Routledge
Taylor & Francis Group

Using mobile phones to promote lifelong learning among rural women in Southern India

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This article is an attempt to study the role of mobile phones in the non-formal and informal context among rural women from resource poor communities. In particular, it focuses on the women's control over the mobile phone as a learning tool through the domestication of technologies. The distance learning, gender dimensions, and use of technologies have been analysed vis-à-vis the concept of social capital. The article demonstrates that the transition from powerlessness to empowerment is possible in non-formal learning settings and low-cost technologies offer means to accelerate this process in the context of social capital.

Keywords: lifelong learning; gender; mobile phone; domestication

Background

The Commonwealth of Learning (COL) has developed a framework for Lifelong Learning (L3) for Farmers, on the premise that open and distance learning (ODL) and information and communication technology (ICT) can add value to the developmental process by reaching the unreached and facilitating self-directed learning among farmers, landless labourers, and various marginalized sections of the rural communities. COL believes that such learning should take place in the context of the entire social and economic value chain of rural society (Alluri, Balasubramanian, & Kamaraj, 2008). The L3 framework is integrated with livelihood strategies, micro-entrepreneurship, and bank credit. The assumption is that when stakeholders in the primary sector are facilitated in understanding the learning process around a specific area relating to their livelihoods, they will enhance the learning in the other areas thereby becoming lifelong learners. Such learning will take place, not only from a vertical flow of knowledge – from knowledge institutions to the community, but also from the horizontal transfer of knowledge – the passing on of knowledge within the community.

COL has initiated ICT-based L3 in various Commonwealth countries, with one such project in Southern India. This project has been undertaken with a non-governmental organization called *Vidiyal* (Vidiyal means *dawn* in Tamil), which has a federation of 239 women's Self-Help Groups (SHGs), called *VIDIVELLI*, that had identified activities around goat and sheep enterprise. COL, VIDIVELLI, and Vidiyal believed that if the women were extended credit to start up small enterprises in goat and sheep rearing, formal training and the resultant self-directed

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learning would enable these women to run viable enterprises and repay the credit. Such an approach would in the long run encourage the banking sector to support L3 as a business strategy.

VIDIVELLI helped to select 320 women who had expressed an interest in goat rearing. Through a series of Participatory Rural Appraisals (PRAs), Vidiyal conducted a learning needs analysis among the participating women. Vidiyal trained 320 women in conducting a value-chain analysis and in developing business proposals for goat-rearing enterprises. The women contacted a public-sector commercial bank and obtained information on the procedures for developing a credit and business proposal. Vidiyal developed multimedia materials in local languages on how to conduct business feasibility studies and credit plans, and trained the women to carry out these processes. They also trained the women in negotiating with various stakeholders.

It took nearly a year for the women to conduct the market feasibility studies and to develop the business and credit proposals. Each of the women developed a business proposal to obtain credit to buy nine female goats, one buck, and one mobile phone. The purpose of the mobile phone was to enhance lifelong learning opportunities.

The bank agreed to the proposal of the SHGs and approved an amount of Rs. 12 million (nearly US$270,000) for the programme. The credit and the legal ownership of the assets are in the names of the participating women. The management and marketing decisions are taken jointly through the monthly SHG meetings. Vidiyal then entered into an agreement with IKSL-Airtel Group, one of the biggest mobile service providers in Southern India, to send audio messages and voicemails to the 300 women through mobile phones.

In consultation with VIDIVELLI, Vidiyal created nearly 500 audio messages of about 60 seconds each on topics such as buying goats, feed management, disease and health management, and marketing management. Every day three to five messages were sent to participants in the programme through the mobile phones.

Vidiyal and VIDIVELLI developed these materials in consultation with the Tamil Nadu Veterinary and Animal Sciences University (TANUVAS). The materials and suggestions given by TANUVAS were integrated with indigenous knowledge and contextualized to suit the local culture and local dialects. The participating members were trained in developing multimedia materials using digital photography and PowerPoint. The materials thus produced were evaluated by VIDIVELLI and then channelled through the mobile phones. The other video-based multimedia materials are shown during monthly SHG meetings and are being telecast through local satellite channels that are run by the SHGs.

Vidiyal also encouraged the women to discuss the enterprise issues with one another using mobile phones. Once a week the women met at the SHG meetings and shared their experiences. The horizontal and vertical transfer of knowledge was expected to encourage self-directed learning among the members.

Self-directed learning is an important antecedent for lifelong learning. COL and Vidiyal believe that in addition to vertical flows of information, the horizontal transfer of knowledge is an essential dimension of such learning. Through a systematic horizontal transfer of knowledge, the initiative has focused on evolving a social learning capital. As Bruegel (2005) points out:

> Social capital develops from collective experience and on that basis can be transformative, realising forms of collective agency. Just as physical capital is transformed and

financial capital is accumulated as it is utilised, so social capital can be characterised as a process in which alternative values and goals may be developed and the power to effect change may be accumulated, depending on the wider context and circumstances. (p. 5)

Hence, in the initiative, structural conditions were created to facilitate the horizontal transfer of knowledge through mobile phones. Vidiyal and VIDIVELLI negotiated with the mobile service agency, who agreed to reduce the cost of calling among the 300 participants. Using the broad principles of quality learning conversation (Baker, 2006), COL and Vidiyal trained the participating women in effective conversation through mobile phones.

Educational technology and gender

The closeness of the relationship between the digital divide and the gender divide has been well established by previous studies (International Labour Organization, 2001; Kennedy, Wellman, & Klement, 2003; Liff & Shepherd, 2004). The digital revolution, which has undoubtedly influenced educational technology, has not broken gender barriers. Nelson and Watson (1995) found significant gender differences in relation to access and performance outcomes and that the disparity became evident even in preschools.

Bryson and De Castell (1996) traced the gender inequity in new technologies in the formal education system in Canada and argued that:

Women live, paradoxically, in a state of intimate connection with technologies of re/production and yet are represented as perennially inadequate-groping towards and never reaching competence – technophobic and Luddite. (p. 121)

Similar gender stereotyping has restricted the access of women to ICT in many developing countries, including India (Gurumurthy, 2004). Yet as Rakow and Navarro (1993) pointed out:

There is nothing inherent in the technology that requires women and men to use it differently. It is gender ideology, operating within a particular political and economic context, that leads to women and men living different lives and using technology differently. (p. 155)

However, most of the gender–educational technology discourses are too computer-centric. The emerging technologies such as mobile phones have received limited attention particularly in the context of non-formal distance learning.

Numerous studies have highlighted the gender bias of telephone technology (see, for example, Fischer, 1992; Marvin, 1988). Quoting the studies of Frissen (1995) and Rakow and Navarro (1993), Omari and Ribak (2008) have described the transition in the perception of phones and mobile phones from the elitist, male, business-oriented medium of communications to adoption by women using it in a 'creative way to carry out their geographically complicated responsibilities of home, family members and paid labor' (p. 152). They argue that although the mobile phone tends to blur the institutional boundaries between the home and work, giving women the flexibility to exist in both domains, it also leads to reinforcement of women's traditional role and subordinate social status. The report of a mobile phone manufacturer puts forward a view that women tend to use their mobile phones as instruments of expression and

sociability, in contrast to men for whom mobile phones symbolize their social and occupational status (Plant, 2003). However, such conclusions have been derived from studies conducted in developed countries.

In the developing countries of Asia, Africa, and Latin America, the developmental role of mobile phones vis-à-vis gender is attracting attention. The Grameen Phone (2005) among others in Bangladesh has focused specifically on targeting women.

Omari and Ribak (2008) studied the use of mobile phones by teenage Palestinian girls and concluded that the mobile phone as 'a cultural objective acquires its meaning through the biographies of its users' (p. 163). The prevailing social relationships and practices are constantly challenged by various stakeholders, and mobile phones may be playing a role in this regard.

Silverstone, Hirsch, and Morley (1992) proposed the Domestication of Technology Framework as one way of understanding the technology–gender relationship since it has a systematic approach to analysing the social shaping of technology. The framework comprises four elements: *appropriation* refers to being able to access and own resources; *objectification* reflects the use of resources within the household economy; *incorporation* is the manner in which the objects and resources are integrated and have an impact on the power relations within the household; and *conversion* is the relationship between the household and the broader society. Silverstone et al. argue that the conversion represents the 'boundary across which artefacts and meanings, texts and technologies, pass as the household defines and claims for itself and its members a status in the neighbourhood work and peer groups in the wider society' (p. 22).

Appropriation has attracted most attention in relating gender to ICT. An understanding of other elements such as objectification, incorporation, and conversion could help in a broader understanding of the gender–technology relationship.

In neighbouring West Bengal, India, Tenhunen (2008) has made the following interesting observation regarding gender issues in the use of mobile phones:

> Men have purchased all the mobile phones in the village, and all the shops with public phones belong to men. However, in many houses women are in charge of delivering news and operating the phone, because their husbands need to be on the road to purchase stocks or sell products. The phones are used collectively by the entire family and even the neighbourhood. (pp. 525–526)

Tenhunen's observation indicates that while appropriation is still in men's hands, women have started playing major roles in objectification and intensification, even though their role may be more of supporting men's occupations.

Communication, networking, and information sharing are seen as the essential functions of mobile phones and the gender dimensions have been perceived vis-à-vis these functions. Limited attempts have been made to conceptualize the mobile phone as an educational (or learning) technology. In this study, the role of the mobile phone as a learning technology and its gender relationships are analysed vis-à-vis the analytical framework of the domestication of technology outlined above.

Most studies on how learning takes place are based on men's experiences in academic institutions. There are very few studies available on how and if women learn differently and whether learning takes place differently in non-formal environments. Belenky, Clinchy, Goldberger, and Tarule (1986) in their longitudinal study of American women in formal and non-formal contexts have identified five categories of women's perspectives of knowing. These are:

(1) Silence, when women see themselves as both mindless and voiceless and rely on external authority for knowledge
(2) Received knowledge when women believe they are capable of receiving knowledge from external authorities
(3) Subjective knowledge, a perspective from which women conceive knowledge intuitively and subjectively
(4) Procedural knowledge in which women invest in learning and follow objective procedures for obtaining knowledge
(5) Constructed knowledge under which women view themselves as creators of knowledge using both subjective and objective strategies. (Belenky et al., 1986, p. 15)

Although these are neither exhaustive nor sequential categories, they may help to establish a hypothetical frame within which women in developing as well as developed countries overcome silence and come to voice.

Purpose of the study

This study focuses on a group of illiterate and semi-literate women in Southern India who are challenging (latently as well as manifestly) the existing social relations through mobilization and learning. It attempts to understand the relationship between social context and the use of mobile phones as tools for lifelong learning vis-à-vis the gender dimension. The study was based on the premise that the digital divide in terms of gender should be perceived beyond the issues of simple access to ICT.

The objective has been to delineate the gender dimension in the use of the mobile phone as a learning tool among the women involved in the goat-rearing enterprise.

Target group

A survey was conducted among a sample 73 women randomly selected from the 320 who participated in the project.

Methodology

The study adopted a two-pronged approach – quantitative analysis using a structured survey and qualitative analysis using social–anthropological tools.

A questionnaire was designed in consultation with VIDIVELLI. The questionnaire focused on primary data (such as education, occupation, caste, age, economic conditions, family size, and infrastructure facilities), experience and usage patterns of mobile phones, and opinions about mobile phones as learning tools. After pilot testing and refining the questionnaire, it was administered to the sample by the staff of Vidiyal. The data were analysed with simple statistical tools (frequency tables and averages).

For qualitative analysis, the study used anthropological tools and participatory rural appraisal techniques such as focus group discussions, participatory observation, and structured interviews. Since the anthropological tools use a process-oriented approach, a combination of the tools would normally be adopted for triangulation and cross-checking. Thus, the observations of the focus group discussions are cross-checked through participatory observation and structured interviews and vice versa.

These approaches helped to transit the women from mere respondents of a statistical survey to participants in evolving a development theme. The theme and the conclusion of the studies were shared with the participating women. Vidiyal ascribes to the participatory process as an ethical framework for development. In a meeting with the members of VIDIVELLI and the 'respondents,' permission was sought for using the quotes of the respondents in this article. Since some of the quotes challenged the male members of the family as well as the community, the women were asked whether such public statements would lead to conflicts within families and the community. The women referred to Peria Jakkamal (2009), an illiterate woman member of VIDIVELLI, who presented her views, and openly discussed the community's attitude towards the issues of women at the 17th Commonwealth Conference of Education Ministers. They argued that through various forums they have started challenging the oppressive practices without affecting the family and community ties.

Results

Socio-economic backgrounds of respondents

Table 1 shows the social demographic characteristics of the respondents. These are similar to what one would find in many South Asian countries. A substantial proportion of respondents were young adults, and half were below the age of 40. Most of the respondents were from families with four to six members. The majority did not have school education. A large number were agricultural labourers. More than 97% of the Lifelong Learners have been declared as in households below the 'poverty line' by the government.

Thus, the participants are generally from similar class backgrounds. However, there are variations in terms of caste, age, educational status of the participant, and the educational status of the participant's family.

According to Table 2 around 38% of the respondents do not have any family member with middle or above middle school education, while around 37% of the respondents' families have few adult members with middle school education. It is also interesting to note that, among respondents with formal education, around 30% of them do not know how to read or write.

Most of the households have around 11 to 15 goats (Table 3). In spite of the poverty of the households, the strong presence of ICT is evident from the fact that more than 97% of the households have television and around 80% of the households have television with satellite cable connections (Table 4). This phenomenon is generally seen in Southern India, where private and government channels have a strong presence. On the other hand, use of radio and landline telephones is minimal.

Appropriation

In Silverstone et al.'s Domestication of Technology Framework (1992), *appropriation* refers to access, ownership, and possession of technology.

Initially the participating women preferred multimedia materials for learning. One of the SHGs, which runs a satellite cable television channel in a village, telecast the multimedia learning materials on its satellite cable channel. Most of the women, as poor labourers, felt that attending classes or watching multimedia materials restricted their movement for employment, occupation, and household chores. They asked

Table 1.   Socio-demographic status of respondents (*N* = 73).

	% of respondents
Education	
No school education	58.9
Primary school	21.9
Middle school	15.1
Secondary school	4.1
Age (years)	
≤20	1.4
21–30	34.2
31–40	50.7
41–50	9.6
Occupation	
Agricultural labourer	89.0
Marginal labourer	8.2
Medium farmer	1.4
Other	1.4
Family size	
≤3	16.4
4–6	65.8
7–10	17.8
Caste status[a]	
Most backward castes	41
Schedules tribe	58
Forward caste	1.0
Economic status[a]	
'Below Poverty Line' Status	97.3
'Above Poverty Line' Status	2.7

[a]Categories as per the guidelines of Government of India (2007).

Table 2.   Socio-demographic status of respondents' households (*N* = 73).

	% of respondents
Type of house	
Thatched	6.9
Partially concrete	63.0
Fully concrete	30.1
Adult members above middle school level	
None	38.5
<25%	36.9
>25%	24.6

Table 3.   Goats in the household.

Number of goats	% of respondents
1–10	6.8
11–15	63.0
16–20	19.2
≥21	11.0

Table 4. Communication technologies in the household.

Technology	% of respondents
Landline telephones	4.1
Radio/transistor	9.6
Television	97.3
Satellite cable connections	80.8

Vidiyal and COL to look into the possibility of using the mobile phone as a business and learning tool.

The mobile phone would not only help in the learning process but would also support the goat-rearing enterprise in terms of animal management and marketing management. However, Vidiyal cautioned the SHGs that mobile phones could be usurped by other family members, since women have limited control over ownership. However, VIDIVELLI and the SHGs argued that since the mobile phones would be purchased by them with bank credit, they would maintain control and ownership.

According to the survey, around 59% of the respondents did not have any prior experience in using a landline phone. Similarly, around 36% of the respondents had not previously used a mobile phone (Table 5).

Vidiyal and VIDIVELLI conducted a training programme on the mobile phone. The mobile phone dealers and mobile service companies were invited to the meetings during which the SHG members negotiated the terms, prices, and service mechanisms. VIDIVELLI made the final decision of the mobile phone and the mobile service company. Through formal functions, these mobile phones were distributed to the women, since VIDIVELLI felt that such functions would help to reinforce the owner-ship of the instrument at the household level.

The transition of the instrument from the shop to the household is an important aspect of appropriation. The survey shows that a substantial number of women involved in L3 kept the phone in their custody (Table 6). In a few cases, the gendered hierarchy encourages the men to take control of the mobile, particularly when the males do not own a mobile phone. During the monthly meetings of the SHGs, the possession of mobile phones is discussed and strategies are laid out to reinforce

Table 5.   Respondents' prior experience in using phones.

Type of phone	% of respondents
Landline phones	58.9
Mobile phones	35.6

Table 6.   Possession of mobile phone (*N* = 73).

Person keeping the mobile phone most of the time	% of respondents
Self	75.4
Husband	16.4
Son	6.8
No answer	1.4

Table 7.   Major user of the mobile phone (*N* = 73).

Major user of the phone in the house	% of respondents
Husband	78.1
Son	6.8
Others	4.1
Nobody else	11.0

the ownership. The spouses are also the major users of the phone (Table 7). Yadu-lamma gleefully announced in one of the SHG meetings that her husband and other male members in her house seek her permission before using the phone. Most of the women in the initiative have opted for pre-paid mobile services and these services have been registered in their names.

Objectification

In Silverstone et al.'s Domestication of Technology Framework (1992), *objectification* refers to the object and its use in the household economy.

All the women who participated in the survey declared that they regularly took the goats for grazing and most of them (90.4%) carried their mobile phones with them (see Table 8).

In the domestic context most of the respondents' families supported the learning objectives of the woman. If family members hear the voicemail or audio messages, they immediately share the information with the woman and help them to learn the content. Likewise, the woman shares the content on goat rearing with her husband and with other members of the family. This process benefits the entire family to learn new things and expand the knowledge base on goat rearing.

According to Jakkamal (2009), 'Whether I am in the kitchen or managing the grazing goats in the pasture land, I am able to listen to the messages which are very useful.' In many parts of rural and urban India, women involved in (for example) agriculture or trade carry a small drawstring purse or pouch called *surukku pai*, in Tamil. Women

Table 8.   Percentage of respondents carrying the mobile phone while grazing goats (*N* = 73).

Response	% of respondents
Yes	90.4
No	8.2
No answer	1.4

carry items such as coins and betel leaves in the purse and it is generally tucked in the waist of the traditional attire, sari. *Surukku pai* is generally associated with women. In this context it is a gendered object. Jakkamal carries her mobile phone in her *surukku pai*. The study found that large numbers of the learners carry their mobile phones in their *surukku pai*, along with coins and betel leaves. A strong symbolic meaning is displayed through *surukku pai*, reinforcing possession of the new object vis-à-vis the spatial arrangement of the household. Although a few women have bought modern leather pouches, most of the participating women believe that *surukku pai* gives a better indication of their ownership over the phones.

Incorporation

In Silverstone et al.'s Domestication of Technology Framework (1992), *incorporation* refers to the way in which objects are used in a temporal context.

Learning materials were prepared within the broad principles of ODL vis-à-vis the learning needs of the group. No examinations or certificates are required to participate in the learning course, although VIDIVELLI reviews the learning processes. The content in the form of audio messages or voicemails are sent to the participating women regularly. Three to five messages are sent every day. Vidiyal and VIDIVELLI also conduct face-to-face training programmes on using the mobile phones. Since most of the women are illiterate or semi-literate, they were given practice in operating the phone. They were further advised to seek the help of others within their family. Spouses seem to be the primary source of help. Daughters (most of them are children or teens) are the next primary source, while Vidiyal and VIDIVELLI are considered secondary sources of help (Table 9).

Women preferred to get messages in the mornings while going to work or doing household chores. They go up to five kilometres away from the village to graze their animals and receive the voicemails while tending the goats. Whatever stays in their minds (*nejil neirpathai eluthuvom seivom*) is recorded in their diaries. The literate and semi-literate women seek the help of spouses and children to write the notes. These notes are discussed during the monthly SHG meetings. Vidiyal and VIDIVELLI initiated this practice since it was felt that recalling, recording, and discussing would help to internalize the learning process.

All respondents fully agreed with the view that mobile phone-based training is useful and easier as compared to face-to-face training (Table 10). When they were asked to respond to the statement that mobile phone-based training is better than face-to-face training, some women did not agree. However, nearly 82% of the respondents

Table 9.   Support received in interacting with mobile phones ($N = 73$).

Who helps in using mobile phones	Primary helper	Secondary helper
Husband	42.6	0
Sons	6.8	1.4
Daughters	27.4	15.1
Other members in the family	6.8	9.6
Non-governmental organizations	8.2	31.5
Nobody	6.8	41.0
No answer	1.4	1.4

Table 10. Opinion of the value of the mobile phone as a learning tool ($N = 73$).

Opinion of mobile phone-based learning	FA	SA	DNA	CD	NR
Useful	100	1.4	0	0	0
Easier	100	0	0	0	0
Better than face-to-face training	82.2	1.4	16.4	0	0

FA = fully agree; SA = somewhat agree; DNA = do not agree; CD = completely disagree; NR = no response.

fully agreed that mobile-based training is better than face-to-face training. During the interviews, women pointed out that attending training programmes involves substantial financial, economic, and social opportunity costs for them. Some lose their labour wages. They have to seek the support of other family members or neighbours in managing the household chores. In contrast they are able to receive regular lessons through mobile phones whether they are in the kitchen or in the field managing the animals. Periathha, one of the leaders of the SHGs, said that as most of them did not attend schools in their youth, the concept of the classroom is intimidating. They are not in a position to stay in the same place, physically and mentally, listening to lectures and discussions. She said that fear of the teacher still lurks in the corner of their minds.

Table 11. Number of audio messages and voicemails received in the week up to the survey ($N = 73$).

Number of messages per respondent	% of respondents
0	1.4
1–3	9.6
4–5	39.7
6 or more	47.9
No response	1.4

Most of the respondents had listened to more than six audio messages and voicemails in the week prior to the survey (Table 11). Most of the respondents felt that they were able to use the salient points of the messages in managing the goats. According to Vidiyal, this was due to the participatory learning need analysis, which helped to identify the relevant themes.

Incorporation is a matter of integrating the new technology into routines of daily living; it is characterized by struggles over and negotiations with the technology (Christensen, 2002). Yadulamma narrated the following incident (citations from the village women in this article have been translated into English from Tamil by the researchers, as best as possible):

> I do not allow my husband to touch the mobile phone. One day while going for grazing, I found that the phone was not working. Since I was going for grazing I requested my husband to take the mobile phone to Vidiyal's office where an engineer comes every Monday to attend the complaints about the handsets from SHG members. The engineer repaired my phone and gave it to my husband. When my husband brought it back, I found the phone was still not working. I opened the phone and found that the **tongue is** missing. I shouted at my husband for missing the tongue and rushed back to Vidiyal's

office. With the staff of the VIDIYAL, I searched and found the **tongue**. Later I told my husband that I would never depend on him for repairing the mobile phone.

In speaking of the 'tongue,' Yadulamma was referring to the SIM card. When Vidiyal staff told her that it is called a 'SIM card,' she said that it is like a *tongue* to the mobile phone, without which the phone cannot speak.

Although phones are shared among members of the family, the women are faced with the constant task of constructing and sustaining an identity within the home, not only in terms of appropriation, but also in terms of objectifying and incorporating the instrument as a learning tool rather than as a mere communication tool.

Conversion

In Silverstone et al.'s Domestication of Technology Framework (1992), *conversion* refers to the way in which the object is used as currency.

Sudha, a middle-school dropout, said:

In my family and neighbourhood, some men do not know how to use a mobile phone. They see me using the phone, listening to voicemails and talking to other SHG members. They exclaim saying that these women who used to sit in the corner of the house and gossip, are now behaving like government officers, talking on mobile phones. While some are sarcastic, there are others who appreciate our transition. Mobile phones have become a symbolic representation of our transition from dependency on males to self-dependency.

According to VIDIVELLI, mobile phones have produced a breakthrough in linking women with information sources. Mobile phones are enhancing the flow of communication, especially with relatives and friends in other villages. Some of the women have learned to send cost-free SMSs through mobiles. With the help of family members, they have assigned particular ringtones to particular callers.

Mobile phones help to share information about the availability of goats for marketing with the members of SHGs in other villages. The women contact the local middlemen in the same or other villages who can facilitate goat marketing, and the merchants who buy goats. They also contact the butchers and agents of weekly markets in the nearby towns. They share information about the market for goats. The agents bring vehicles to the village and transport the goats to the weekly market. This helps the women to identify better market options and to sell for the best prices. The use of the mobile phone has resulted in reduction of transportation and other opportunity costs.

The women felt that effective and crisp conversational ability is required since the price they pay for a call depends on the time taken in conversation.

A substantial number of the respondents had been using the phones to call others to discuss goat rearing (primary calls). As shown by the responses given in Table 13, respondents frequently called SHG members in the village and family members (Table 12 and 13). These calls were made to discuss and ascertain the validity of the lessons and information passed through the audio and voicemail messages. In contrast, the number of respondents receiving calls from others on goat rearing is limited. Only around 38% of the respondents have been receiving calls.

There was general agreement among the women that their social network had become more intensive with the arrival of the mobile phone. In addition to goat

Table 12.   Calls on goat rearing made and received on mobile phone (*N* = 73).

Number of calls	% of respondents	
	Calls made	Calls received
0	35.6	61.7
1–3	21.9	10.9
4–6	12.3	2.7
7 or more	28.8	23.3
No answer	1.4	1.4

Table 13.   Person or institutions to whom calls made or received (*N* = 73).

	% of respondents			
	Calls made		Calls received	
	Primary	Secondary	Primary	Secondary
Immediate family members	12.3	1.4	6.8	0
Neighbours	1.4	1.4	1.4	0
Relatives	0	19.1	1.4	4.1
SHG members in the village	38.4	5.5	20.4	4.1
SHG members in other villages	6.8	17.8	4.1	5.5
Vidiyal and VIDIVELLI	2.7	13.7	1.4	10.9
Extension officers, doctors, and others	1.4	4.1	1.4	2.7
None	35.6	35.6	61.7	71.3
No answer	1.4	1.4	1.4	1.4

rearing, they have been receiving lessons in governance and fundamental legal rights. When any of the villagers is taken to the police station, the family members have started approaching the SHG members to discuss their legal rights. According to VIDIVELLI, the enhanced ability to negotiate with various stakeholders has added a new dimension to the personality of the participating women.

Discussion about voicemail and audio messages is a regular agenda item in the monthly SHG meetings. The mobile owners share the information received with the non-mobile owners. These meetings provide the women an opportunity to discuss the messages received, clarify their doubts, and fix the information in the existing knowledge system. According to Vidiyal such a process of enquiry and introspection is essential for providing the confidence to the learners to convert the messages into actions for better goat rearing. The diaries in which the women record the voicemail and audio messages received are brought to the monthly meetings for discussion. Sometimes women learners are unable to comprehend the message heard. The facilitation of horizontal learning in the SHG meetings helps to clarify their doubts and enhances understanding.

Mobile phones are used for other purposes, such as discussing matters not connected with business or learning. During one of the interviews, discussions centred around *gossiping* through phones. Immediately the women challenged the fact that men also spend time gossiping about politics, recreation, etc. Sudha said:

> We are not rich people to spend hours talking through the phone. Every minute of conversation is a cost to us. While conversations among the 320 participants is subsidized by the mobile company, we have to pay full charges for conversing with others. Also, our telephone bills are discussed in the monthly SHG meetings and assessments are made on Quality Learning Conversations. Hence we are always careful in using the phone.

At the beginning of the initiative, the male staff of Vidiyal recorded the audio and voicemail messages. During VIDIVELLI's meeting the women participants argued that the voices of the participating women should be used in the messages. Some of the participating women were trained and their messages are being recorded in their own voices. Similarly, women felt that there should be quizzes and a feedback system for reviewing and evaluating their performances. Based on their suggestions, COL and the University of British Columbia have developed a learning management system using audio messages and voicemails. The mobile service company is providing Vidiyal and VIDIVELLI with a master SIM card through which they will be able to upload the messages directly to their system.

Discussion and conclusion

Two aspects are evident from the above analysis: self-directed learning and gender dimensions.

The community came together, defined the learning goals based on individual needs, identified the resources and strategies for learning, and are in the process of evaluating the outcomes. The blending of vertical and horizontal transfer of knowledge helped individual learners to learn in their own time and at their own pace.

The latent as well as the manifest challenges to the gender stereotypes posed by the women's group while domesticating the mobile phones reflect the critical perceptions evolving among the women in the group.

The SHG movement of VIDIVELLI facilitated by Vidiyal operates beyond the conventional framework of microfinance. Creating livelihoods through micro-enterprise, developing institutional structures for emphasizing legal rights, and enhancing the ability to negotiate with various stakeholders, are some of the important agendas being pursued by the SHGs. Thus, there are latent as well as manifest challenges to the existing social relations. However, it is beyond the purview of the present study to make an assessment whether such challenges are altering the present social relations.

The study shows that the SHG movement, micro-enterprises, and lifelong learning represent challenges for the existing social relationships. Management decisions of the assets and resources are discussed in the SHG meetings and thereby the realm of the decision-making in the household economy is moving beyond the household. Clearly, this empowerment results from women's participation in learning and in ownership of assets. It is clear that given the appropriate opportunities, even the most marginalized women can learn effectively. Yet they learn differently.

The women of VIDIVELLI are in the stages of development of procedural knowledge and development of constructed knowledge. However, the transition from silence to development of constructed knowledge has been influenced by the strong cognitive social capital developed through the learning and sharing processes. ODL has helped with the development of procedural knowledge and has led to a stage where development of constructed knowledge is becoming possible. It is important to point out that all of these stages of learning cannot be attained without access to some

basic resources, and in this case these resources have been provided via mobile phones.

Mobile phones have been introduced as both learning tools and as tools for business. The domestication of technology, with elements of appropriation, objectification, incorporation, and conversion, has taken place in the context of cognitive social capital and social learning capital. The appropriation of the mobile phone in the context of bank credit and lifelong learning has helped to create an identity for the phone as a learning and business tool. Using mobile phones while managing animals, listening to audio messages and voicemails and recording messages for discussion and peer review, sharing the messages in the neighbourhood, workplaces, and SGH meetings, discussing the various aspects of goat rearing, all these have strengthened the objectification, intensification, and conversion processes. The participants' constant interaction with the mobile phone company has helped to introduce them to new technologies and familiarize them with procedures such as uploading the messages through master SIM cards. Their feedback has encouraged COL and the University of British Columbia to develop a learning management system for mobile phones. Thus the participants have not only been influenced by technology, but are also playing a role in shaping the technology.

VIDIVELLI women represent a cognitive social capital that emerges from trust and norms generated from cognitive and interactive processes. It is further reinforced by reciprocity, collective identity, shared beliefs, and recognitions that contribute mutually beneficial collective action. Continuous interactions, dialogues, and debates characterize this process. Thus it acts as a collective agency in addressing common issues.

Lifelong learning was integrated as a component of this social capital and the domestication of mobile technology as an instrument of learning and information sharing took place within the framework of this collective agency. While clearly the mobile phone was 'given shape and meaning by being grafted onto existing rules and expectations about the structure of social relations' (Omari & Ribak, 2008, p. 163), it was instrumental in building cognitive social capital. The absence of such collective agencies could be one reason for the digital and gender divides in the use of educational technology in formal education.

This study demonstrates that the transition from silence to voice, from powerlessness to empowerment is possible in non-formal learning contexts, just as it is in formal contexts, and that technology offers a means to accelerate this process if the use of technology is placed in an appropriate social context.

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