



After the Smartphone Has Arrived in the Village. How Practices and Proto-Practices Emerged in an ICT4D Project

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Abstract. This paper presents a case study of an Information and Communications Technologies for Development (ICT4D) project in rural Bangladesh, and examines the emergence of new practices connected through a theoretical lens. Social Practice Theory and different concepts of place provide a middle-range theory frame for interpretation. Two groups of 100 women living in different remote villages took part in the project and received smartphones and training. The project also established a call center and delivered timely agricultural information by voice, apps and short message service (SMS). A mixed design was used to evaluate the project progress. A baseline survey was completed in the two areas before the project started. After one year, the two groups of women involved in the project and two control groups completed a questionnaire on smartphone use practices. Episodic interviews were also conducted with a subsample of 40 participants. Project participants developed new skills and meanings associated with smartphones, which contributed to enhanced communication practices. The new practices and the emerging proto-practices at a micro-level also resulted in new perceptions of time and place and new locations for personal presence and interaction. The use of Social Practice Theory in conjunction with insights from theories of place provides a transferable framework with which to identify and emphasize what is meaningful to individuals and communities in the relationship between skills, materials and ideas with respect to different social-technical initiatives. In this regard, Social Practice and theories of place provide new insights into the integration of Information and Communications Technologies (ICTs) in development projects.

Keywords: Social Practice Theory · Place · Placefulness · Gender and ICTs · Bangladesh

1 Introduction

The fact that international development projects are increasingly interested in using mobile technologies for ‘pro-poor’ solutions should not be surprising, given the explosive growth in mobile technology use in the developing world [1]. However, while there is

a growing body of research relating to mobile phones in developing countries, with few exceptions [2], the literature on Bangladesh is almost entirely limited to descriptive surveys about their use and assumed impact, with voice calls and SMS as the two functions of most interest [3]. However instead of mere description, ICT4D projects also require theory-based analysis in order to overcome the simple impact metaphor of technology, and to better grasp the socio-technical processes they activate at the individual and community level [4]. This paper examines whether and how a smartphone project in Bangladesh has been able to foster the emergence of new individual and community practices connected with smartphones. Social Practice Theory (SPT) is used to develop a micro-lens on a local sociotechnical system, in which sociomaterial practices are operationalized in terms of material, skills and images in both physical and virtual settings [5]. Moreover, given the specificity of mobile practices, insights from theories of place allow for reflections on the ‘experience of place’ [6, p. 28], and its effects on feelings and affects associated with connectivity [7].

2 Social Practice Theory

SPT, as presented by Shove and colleagues [8], has been used for the analysis of stability and in innovation of everyday life, especially with regard to the individual dimensions of sustainability. Shove and Pantzar [5] consider social practices as composed of a mix of *materials*: objects, technological devices embedded in particular situations and relations that endure across time and space; *skills*: operational capability, know-how; and *images*: meanings attached to a specific performance. The level of integration of these three elements can be used to distinguish between practices and proto-practices. Practices assume an active integration of the three components. In proto-practices, the three elements are not connected either because some elements are missing or disconnected ‘I know how to operate the mobile phone but I have no idea that a help service may exist’, or because they are no longer connected due to changes in their components.

In this paper, we focus on providing further nuance to SPT and we link the insights of SPT to concepts of place. We suggest that SPT can also be fruitfully employed to analyze the appropriation of smartphones in the village, in a new experience of ‘disembodied mobility’ [9, p. 561]. In this ‘placefulness’, mobile practices involve social-technical innovations that interact with and modify everyday mundane behavior [10–12].

3 The Complexities of Place

In studies of mobile phones, there has been particular interest in how mobile phones affect both physical and virtual senses of place. Mobile phone experiences in social-technical settings are considered to be different from those carried out in bounded physical locations with fixed technology such as personal computers or telecentres [13, 14].

However, ‘place’ is a complex thing. Drawing upon insights of geographers influenced by the seminal work of Hagerstrand [15], and later usefully synthesized by Giddens [16], concepts of place and mobility have influenced the study of the mobile phone and its effects [17–23]. Post-Cartesian time and space, which frame place and movement, are

in a state of relational production, dependent on such factors as time of day, seasonality, negotiations between people and objects, culture and of course, the particular social formation in which people live [16, 23–25]. The following number of place concepts are relevant:

1. Place as fixed points (e.g. a map of people's houses).
2. Place as locale, the 'settings of interaction' [16, p. 118], where daily life passages take place. For example, the village courtyard as a meeting place for men at one time of day, for threshing grain by women at another. Nowadays, this locale also has virtual overtones that mix geo-location at either end and the virtual.
3. Place as a response embedded with meaning, a 'sense of place', thus the idea of 'my home', 'my village', but also now 'my Facebook' [26–28]. As well, the concepts of settings of interaction as described above and 'sense of place' imply group-oriented, rather than individual forms of action via the phone [28].
4. 'Placefulness' or positive placelessness. This contrasts with negative ideas about placelessness, as a kind of disempowerment or homelessness [29]. Strong connections that exist virtually [4, p. 85] as hybrid assemblages of humans and artifacts, stretching relationally through post-Cartesian time and space [27] provide 'geo-imaginary' agency [30] within much larger global technological trends [31].
5. Gendered place affecting all the above. This structuring factor accords with ideas from feminist geography with its insights into place-based social reproduction under patriarchy in particular cultural and structural conditions [32–35].

Of these, the first three are more commonly discussed in ICT literature, while the fourth and fifth are of particular relevance here. Indeed, the constraints upon women are particularly relevant for research in ICT4D, since women are generally underprivileged, along with their dependents [4, 36, 37].

4 The Project in Context

Bangladesh has a population of approximately 160 million, of which around 80% live in villages in vulnerable regions prone to floods, cyclones or earthquakes, with consequent negative impacts on food security and livelihoods [37]. In this context, ICTs can be important tools for dealing with everyday needs and emergencies. Non-governmental organizations (NGOs) and government now view mobile phones as a tool for an information and knowledge-driven society [38], although the challenge is how to achieve this beyond aspirational discourse [39]. According to the Bangladesh Telecommunication Regulatory Commission, as at December 2015 there were 133 million mobile phone subscribers. Anecdotally, the majority of people have basic mobile phones (known as button, China, or touchphones), although smartphones with varying levels of advanced functionality are being adopted as prices drop. According to one report, 82% of adult males own a mobile phone, in contrast to 55% of women, and 34% of men access mobile Internet services in contrast to 13% of women [40].

A review of the literature on mobile phone adoption in Bangladesh in rural areas suggests that phones have impacted the lives of rural women in at least five areas, namely:

social security; social status; economic mobility; disaster and emergency response; and bridging the digital divide. However, recent studies are few in number. Studies note that access to mobile phones has the potential to contribute to increased pro-poor outcomes such as material affluence, improved health, education and livelihood outcomes, and reductions in travel times and isolation [37]. Gender is seen as central to discussions about improving life opportunities (including ICTs) in Bangladesh, because women are overwhelmingly poor and disadvantaged compared to men with respect to their rights, economic status and access to information [41].

5 Description and Aims of the PROTIC Project

PROTIC (Participatory Research and Ownership with Technology, Information and Change), is a collaboration between Monash University, Australia, and Oxfam, a major International NGO, through its affiliates in Australia and Bangladesh. It has been a five-year project (2015–19) to develop and implement an interactive smartphone-based information system capable of providing specialist localized agricultural information to women. While there are other examples of call center and SMS projects in the ICT4D context, the degree of participatory engagement (known as *gonogobeshona* in Bengali) in building knowledge and skills has provided a strongly sensitizing theory and practice frame for people-centred development research [42–44].

The project has been working in the far north-west of Bangladesh (Area1), and in the southern mangroves region (Area2), chosen because they represent different ecological systems. One hundred women in each project village were provided with smartphones. A community information service was established, providing messages by voice and text, with the ability to call agricultural experts in a call center for more information. Local NGOs provided training in the use of the smartphones and apps. Monthly meetings were held to provide community-based feedback and on-site training to reinforce messages has been provided. For example, training in animal vaccination and use of particular vaccines has been provided, allowing for mass inoculation of ducks in the village. This would not otherwise happen due to staff shortages in veterinary services. As well as this, there have been small-scale research projects conducted by local university students with the villages for the project in conjunction with local NGOs. As such, it has acted to highlight the potential for *gonogobeshona* with local communities to the universities and NGOs.

6 Method

A mixed methods approach was used. Survey data (2015 Baseline and 2016 follow-up surveys) and episodic interviews [45], have been used to examine the stability or changes in practices. Further insights, emerging from qualitative observation and analysis of secondary data are summarized in the discussion and conclusions section.

6.1 Baseline Survey

Questions concerning the ownership and use of mobile phones were included in a broad Baseline survey, conducted by Oxfam in 2015, in the two areas where PROTIC was to be

implemented. The survey, in Bengali with English-language coding, included questions on income, occupation, and health status at the household level. Other sections collected information on ownership mobile usage (i.e. material and skill components), and their use of mobile phones. Data was collected by trained interviewers.

The Baseline survey was distributed to 649 participants (N = 160 in Area1; N = 489 in Area2). The mean age and gender of respondents was: Area1 40.87 (SD 15.31), 39.4% men and 60.6% women; Area2 38.00 (SD 13.86), 36.2% men and 63.8% women. The data was checked for differences based on gender and no significant difference as regards mobile phone use was found, except that women contacted friends more frequently, whereas men were more likely to use the phone for calling abroad (probably India). Most respondents in both areas were housewives or farmers (>80%) and married (>85%). With respect to education, in Area1 and Area2 respectively, 42.9% and 37.9% were illiterate or could only sign their name, 25% and 19.4% could read and write or completed up to class 5, 22.4% and 22.6% completed up to class level 9. The remaining 9.6% and 20.1% had higher levels of education.

6.2 2016 Survey

To monitor the early effects of the project, a Bangla-language survey was administered in July 2016. The first section of the survey included open questions on the perception of what a smartphone is (the image component of practices), the second section collected information on frequency of use of smartphones (material and skill components), and the third section focused on practices and purposes of using smartphones. Data was collected by trained interviewers in conjunction with village intermediaries.

Respondents were from the two areas included in the Baseline, and included respondents involved in the project (PRgroup1 and PRgroup2) and two control groups (Control1 and Control2) with similar conditions that were chosen to check against any natural spread of smartphones or general improvement in information resources and practices. A total of 388 women from the four groups completed the survey. The main characteristics of the four samples are similar in terms of age, marital status and occupation. The women were mostly aged around 30 years, married (>88%) and the majority were housewives or carrying out agriculture (>80%). Overall, participants from project groups have slightly higher levels of education than participants from control groups. More than 70% of participants from project villages and more than 50% of participants from control villages stated they were at least able to read and write.

Quantitative data was analysed using SPSS. Chi square tests with the analysis of standardized residuals were used to identify significant differences among the four villages. Free-text answers to the question 'What is a smartphone?' (translated from Bangla into English) were submitted to content analysis to identify themes relevant to the investigation of the image component of practices.

6.3 Episodic Interviews

Episodic interviews were conducted at the end of 2016 and at the start of 2018. In order to reflect the diversity of the community on social and economic grounds, a purposive

sample was constructed with the assistance of local NGOs. Twenty women in each project group (40 in total) took part in each round.

The interviews covered areas of everyday life and technology. They were translated, transcribed and coded by experienced bilingual researchers using NVivo software for hermeneutic discourse analysis [46].

7 Results

Taken together, the results provide an overview of changes fostered by the project. The basic facets—access to materiality, skills and image—of smartphone practices are described. Evidence of new practices concerning family, livelihood, citizenship, micro-economics and sense of place are then presented.

7.1 Access

The Baseline survey showed that just prior to the start of the project the large majority of respondents had at least one mobile phone: 89.4% in Area1; 87.5% in Area2. Of these, the great majority of respondents who used the mobile phone used only a button phone: 92.8% in Area1, 93.1% in Area2. One year into the project, the situation remained constant in the control groups, whereas smartphones provided by the project are now used in PRgroup1 (93.8%) and PRgroup2 (96.7%).

7.2 Skills

At the time the Baseline survey was conducted, the vast majority of respondents knew how to use a button phone (87.2% in Area1, 87.4% in Area2) and some advanced skills were already present, especially in Area2, including the capacity to use mobile phones for music, movies and photos.

One year after the start of the project, the use of mobile phones for taking and exchanging photos and videos increased significantly in the project villages compared to the control villages. Participants from project villages were also watching more videos, playing more games and using calculation tools, even though these tools were already present in the button phone. From the point of view of understandings of place, the smartphone has had the clear effect of providing tools in a fixed point (the village, the home), as well as new locales for social activity and placefulness (for example, posts on Facebook, or virtual infotainment).

It is worth noting how the women developed their skills. In the interviews, there is only occasional mention of the initial training provided by the local NGOs. Time and again, however, the women mention some form of peer learning, from other PROTIC participants, their husbands, their children, and sometimes their neighbors. Here, the collective, rather than individual orientation of the women can be noted.

In the first round of interviews many women mentioned apps, even though several were hesitant about describing them and clearly lacked confidence in using them. By the second round of interviews, the women were more confident, both in talking about the smartphone apps they could use, and also in discussing new apps they had

identified. These apps included ShareIt, Discover Shyamnagar and Bangla Geeta (for religious information), taking advantage of new and positive local sense established via the smartphone. In 2016, only one woman who described herself as a businesswoman, talked about using bKash, so that she could pay bills using the smartphone. By the end of 2017, bKash was in common use, demonstrating a new placeful locale for financial interaction.

7.3 Image

In SPT, an image is the understanding, representation, awareness of the multiple possibilities offered by a technology [8]. To explore this, the survey used an open question ‘What is a smartphone?’

The Baseline survey had almost no responses because very few respondents had any experience of smartphones. The same result is found in the control groups in 2016. As expected, in 2016, the PROTIC groups provided interesting insights. In the following, italicized words are typical associations given to smartphone. It is a kind of *modern, good, developed mobile phone*, it is an *expensive mobile* that allows one to *communicate abroad*. *Call* is the most frequent practice associated with the smartphone. *Activity and functions* include to *receive and share information on agriculture*, and multimedia: *pictures, music and video*. It is linked to the *Internet*, mainly represented by *Facebook*, and to *news*, to the *world* and to *new apps*. A further group of words suggests that it is useful to *solve problems* and to *save time*. In terms of ideas about place, here we see a strong sense that the smartphone offers new sense of placeful experience, and social meanings and positive experiences via different media for new forms of interaction beyond fixed-point location.

Likewise, the in-depth interviews confirmed that the image is anchored around improved communication and information. Moreover, a number of new images emerged, coherent with the goal of the project. In the first round of interviews, the smartphone was linked to improve social positioning in the family and community by 12 interviewees—affecting their interpretation of locale and sense of place and community. Moreover, it was linked with individual empowerment in terms of learning opportunity (six respondents), and improved agency (six respondents). By the second round of interviews, the image of the smartphone is clearly that of an information seeking tool, but to some extent it has been expanded to being seen as a shared family or community tool, affected its use in locale such as the village, and beyond into the realm of ICT communications.

The most important job is talking with my sick husband and to know his condition. I can take care of my daughter’s education using the mobile phone. I also can get helpful information about cooking by searching in Google through this mobile phone. All these activities I do for my family. I can help my neighbours by this mobile phone as well.

Constraining social influences also appear to come into play, with many women reporting that they need to limit the range of potential activities, or to make calls from home.

Yes, my friends. I mostly communicate to them by sending texts or commenting on their posts in Facebook. But I did not talk to my male friends much, it may hurt my husband or he may not like that.

Although the activity is placeless, this is one indication at least that extended places—new settings for interaction—are not always viewed as a positive form of placefulness. Within the traditional setting, social pressures can constrain use.

7.4 Practices

The 2016 survey data and the episodic interviews confirm the emergence of new mobile practices for respondents involved in the project, who extended the range of purposes of phone calls to include business calls, calls to veterinarians, doctors, the local NGO, and the project call center. Although the number of new practices may be limited, they are perceived as important by the participants. New practices fall into four groups: family, livelihood, business and citizenship practices.

Family Practices

Communication practices continue to be complex, subject to traditional deference to the husband and his family. Smartphones can change this relationship to a certain degree by providing new locales for activity and virtual placefulness. This can include feeling privately connected with one's own parents in other places through a virtual connection on one's own device as well as connection with non-family males on family related matters.

In the Baseline survey and in the 2016 survey, the main use of the phones is to make phone calls for family communication. Respondents from both project and control groups report that they make or receive calls from their spouse and children once or more than once a day. Phone calls with relatives are slightly less frequent (several times a week). However, the qualitative data shows that smartphones provide a new setting or locale for interaction.

My communication network developed more. Earlier I rarely used my husband's phone. But now I can call anyone. It is also helping my family. I can talk to the teachers of my children. I can communicate to my parents in India. Earlier I was not comfortable to talk with them on my husband's phone.

A sense of feeling comfort implicitly refers to greater technical affordance, but it can also relate to a sense of positive and private placefulness, and reflects an increase in the sense of self-confidence and agency:

I think if you can spend some time by yourself then you will learn more. Just think, a woman like me was never comfortable using a buttonphone but I am now using the smartphone efficiently.

The episodic interviews also provide evidence that the range of calls was growing, particularly in relation to obtaining medical advice and activities associated with their children's education.

My husband visited the doctor in India a few months before. Last week I sent a recording to my brother to talk to the doctor as a follow up visit. After listening to the video, the doctor wanted to talk to my husband. My brother called me on my phone by using WhatsApp from doctor's chamber.... My brother sent the medicine... It is saving our huge effort and money and all these are possible because of technology.

As can be seen, the women are adopting new strategies to both find telephone numbers, through the use of apps such as Discover Shyamnagar, and for actually making calls, for example using WhatsApp.

Questionnaires also show an increase in the reported use of SMS in the PROTIC villages. Interviews and field observation, however, suggest the need to consider this result with care, since the use of SMS is often mediated by younger people who can more easily read messages. This gives a new role to young members of the family, and stresses the importance of young people as support for relatives.

Livelihood Practices

At the time the Baseline survey was conducted, the great majority of respondents did not receive agricultural information using their phones. Personal phone calls were used to get information by just of respondents, 2.8% in Area1, 6.9% in Area2, although they were considered potentially useful by 9.9% in Area1, and by 20.3% in Area2. The call center, as a significant virtual setting of activity, was identified as potentially the best way to get information about agriculture by 15.5% of respondents in Area1, and 5.8% in Area2, however they were used by just 1.4% in Area1, 3.6% in Area2.

Such a proto-practice, as identified by the Baseline survey, quickly became a practice in the project villages. Indeed, the data shows significant differences in livelihood practices between control and project villages in 2016, with respondents from project villages seeking information related to seeds, equipment, weather, cultivation, fertilizer, irrigation, weeding, harvesting, storage and market prices. Here, the smartphone and its affordances have a direct impact on fixed location activity in the village and settings of interaction, whether in the village, the paddy field, fish ponds or in the local market. The accounts provided in the interviews suggest that there has been a positive response to the call center—a virtual locale—and other informational opportunities in a relatively short time. As a villager from PROTIC-Village2 reported:

My experience is really good. Earlier we were really helpless, and could not save our domestic animals from different diseases. If they got sick we had to go to the doctor physically to inform them, it took a long time and most of the time we had lost them before the doctor came. But now we can call the doctor for the quick support. This kind of communication is saving time, travel cost and effort.

Similarly, an interviewee from PROTIC-Village1 said that:

In the case of agriculture if we can get the market price of vegetables, fish and other items then I can set the same price and bargain with the buyers. You do not need to go to market as I am giving them the fresh thing in the same price. It will save their transport cost also.

These quotes add to the idea that a new placefulness is developing, that is, that various types of communication and activity are no longer dependent on people being in each other's presence, and that time-space compression has taken place [19, 20, 43]. Thus, the villagers emphasize the immediacy of activities, leading not only to faster responses to problems, but also a reduction in their feelings of isolation.

Business Practices

The use of the mobile phone for personal business—which is closely related to livelihood practices—was reported in the Baseline survey by 14.3% of respondents in Area1 and by 30.8% in Area2. In terms of business practices, one year after the start of PROTIC, analysis shows significant differences between the project and control groups, particularly with regard to the intention to use mobile phones for getting information on market prices and for buying/selling products.

Data from the interviews suggests that the project has fostered the development of the household business unit, with women serving as a home-based hub that coordinates the activities of children and men in the field, at the market and in other working environments. Settings of interaction—the locale—have increased through the project physical and virtual sense. Location-based business interaction is enhanced by placeful communication. For example, a woman in PROTIC-Village1 commented:

This phone is saving my time, money and effort. Earlier I need to go to the market to buy the materials. But now I just call the shopkeeper in the market and they send me the materials. I pay them through bKash. Earlier it took 50 BDT to go to the market but now I am paying it through bKash and it is taking 20 BDT and saving 30 BDT. I can also utilize this time in my tailoring business.

Citizenship Practices

The Baseline data suggests that mobile-based citizenship practices were extremely limited before the project was implemented. Official information from government, NGOs and other sources was received by 1.3%, 1.9%, and 3.8% of respondents in Area1, and by 2.5%, 8.8%, and 1.4% in Area2. In the 2016 survey, the situation had changed dramatically. Percentages of participants who used their mobile phone to call any call center, union parishad (local government), or another local officer were 79.6% for PRgroup1 and 62.0% PRgroup2, compared with 39.8% Control1 and 29.0% Control2.

The episodic interviews provide further evidence that participants feel more entitled, to bring their voice (or the voice of other community members) to the authorities:

I communicate with many people. I use the app Discover Shyamnagar to get useful contact numbers. For example, I am a community member of the Forestry Department. If I see someone doing any harm to the forest then I can directly call the Forestry Department. Earlier I need to go physically for any kind of communication. But this mobile is saving my time and I can communicate more easily.

This effect is strongest with people who are already seen as community activists. The research shows that placeful political activity occurs.

8 Discussion and Conclusions

Overall, the results present changes in ICT practices as seen through the SPT lens, and an impact on sense of place commencing soon after the implementation of the PROTIC project. In the project villages there has been a change in the perception and practice of material agency with the smartphone, and movements in skills, and image components of practices linked to new and overwhelmingly positive senses of place. New skills concerning visual functions have been acquired resulting in new locales for presences with new means of communication. SPT demonstrates these different pathways in the appropriation of the smartphone.

In the first proto-practice pathway, the stability of practices is preserved and the new material artifact (the smartphone) takes the place of the buttonphone. Although aware of more advanced functions, the participants do not appropriate them for everyday mundane tasks and prefer to use verbal communication (for example, calls) over apps (Facebook, Messenger). There is little impact or refinement on senses of place.

In the second practice pathway, the smartphone introduces new place-based and virtually-connected affordances which contribute to capacity building, for example, by using services to obtain agricultural information. The idea of receiving useful information was already present in the villages, but only the new artifact connected to a placeful call center provided this affordance, quickly becoming the means to transform the proto-practice into a new everyday practice for receiving information.

A third practice-based pathway is connected with the emergence of ideas and images of different types, which were not present before, and which require more time to be connected into new practices. This is the case, for example, with the placeful citizenship practices that developed.

Additionally, a sense of placefulness (the fourth interpretation of place) in the sense that activities can take place anywhere is emerging, and this is linked to the collapse of time and geographic restrictions upon physical movement. However, its impact is clearly restrained by strongly gendered social and cultural traditions and practices (such as fear for personal and family reputation) that limit more open communication. While the research reported upon here only hints at this issue, more recent research to be published demonstrates how strong is the salience of gender-based regulation.

In some cases, in order to become practices, some components changed in ways that were not expected. For example, although skills and knowledge were in place, the smartphones and their placefulness did not reach their full potential because of gendered social constraints. However, to some extent, seeing the smartphone as a shared resource helped the women in having smartphones accepted. It remains to be seen, however, whether that component may cause future problems, for example, with regard to different types of digital abuse, as smartphones are designed for individual, rather than shared, communal use. When phones are shared, physical and virtual privacy is contested, problems may all-too-easily occur [47].

The women involved in PROTIC are aware that it is possible to access relevant information using a smartphone and that they had the necessary skills to do so. There is a vision of the smartphone as a tool capable of supporting almost any information need in whatever sense of place. However, this appropriation must be kept in perspective: the primary method of communication is through talk, particularly face-to-face talk, as well

as more conventional record-keeping such as notebooks, as more recent research results are now showing [28].

The results demonstrate that there are emerging practices that affect daily life and self-perception. The impact is stronger on personal and livelihood practices, although business practices have also emerged. At this stage, communication is still overwhelmingly verbal in form, and advanced uses of smartphones, which include accessing the Internet and using problem solving tools, are still at level of ‘proto-practices’ for the majority of women, even though they touch upon the different and positively viewed new senses of place. With a few interesting exceptions, they have not yet taken the next step of connecting skills and images to create new, locally meaningful sets of online practices.

There are, however, other limitations to these findings, particularly as they represent a case study of some villages in one country. This focus has been upon women, and the gendered nature of their experience with the constraints of a hierarchical, patronage-driven, gendered and risk-averse culture [48]. Careful further research is needed to explore this issue as it effects responses beyond aspirational discourse [49].

The broader implication is that SPT and theories of place, certainly for women and probably for men, provide a framework for identifying what is meaningful to in their communities, at least in Bangladesh. Being able to capture and understand nascent perceptions and experiences with mobile phones helps to identify the relationship between skills, materials and ideas when undertaking ICT sociotechnical initiatives. These insights could first, help to develop more nuanced research and development of products and services, and second, help governments and NGOs in tailoring policy development, advocacy and decision-making as to how technologies are to be introduced to communities, potentially resulting in more sustainable ICT4D projects in Bangladesh. The same framework could also be applied in other countries and contexts, possibly resulting in a useful body of knowledge for research and sensitive ICT4D projects and programs.

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