanied each participant as she performed her daily duties, including cooking, cleaning, taking care of the children, and collecting water. During observation, we asked situated, spontaneous questions to better understand participant activities and took detailed notes recording our observations. We conducted observations with all but one of our interview participants (n=49). The one participant who declined to be observed said that she felt uncomfortable since her mother-in-law and husband were at home.

Focus Groups

We also organized focus group discussions in the villages. A total of 80 participants took part in 12 focus group discussions. Focus groups ranged in size from four to 16 people and lasted approximately 45 minutes each. We asked the groups about their perceptions of gender roles in society, their specific roles within their families, their household work and other duties that they were expected to carry out, the challenges or difficulties that they experienced in their everyday lives, and their knowledge and past experience using technology. We also asked about participants' opinions of and reactions to the idea of new technologies that might be specifically designed for them. We structured the focus groups to be somewhat less controlled than the interviews by not individually asking about each participant's specific demographic characteristics. Instead, we encouraged women to informally join the group discussions if and when they were able to and to speak freely about topics that concerned them. The focus groups were usually held at regular meeting points in the village during times in which women would naturally congregate and talk (e.g., while having lunch). Again, we took detailed notes and audio recorded the focus groups for later transcription.

A total of 90 women participated in the study; of these 10 were only interviewed, 40 attended only a focus group session, and 40 took part in both an interview and a focus group. Although many participants overlapped, we used both methods because of their different characteristics. On the one hand, we anticipated that participants would be more likely to share personal or private information in a one-on-one setting than in a group. On the other hand, we thought that group discussions may help to encourage women who might otherwise be too shy to tell their stories if they saw other participants doing so.

Data Collection and Analysis

We collected approximately 30 hours of audio recordings and hundreds of pages of field notes. The first author transcribed the interviews and translated them into English. We then performed thematic analysis on our data [16]. We started by reading through the transcripts carefully and allowing codes to develop. Examples of codes include, *"financial challenge"*, *"domestic violence"*, and *"technology access"*. We iteratively refined the codes before clustering related codes into themes that represent our prominent findings described below.

UNDERSTANDING RURAL WOMEN'S LIVES

The first goal of our study was to develop a nuanced understanding of rural women's lives, daily activities, and their diverse challenges, as a grounding point for future technology design. We organize our findings according to the experiences of women in different stages of their lives: before they get married when they are under the control of their parents; while they are married and under the control of their husbands and in-laws; and after their marriage has ended when they either return to their parents house or live alone.

Before Marriage

Bangladesh is a deeply patriarchal society and our participants described challenges from a young age that result from their family's preference for males, including receiving less food, less attention, and fewer opportunities than their brothers. As one participant described:

> *"I have seen my mother save the drumsticks of chicken, head of fish, best pieces of beef for my brother. I only got to eat them when my brother did not feel like eating them. You might think I am funny, but to be honest, I never liked the fondness of my family for their son over me." (P34)*

Our participants were taught from birth that girls should be *"soft"* and that it is inappropriate for girls to argue, protest, or complain about their treatment. Speaking in the presence of others is strongly discouraged and women who do so are considered to be *"shameless"*. However, since societal norms and local customs are frequently discussed at social events and family gatherings, not being allowed to express their opinions or speak for themselves often results in men being the ones who speak for, and make decisions for, women and girls. Decisions from their physical appearance (e.g., the clothes they wear, the length of their hair) to their daily activities (e.g., household duties, being allowed to leave the house) to important life-changing decisions, such as when girls will start or stop going to school and when they will get married, are typically made by men without women's input or consent.

Our analysis shows that girls' education is not a priority in these communities and our participants generally possessed very low levels of literacy and education (see Table 1). Half of our interview participants (n=25) never attended school. Of these, five participants were completely illiterate and the other 20 only knew how to write their names, which was due to a local NGO-run workshop that taught women to write their

Age Groups (years)	18-24: 2	
	25-34: 18	
	35-44: 18	
	45-54: 8	
	55-64: 4	
Marital Status	Woman is the only wife:	34
	Woman is one of multiple wives:	10
	Woman is a widow:	6
	Woman was sent back to parents:	5
	Woman is divorced:	3
No of children	Min: 0 Median: 2 Max: 5	
Household income (USD per month)	Min: 0 Median: 80 Max: 275	
Education Level	No formal schooling:	25
	Less than 5th grade:	11
	Less than 10th grade:	11
	Completed 10th grade:	2
	Less than 12th grade:	1
Occupation	Homemaker:	27
	Farmer:	10
	Handicraft maker:	11
	Factory worker:	2

Table 1. Demographic characteristics of our 50 interview participants.

names so they would be capable of signing official documents. Of the 25 participants who reported receiving some formal schooling, 11 began but did not finish elementary school (5th grade in the US system), another 11 began but did not finish high school (10th grade), two took the 10th grade final exam but failed, and one began but did not finish local college (12th grade). None had attended university.

One reason for women's low levels of education is that they frequently get married at a young age. The median marriage age of our interview participants was 14.5 years (see Table 1), and 38 participants got married before the age of 18. This practice is driven in part by "eve-teasing", where men or boys harass teenage girls by e.g. staring or whistling, blocking their path, touching them, or offering socially unacceptable proposals. Fearful of damage to their daughters' reputation, girls' families often decide that marriage is the safest way to stop the harassment. The girl's continuing education then becomes a decision for her husband. One woman said:

"At school a group of boys targeted [my daughter]. They used to stand in front of her school's gate. They used to make comments about her. We chose to stop her school …Finally, we found a husband for her. Now she can study if her husband wants her to." (P32)

Unfortunately, our data shows that getting married usually does not prevent women from being harassed. Instead, many participants reported harassment, abuse, and intimidation by their husbands or in-laws, as we now discuss.

Married Life
Our participants' communities practice joint-family culture, where several family units live together that share the same grandparents or great-grandparents. When a woman gets married, she must leave her parents' house and go to live with her

husband, usually at his family's home, where she is expected to accept her husband's family as her own and fully devote herself to running the household. However, our participants described that although they are expected to treat their husband's family as their own, the reverse was not true. Instead, a woman is considered to be an *"outsider's daughter"* by her husband's family and her needs are less important than those of the other family members. Participants also told us that they are restricted by their in-laws from communicating with their own families and therefore isolated from their existing social support networks. Decisions concerning when women are allowed to communicate with or visit their parents are usually made by their husbands. One participant said:

"I am not the one who decides when will I see my parents, it's my husband. Whenever he allows me to go, I can go. I also buy a present for them of his choice. Last time he bought a watch for my father, but I wanted to buy a panjabi (traditional Bangladeshi shirt)." (P46)

Participants described being expected to seek permission from husbands or in-laws whenever they want to leave the house or talk to other people, both of which are often strongly discouraged. Instead, women usually try to form a new support network with other daughters-in-law, aunts, and female elders within the extended family. These groups of women frequently get together after a daily bath and talk while they dry their hair in the sun and eat together. These informal meetings provide women with a place to talk about their daily life, share their experiences, seek advice, and try to resolve conflicts.

Financial Challenges
As shown in Table 1, the majority of our participants live in extreme poverty, with a median monthly household income of approximately US$80. Many (n=32) of our participants expressed anxiety and fear for the future as a result of being so poor. Several also explicitly asked the researcher to help them find employment for their children. One participant said,

"My son is graduating very soon, I am very worried about him. I have suffered a lot to educate him. You must know a lot of people, right? Can you talk to them so that they give him a job?" (P47)

We found that women typically have little financial control over their lives. Economic decisions are generally made by men, which women are expected to accept and abide by. Nine participants said that they are not allowed to make any decisions regarding their own or their family's money. Another 14 said that they can request money from their husbands to buy things for themselves; however, their husband's decision depends on his perception of the importance and legitimacy of the woman's needs. Many participants said that having men control the family finances was normal and they don't object to it. Several described how men's control of the money was justified since, after all, the men are usually the ones who earned it. One participant told us:

"If you earn the money, you have the power to say how to spend it and where. We are just like the servants." (P13)

Interestingly, this statement was not true when the woman was the one earning the money. The few participants who reported earning their own money, most often by making and selling handicrafts (see Table 1), told us that they were *not* free to spend their money as they liked. Instead, they were often forced to hand their earnings over to their husband or other family members, which was a source of considerable frustration for those participants and kept them financially dependent on their husbands. Other participants described how they wanted to find employment and earn their own money, but were prohibited from doing so by their husband and in-laws. In addition to controlling money directly, men also control other household-related decisions involving money, such as the food that will be bought and prepared. A participant said:

> *"What vegetables and fishes will be bought, and what is going to be cooked, is always decided by my husband. Sometimes he asks our child what she likes to eat, but my husband is the one who eventually decides." (P2)*

While our data shows that men make most of the decisions regarding the running of households, women are usually responsible for the bulk of the work associated with those decisions. Many (n=26) participants related often being too busy with their household duties to remember to eat. They rarely found time to engage in leisure activities. One said:

> *"I cannot recall when is the last time we watched a drama or movie together on TV, let alone visiting somewhere." (focus group, village 7)*

Domestic Violence

Women who disobey or disappoint their families are often given *"shashon"* (punishment) that typically consists of physical violence. As one participant described:

> *"I was too young to understand what my mother-in-law wanted me to do in the household. She used to beat me for my mistakes. I never liked it, but my like or dislike did not matter because my husband never talks against his elders. I usually went to aunty next door after getting beaten, and she consoled me by saying that this is how I will get to learn. However, now I choose not to beat my daughter-in-law even though my mother-in-law is not happy about it." (focus group, village 11)*

Although we did not specifically ask our participants if they were beaten by their husbands, more than half of our interview participants (n=26) mentioned that they were. They described such beatings as extremely common and accepted in their communities. Speaking out against such behavior is not socially acceptable. Several participants described how, when a man has married a woman, he is responsible for her and for making sure that she does not cause trouble or disrupt the family's peace. As such, choosing to 'punish' the women if she makes mistakes is entirely the man's decision, is a private matter, and people outside of the family should not interfere. Moreover, several women described how they would choose to accept the beating and get it over with over being 'rescued'.

> *"If somebody comes to rescue me, I am saved for a small time, but it does not end there. He will release his anger on me anyhow, maybe double next time, and I do not know when. I choose to be beaten for a few minutes rather than worry about that." (focus group, village 2)*

Women who choose to seek help as a result of domestic violence most often turn to their social support networks *within* the family, with family elders often acting as negotiators between husbands and wives, or wives and in-laws. Of course, since these extended family members are ultimately part of the *husband's* family, they may be biased against the woman and more inclined to excuse the abuse as justified. Although there are formal resources that exist to help women cope with domestic violence, our participants said that they are strongly discouraged by their parents and other family members from reporting the abuse or seeking external support. For example, although the Bangladeshi government has a dedicated police officer at every police station whose responsibility is to assist in cases of gender and domestic violence, none of our participants had ever made a police complaint against their husbands. In addition, a number of local NGOs run violence against women programs that aim to raise awareness and offer support to women. However, many participants decline to receive services through these programs, in part because of the backlash that they may receive from their families and from society. One participant described how her family had sought compensation from her sister-in-law's husband, but had been pressured into backing off when her sister-in-law was threatened with social humiliation and divorce.

Stigma

In addition to domestic violence as punishment, we discovered that many women are beaten as a result of various stigmas. For example, women who have darker skin are often considered to be unlucky or *"cursed"*. One participant described how she suffered after being beaten for having darker skin:

> *"I do not know how I survived. I wanted to die. I did not want to take the insult and torture . . . I know I do not look good; even my parents do not like me . . . I am really frustrated with myself." (P29)*

A woman's social status is also heavily dependent on her ability to have children. Three participants described being humiliated by their families for failing to produce any children (or any sons), while another four said they had been ostracized for having a miscarriage or giving birth to a disabled child. Our participants described how, after getting married and giving birth to a child, they often stop being called by their own name and are instead referred to as *"bride of [husband's name]"* or *"mother of [child's name]"* (this does not happen to men). When we asked one participant her name, she said:

> *"It has been a long time since I recalled my name. Nobody calls me by my name now-a-days . . . I feel like I'm losing myself and becoming someone else . . . It feels empty when you are you, but not you." (P42)*

Many of our participants reported that, if they do not obey their husbands or cause trouble for the family, they are threatened with divorce or being sent back to their parents house. To be divorced, abandoned, or rejected by her husband carries an enormous social stigma for women in these communities.

Such women are usually considered incompetent, are held responsible for the situation, and are frequently socially ostracized by their community. As a result, most of our participants were terrified of being sent away by their husbands, and being threatened with this was an effective way for husbands and in-laws to exert control over the women. More than 20 participants said that they had been threatened with divorce by their husbands or in-laws at some point, and five reported that they were sent back to their parents' house.

Another stigma prevalent in these communities is related to multiple marriages. Twelve of our participants said their husbands had multiple wives. Although not supported by national law, the religion of these communities allows men to marry multiple women. However, it is deeply humiliating for the man's current wife when he chooses to marry another women, since it signals to the community that she is inadequate and failed to satisfy her husband. Despite the humiliation, many women told us that they accepted their husbands' multiple marriages since it was better than being sent away.

> *"I am his second wife, he sent the first woman to her parents. He wanted my parents to buy a shop for him in the local market. My parents could not afford it, rather they presented him a bicycle. He was never happy with that. When my mother-in-law informed me about his third marriage, she advised me to just accept it as I bring no dowry. I console myself that it is true that I bring no dowry. Still it's better that at least I have not been sent back to my parents." (P50)*

To cope with the challenges associated with these stigma, our participants described seeking the help of local *"Kabiraz"* or spiritual healers. These healers are usually Islamic scholars who live in the community and who are considered to possess special knowledge and healing powers. They typically provide treatments or cures for their customers' problems such as homeopathy, allopathy, ayurveda, wearing spiritual objects or trinkets, and other spiritual medications. Our participants described that they especially seek out the help of these spiritual healers when they want to keep their situation a secret from the wider community, including for domestic violence, pregnancy problems, and other stigma.

After Marriage

We turn now to the experiences of women whose marriages have ended, either through divorce, being sent away, or because their husband died. As mentioned above, five participants had been sent away by their husbands. Another eight were widows and they described how their husband's families had abandoned them and their children after the death of their husband. Another two participants told us they had kicked their daughters-in-law out of their house after their son's death.

Surviving as a single woman in these communities is extremely challenging. Women have fewer employment opportunities than men since, even when women have the same qualifications, employers prefer to hire men. In addition, participants who were able to find a job—for example by working on a nearby farm—reported receiving substantially less compensation than men with the same workload. Our participants re-

ported that their employers would claim that women's physical conditions—such as menstruation or being pregnant—made them less efficient than male employees.

Several widows also described how being alone made them more vulnerable in society. For example, one participant, whose husband died a few months ago, described how she became desperate to find a job since there was no other earning member in the family. When she approached several of her husband's friends seeking employment, one of them tried to take advantage of her by offering to pay her for sex. However, she is afraid that if she seeks help or tells anyone about this, she will be blamed for the situation. She described:

> *"Often he calls on my phone in the middle of the night, he speaks inappropriate words to me. He also offers me money for meeting him alone . . . I do not know what to do, if I tell anyone about this, everybody will blame me. I am already so upset without my husband and now this. I am very tense and afraid." (P3)*

EXAMINING WOMEN'S TECHNOLOGY ACCESS AND USE

We now turn to our participants' use and non-use of technology. Three of our interview participants reported that their family did not possess a mobile phone because they could not afford a device. Of the 47 interview participants who had access to a mobile phone, 16 possessed their own phone. A common reason that their husbands allowed this was so that they could contact their wives when they needed to. However, in addition to communicating with their husbands, the women used their phones to accomplish a range of tasks, including talking to friends and family, coordinating business activities (e.g., selling their families' crops), and for entertainment (e.g., listening to music or watching videos).

The rest of our interview participants (n=31) reported that their family shared one or more phones among all family members. The primary reason that women gave for sharing a phone was that their family was unable to afford a phone for every family member. They also described how sharing a phone enabled husbands to control their and their children's device usage. Many of the women whose families shared a mobile phone reported that their husband was the one who kept, controlled, and primarily used the phone. The woman's access to the device was entirely dependent on her husband's permission and limited to times when it was convenient for him and he was not using it. Several participants emphasized that, even in emergencies, they were required to wait for their husband to return home to make calls. Not having reliable access to a device meant that many participants had very little experience using mobile phones and lacked both knowledge and confidence when it came to interacting with them. For example, 24 participants said that the only thing they know how to do on the phone is press the green button to receive a call. Another 20 said that they are also able to make a call by themselves. One participant said:

> *"I do not use the mobile phone. My son and my husband know how to use it. I can only listen to those beep beeps and understand that somebody is calling or texting us. But I am unable to handle it so I leave it there." (P13)*

Many participants faced challenges when using mobile devices because they were low-literate and had trouble reading or understanding information displayed on the screen. Several reported that asking for help from other people if they needed to use the phone for anything other than making and receiving calls, often from their husband or sons. Interestingly, five women said that they also rely on local mobile phone shops for help. They described how shopkeepers usually save the phone numbers of their relatives or friends with their name, because the women often do not remember their phone numbers. Then, whenever the women need to make calls, they go to the shopkeeper who makes the call for them. They are also able to receive personal calls using the phone at the shop, with the shopkeeper charging for both making and receiving calls.

Of the 47 interview participants whose families possessed at least one phone, 31 reported having a basic phone, 15 said that their family had a smartphone, and one did not know what kind of phone her family used. Many of the 15 participants whose families had a smartphone reported trouble using or fear of touchscreen devices. Only four participants said that they were able to operate the smartphone, and only two of those reported having access to the Internet. Six participants said that they relied on help from other people to use the smartphone, while five had *"zero interest"* in touching the device. Particular difficulties that participants expressed to us included not understanding how to use a touchscreen (e.g., how much pressure to apply when touching the device) and being afraid that they would accidentally break the device. One participant described:

> *"I have both button phone (basic phone) and touch phone (smartphone) at home. My husband runs the touch phone. I can barely run the button phone to make calls. I never use the touch phone. I tried using it, but often something happens when I put it near my ear, it touches my face and I cannot listen." (focus group participant, village 3)*

Finally, in addition to mobile phones, 13 participants reported that they watch television for recreation. Indeed, many described how the stories that they followed on local soap operas provided a welcome distraction from the challenges they encountered in their own lives. They also learned about local awareness campaigns through television commercials.

Designing New Technologies Especially for Women

As HCI researchers, we were interested in participants' reactions to the idea that technologies could be designed for them. Several rejected the idea of designing technology for women, arguing that such devices were more appropriate for men:

> *"Many of us are not interested to carry or use something that women do not usually use. Rather the males should use them. I don't want to be laughed at in the neighborhood." (focus group participant, village 10)*

Participants were afraid that carrying or using new technologies might result in unwanted attention or in other people in the community making fun of them. They were also concerned that, instead of making their lives better, new technologies might amplify existing social and cultural challenges. For example, one participant described how she was afraid she might not be able to interact with a new technological artifact as well as her husband's other wife, which could hurt her social status:

> *"I am less smart than the other bride in the house, but maybe both of us are going to receive the same artifact. I am afraid I might fail to use it while I am pretty sure she will be able to. Cannot it happen that the internal mechanism [of the technology] is set in such a way that both the artifacts function the same, but mine with very simple and easier settings? Like the mobile phone that I use, my husband made the settings easy and, even if I forget, usually people are able to help me use it." (P26)*

Although some participants were optimistic about new technologies designed for them, they also identified problems if any new artifacts interfered with their household duties. Their ability to use a technology depends on their husband allowing them, which would be unlikely if he perceived the technology to distract his wife from her work. One participant said:

> *"If you give me [a new artifact], I might spend my whole day with it, stop doing mundane household work, do not cook or clean the house. It is going to be a trouble. If my husband does not find meals on time, he will be very angry, and if he realizes that it is because of that artifact, he will no longer allow it at home." (P50)*

Several participants suggested that the likelihood of their husbands or in-laws being amenable to new technologies designed for women would be increased if the technology came from a trusted source and if it was clear the technology would benefit the entire household, not just the woman. One participant said:

> *"If somebody that we do not know comes and gives us [a new technology], my husband and in-laws will not allow me to receive it. But if it is given by doctors or NGO people that we can trust, then it is fine, as long as they are able to convince my family about the purpose of the [technology] and how it is going to benefit us." (P41)*

Other participants were skeptical that technology would have any positive impact in their lives, especially when it came to complex, embedded social problems like domestic violence:

> *"If my husband beats me, I am sad after that. If you design for me and my sadness, it won't help. It does not matter much if there is some [artifact] to cheer me up. If my husband is again dissatisfied with me he will beat me again and no device can help me at that point."(P6)*

Indeed, several participants suggested that if we really wanted to create technologies to help them, it would be more effective to design new artifacts for their *husbands*, since if these artifacts kept their husbands busy and distracted, they may be more inclined to leave their wives alone.

DISCUSSION

Our findings show how women in these communities are entrenched in masculine and societal hegemony. This leads to economic challenges, educational challenges, social and cultural challenges, domestic abuse, and insufficient support. Women are generally economically dependent on their husbands and their insights are often taken lightly if at all in house-

hold decision-making, ownership of properties, and financial planning. They are unhappy about their limited monetary access and freedom. Their workload is often excessive, unpaid, and unrecognized. The women we studied are often less literate because of poverty and undervaluation of education for girls. Gender harassment is commonly solved through child marriage. Women receive less attention, inferior food, and fewer opportunities to engage with technology. Their voices are systematically restricted. They face risks associated with stigma, most of which are not under their control. Intimidation and physical abuse are prevalent in the domestic environment. Their access to and use of digital technologies is often limited and/or controlled by their husbands.

As HCI designers, we often view the world through the lens of finding problems that we can solve through design. In the world of these rural women, there is no shortage of such problems, and there would thus appear to be a wealth of opportunities for design. However, from our perspective as designers trained within Western systems of value and action, the challenges these women face appear so systemic, and the scope of possible action so constrained, fraught, and potentially dangerous, that it can be difficult to imagine what we can do. What we found was not just challenges *for* design, but challenges *to* design as pursued in HCI and the ways HCI designers understand design for social change. In this section, we unpack the nature of the challenge this situation poses. We then introduce and weigh possibilities to move forward constructively.

Challenges in Fit with Urban HCI4D

We began design by turning to recent, inspiring HCI4D research. But when we tried to adapt these ideas, we found that many interventions that aim to empower urban, higher-income, and/or more educated women in the Global South seem to fit poorly to the situation of rural, low-income women. For example, one strategy developed to help urban women deal with dangerous situations is an emergency button on their phone [25]. Here, however, violence is not coming from strangers in public; it is happening in the women's own homes, and there is no one to call for help. The problem is that this design rests not only on a technological infrastructure, but also on a social infrastructure of people who agree the behavior is unacceptable; this is not the case in our communities.

HCI4D designers have also worked to create smartphone and location-based tools that help women to report and map incidents of sexual harassment (e.g. [3, 4, 49]). At our research sites, a different solution has been found: marrying women off as child brides. Harassment is seen in villages as a problem not because of how it limits women's freedom, but because of how it could damage a woman's reputation. From this perspective, providing girls with tools to report harassment could arguably result in their parents being more aware of harassment, more concerned for their reputation, and marrying them off even younger. This example underlines how the gap between designers' and community's values in this case is so wide that planned interventions may backfire.

We also see that interventions that use technology for empowerment may assume a level of access to and comfort with technology that simply does not exist for the women we studied.

For example, providing public WiFi may be an empowering step in some contexts [20, 35], but the women we are working with are often not allowed out in public and even then, do not have devices, Internet, or knowledge of how to use them.

A Clash of Values

These breakdowns make clear that, while it is challenging to move beyond Western frames of value when we design for urban, higher-income, or higher-educated contexts in the Global South, the challenges are exacerbated in rural, low-income areas, particularly when designing for women. In our own research, the deepest breakdowns have to do with clashes that arise between the values we have as designers trained in Western styles of thinking and the values and norms of the community we are working with. Our fieldwork quickly exposed how our generally liberal, feminist values put us in some degree of conflict not only with the local community, but also with the very women we want to help. The women we are working with articulate serious issues that they would like help addressing, such as malnutrition, exhaustion, violence, illiteracy, and health problems. However, they do not necessarily want to be 'empowered' in ways we might imagine as desirable. For example, they do not wish to have a stronger voice in family decisions because this may risk shame for their families. They are interested in making their lives more bearable, not in a cultural revolution.

As designers, then, we find ourselves caught between two untenable design directions. The first is to take an extreme user-centered design stance in which we simply design for the things that people need and desire locally while ignoring the moral or ethical objections we might have to the outcomes. For example, we could combat sexual harassment by designing a match-making system that helps families more effectively find husbands for their child brides. The second is to impose our own values on this community and aim to change how it works. Our enthusiasm for this second approach is tempered by an awareness of the long history of colonial domination where designers in the Global South have been horrified by what they see and aimed to 'fix' what they perceive to be problems in ways that turn out to be indefensible [38]. It is impossible to do HCI design responsibly in the Global South without being sensitive to this history and the possibility that one may be inadvertently continuing it [24]. Our dilemma, then, is how do we move forward? What paths can we find to design that negotiate this awkward territory in ways that feel right to us and the community we are designing for?

This ethical dilemma aligns with a challenge Bardzell identifies as core to feminist HCI:

> "How do we simultaneously serve real-world computing needs *and* avoid perpetuating the marginalization of women and indeed any group in technology? It would seem that serving existing needs – the traditional approach to HCI – is conservative and perpetuates the status quo. Conversely, an activist stance is problematic because it seems to privilege the social values of the designer. This is a vital ethical dilemma that is central to domestic computing and ICTs for developing countries,

and our field as yet offers little practical guidance on how to cope with it." [8]

In what follows we provide some practical guidance for dealing with this dilemma in rural Bangladesh and beyond.

Design within the Patriarchy

The core idea we came to in considering how to address this field site through design is that we have to design *within* the patriarchal system, even if we ultimately wish to subvert it. To be clear, we certainly might want to directly fight against the patriarchy. For example, we could work with NGO's to provide employment opportunities for girls outside the village, and try to help those who wish and are able to find an opportunity to get out. However, if we want to work within this community, we have to work within the situation as it is. It is not helpful or realistic to expect to change a deeply patriarchal society or for us as powerful outsiders to insist of some of its most subjugated members that they should want a different life. Instead we have to work within this system if we want to have a chance at creating some meaningful change. The question, then, is what it means to design within the patriarchy. We provide three design orientations that may help us to design interventions that we and our participants can live with: empower within a patriarchal society, rather than against it; enable situated tactics; and design beyond the user.

Empower Within, Not Against

Our first sensibility is to try to empower women within the structures of their society, instead of trying to destroy those structures. This requires us to make at least a temporary peace with the limitations they, and by extension we, are working with. At its best, such a strategy could build on Sorcar et al.'s impressive successes in making AIDS education in India accessible by working around value clashes, redesigning around taboos, and building on locally valued advocates [42].

Accepting that we are caught up together in the local situation enables several design strategies that could potentially help the women we are working with. For example, we must recognize that only designs that are approved by the women's husbands and in-laws will be allowed. This suggests that, even when we specifically wish to design for women, we must adopt an approach that considers the needs of all stakeholders and design something that is acceptable to all. One strategy, for example, would be to package materials that empower women (e.g., educational content) with information that would be approved by their husbands or in-laws (e.g., information on cooking or raising children). The women we worked with also suggested that interventions that are endorsed by respected organizations or individuals may be more likely to be acceptable.

A set of related issues arise from men's concerns that the women's engagement with us would distract them from their duties. To be acceptable, then, any tools we design must not interfere too much with women's current lives, jobs, and duties. Conversely, women's burden of labor in these villages suggests a straightforward design opportunity to improve their lives by easing their chores. Although this does not directly alter their structural situation, it would definitely improve women's lives,

and could possibly give women energy and time to find their own ways to improve their lot.

Any approach that incorporates the needs of powerful stakeholders draws from the sensibility of participatory design, which is sensitive to the need to address power differences between stakeholders in design [41]. This move is also in line with Bardzell's call for the centrality of participation as part of feminist HCI [8]. But something tricky is happening when we recognize we are calling for participation of people Western designers would likely frame as oppressors. In addition, the cultural situation we are working in has such different expectations for how and whether people can speak, and for the personal consequences of violating norms for speaking, that many of the experimental, playful, and open methods of participatory design would fail and perhaps even be dangerous to participants. While participatory design regularly deals with power differences, in the West we are able to hold powerful participants to some degree accountable to norms of democratic participation which do not exist in the communities we are working with. In this context, participatory design methods would need significant adaptation and our assumption that the outcome is (more) democratic may be undermined. The polyvocal dialogue Bardzell advocates and we would also like to see is unlikely to be entirely possible [8].

Enable Situated Tactics

Our first reaction to the results of our fieldwork was to be overwhelmed by what the women are going through and the sheer weight of the challenges they face. This was an uncomfortable and dangerous starting point for design, because we were in danger of casting our participants as objects of pity or as alien others. This stance is problematic because it undermines our ability to have empathy, which we need for design, and, as Taylor warns us [43], casts designers falsely totally separate from and unimplicated in the worlds we view. It also can cause us to misconstrue the potential for the women's own agency.

The second sensibility we suggest, then, is to shift focus from the problems that women face to the tactics they already use to cope and look for opportunities to support these tactics. Tactics women generally do *not* use include seeking help from police, legal courts, 'Shalish' (local systems for adjudicating petty disputes), or other outside authorities, although they will appeal to female members of the local council if situations become dire. They also do not fight directly against their husbands or in-laws to establish a voice for themselves. The danger of being cut off from the primary source of value in their society—a patriarchal family unit—makes these approaches untenable.

However, this does not mean women are powerless or lacking agency to help themselves. Our analysis shows how, after they marry, women become isolated from their birth family because they are now located in their husband's household. In this situation, women take advantage of the joint-family culture by making friends in their amity group, i.e. other daughters-in-law, aunts, and female elders in the extended family, and these groups provide emotional support to women during conflicts. Potential interventions might therefore consider how to improve communication or peer mentorship among these groups.
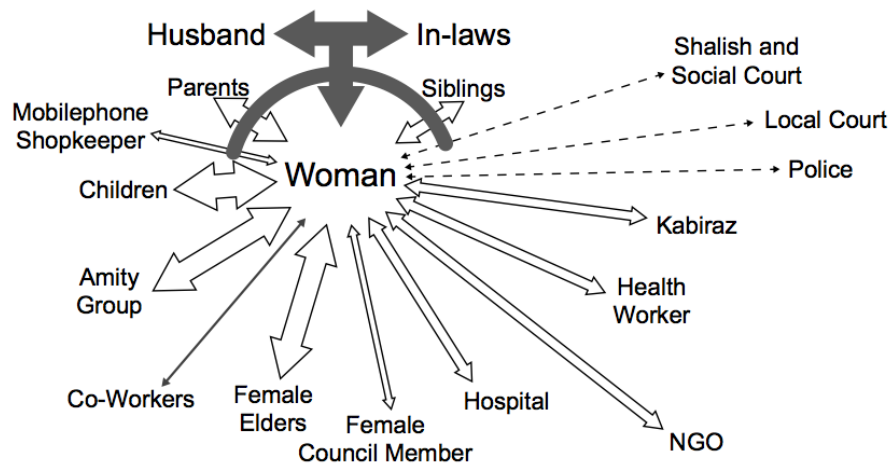
Figure 1. Access points for design action in women's lives. The most significant relationships that shape women's lives are the relationships with husbands and in-laws indicated in dark gray. The width of an arrow indicates the frequency with which interactions happen. The length of an arrow gives a sense of the intimacy of the relationship. Dotted arrows indicate relationships rarely drawn on. The gray arc cuts through relationships that are most significantly mediated through husbands and in-laws.

Our data shows that women often rely on spiritual support. All our participants are religious and many find peace in praying for their situation and hoping it will improve. As discussed previously, women seek help from local Kabiraz (Islamic scholars) who are considered powerful because they take responsibility for issues that people think police or doctors would fail to resolve. Although prayer may not seem efficacious to secular designers, within this community it is valued and experienced as helpful, and is thus a legitimate target for design attention [13, 47, 48]. In addition, designing for and with the Kabiraz could create a valuable channel for disseminating information to women.

These specific opportunities suggest that rather than being subjected to a system of total hegemony, women have many relationships that they experience as providing varying levels of help and agency, any of which could be sites for design action. In Figure 1, we map out local access points that we discovered through our fieldwork. We identify organizations and individuals with which women are in relationship, and that we can design for and with. As indicated by the gray arc in the diagram, some of these relationships are significantly controlled by women's husbands and in-laws. Some relationships may also be highly constrained because of social norms. Others are less controlled and may provide more flexible openings.

Design Beyond the User
Rural village women currently have limited access to technology which contributes to their exclusion from technology research, since, with a few exceptions, we tend to focus on users, not non-users [10, 11]. What makes design centered on users particularly problematic in this context is that technology users are structurally gendered male. Bangladeshi women are not encouraged to touch or handle machinery or technical artifacts. Since childhood, they are taught that jobs involving technologies are for males. In addition, mobile phones are a relatively new technology here; many women do not and cannot see themselves as expert users of a technological device like a mobile phone. Thus, approaches that apply user-centered design naively, aiming to turn female non-users into users simply by building a device to meet their needs, will face significant challenges running against the gendered division of labor in these communities. This suggests that we need to broaden our idea of who the users of such technologies might be and who is to be the target of our design efforts.

The third sensibility, then, is that in the village context our own initial standpoint of taking women as the potential users of technology was too limited. One way non-users have been addressed in HCI4D is through designing for third-party intermediaries [36]. By advocating design beyond the user, we are generalizing this to suggest that designing for a particular person may mean designing something for the people around them that only indirectly affects the person you aim to help. For example, an application that helps men better manage their finances might reduce the stress that women feel. Or, if we decided to make education about violence or taboos a goal for design, it would make sense to educate the whole community, not only women who are its victims. The stakeholders shown in Figure 1 thus provide many starting points for design that could directly or indirectly address women's needs.

CONCLUSION
This paper unpacked opportunities for and challenges to designing technologies that empower rural, low-income women in Bangladesh. Our field study revealed systemic challenges that women face and identified barriers these challenges pose to the efficacy of prevalent HCI research and design strategies. To move forward, we proposed ways to design *within* the patriarchal system, even if we wish to subvert it, and discussed the ethical and pragmatic trade-offs of such an approach. Taken together, our findings expand the HCI community's understanding of technology design within deeply patriarchal societies.

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