

The Use of notebooks by Bangladeshi rural women to preserve information

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Abstract

- Purpose: This article uses Continuum theory to analyse how Bangladeshi rural women who participated in an information and communication technology for development (ICT4D) project accessed and preserved information during and after the end of the project.
- Design/methodology/approach: Semi-structured interviews were conducted over the phone with a sample of the project participants two years after the end of the ICT4D project, then a survey of all the participants in one village was conducted face-to-face by one of the project participants using a questionnaire developed by the author.
- Findings: The majority of the participants used paper notebooks to write down information that they received in digital format during the project as a guarantee against the fragility of digital data and continued to use them to access and preserve information after the end of the project.
- Originality: The author applies the Continuum theory concept of *proactive appraisal* to the use of information in an ICT4D context and argues that it can help with assessing the information needs of marginalised communities and the technologies and formats that should be used to ensure that the information provided to them will remain accessible for as long as they need it.
- Practical implications: The author suggests that the application of *proactive appraisal* during the planning stage and throughout ICT4D projects can ensure that the longer-term needs of the communities for information and their capacities to use specific formats will be considered.

Keywords

Analogue Backup, Information Access, Information Preservation, Proactive Appraisal

Introduction

The United Nations' Agenda for Sustainable Development affirms that access to information is necessary to foster sustainable development (United Nations, 2015). Timely access to information is needed to perform many economic and social activities. For marginalised

communities who have limited access to information, preserving previously accessed information can ensure that individuals will be able to access important information when they need it. However, little is known about the ways marginalised communities in developing countries preserve information. This article contributes to filling this gap by reporting on a study that investigated how women in a remote Bangladeshi village took the initiative to preserve information during and after an information technology for development (ICT4D) project that provided them with smartphones and localised agricultural information for three years. It uses Continuum theory to analyse the data and show how the women took themselves the initiative to preserve the information that they wanted to keep in formats appropriate to their context and kept using that information after the end of the project.

This article starts with a brief review of the literature on the information needs of farmers and on personal information management. It then introduces the theoretical concepts from Continuum theory that are used to analyse the data before presenting the context of the ICT4D project and discussing the methodology used for the research. Research had to be conducted remotely due to the COVID-19 pandemic. Semi-structured phone interviews of a sample of participants in the ICT4D project were organised two years after the end of the project, then a face-to-face survey of all the participants was conducted six months later. The presentation of the findings focuses on the ways the participants used to access and preserve information, and in particular on their use of notebooks to preserve information during and after the end of the project. The discussion section applies Continuum theory, and in particular the Continuum concept of appraisal, which the author calls *proactive appraisal*, to the analysis of the findings. The author then concludes that using the concept of *proactive appraisal* to analyse the information needs of marginalised communities may help ensure that information will be provided in formats that will enable the marginalised communities to access the information after the end of the ICT4D projects.

Literature review

Information is essential to perform many economic and social activities and plays an important role in fostering sustainable development (United Nations, 2015; Hoq, 2012). In the agriculture sector, information can help farmers to make decisions regarding agricultural loans, new seeds, disease and pest control, and markets for their crops (Hoq, 2012; Phiri *et al.*'s, 2019). Agricultural productivity can be improved by access to reliable, relevant information (Hoq, 2012; Mahindaratne and Min, 2018; Naveed and Hassan, 2021). However, to be useful, information must be relevant to the specific needs of farmers. Studies have shown that content must be developed through a bottom-up approach in order to meet the information needs of farmers (Dey, Predergast and Newman, 2008; Case and Given, 2016).

However, individuals in marginalised communities are often unable to access the information they need. Information access studies have identified many barriers that prevent access to information, including the lack of information literacy skills necessary for understanding the information and the lack of content that is relevant to the local linguistic and cultural contexts (Potnis, 2015, McCreddie and Rice, 1999). Phiri *et al.*'s (2019) literature review of the problems encountered by farmers to access information found that the main challenges were illiteracy, the ignorance of information sources, the lack of funds to obtain information, the

cost of phones and internet access, an insufficient number of extension agents, and language barriers. Their research in Malawi found that the lack of money to travel to town to consult extension officers was the major problem experienced by farmers.

ICT4D projects have been designed to help marginalised communities in developing countries to use ICTs to access information. However, these projects commonly operate for short periods of time and focus on technology to access information rather than on the information itself (Unwin, 2009; Walsham, 2017). They are not concerned with planning for the preservation of the information accessed during the projects (Anwar and Frings-Hessami, 2020). The author could not find any previous study that investigated how participants preserved the information that was provided to them during an ICT4D project.

Personal information management research has usually been conducted in contexts where information is plentiful and people need help to manage the abundance of information, particularly in libraries, academic environments and workplaces (Bruce *et al.*, 2004; Kaye *et al.*, 2006; Oh, 2021). These contexts are very different from those of marginalised communities in developing countries, for whom the lack of information, rather than the abundance of information, is a problem, and access to technology is limited. Most of the strategies to manage information mentioned in the literature require access to a computer and advanced digital skills which few people in marginalised communities possess. A few studies have looked at how individuals manage their personal information through analogue means in the context of leisure activities (e.g. Hartel, 2010), but again, those contexts are very different from those in which Bangladesh rural women live.

As Oh (2021, p. 558) has argued, “the way individuals organize their personal information often reflects their social environment”; yet, the social aspects that impact on how they organise their personal information organisation have rarely been studied. Little is known about the ways rural communities in developing countries preserve information. In a country like Bangladesh, where half of the population in rural areas are illiterate (Bangladesh Bureau of Statistics, 2015a) and where information is usually transmitted orally (Stillman *et al.*, 2021), one may not expect village women to create written records. However, previous research has shown that participants in the PROTIC project wrote in notebooks information they acquired during the project (Frings-Hessami *et al.*, 2020).

The PROTIC project was a collaboration between Australian researchers and Oxfam in Bangladesh, which aimed at empowering Bangladeshi women working in agriculture in remote communities through access to information (Stillman *et al.*, 2020). Women in rural Bangladesh face religious and cultural restrictions which limit their ability to travel to regional towns to consult vets and agricultural extension officers. The PROTIC project aimed at teaching rural women digital literacy skills so that they could access the information that they needed to address their problems without having to leave their home. Three hundred women in three different areas were provided with smartphones and free data packages. A local agricultural development organisation was contracted to develop text messages relevant to the local conditions of each village and send them to the participants every week, and to set up a call centre that the participants could call to ask questions relating to agriculture. The services ran for three years from 2016 to 2019. With the information they received or accessed themselves during the project, the participants and their communities were able to start cultivating new crops and to set up some small businesses (Jannat *et al.*, 2018). The

participants became “information hubs” for their communities (Frings-Hessami *et al.*, 2020). This resulted in economic benefits and improved their social status in their communities (Stillman *et al.*, 2020). However, during the course of the project, the women became aware of the fragility of the phones and of the information stored in them when some of them lost data. Research conducted in 2019 found that some of the project participants were writing down in notebooks information they received from the project as a form of backup for information they wanted to keep (Frings-Hessami *et al.*, 2020). The research presented in this article investigated whether the practice of preserving information in notebooks continued after the end of the project.

Theoretical background

The findings of the research presented in this article will be analysed through the lens of Continuum theory. Continuum theory was developed at Monash University in Australia in the 1990s by Frank Upward and colleagues, including Sue McKemmish and Livia Iacovino, in order to address the insufficiencies of lifecycle models to manage digital records (Upward, 1996, 1997; McKemmish *et al.*, 2010; McKemmish, 2017). Continuum theory posits that information, records and archives should be viewed in a multidimensional ecosystem that encompasses their uses by different users for different purposes through time and space (Upward, 2000, McKemmish, 2017). Whereas lifecycle models consider the progression of records through a series of stages from their creation to their destruction or transfer to an archive for permanent preservation (Williams, 2006; Millar, 2017), Continuum theory postulates that records can be used simultaneously for different purposes and that all the future uses of the records should be planned for from the time of their creation in order to meet the needs of their future users (Frings-Hessami, 2022). An important concept in Continuum theory is that of *proactive appraisal*. The appraisal of documents in order to determine their value is a key archival concept. In a lifecycle framework, appraisal is performed when records are no longer needed to support current business activities in order to determine whether they should be preserved in an archive because of their cultural importance (Craig, 2015; Reed, 2010). In Continuum theory, however, *proactive appraisal* is applied throughout the lifespan of the records (Reed, 2010). *Proactive appraisal* consists of “evaluating business activities to determine which records need to be created and captured and how long the records need to be kept” (International Organization for Standardization, 2016, s. 7.1). Before records are created, appraisal decisions should be made about which records should be created, how they should be created and how they should be managed to meet the needs of the people who will need them to support their activities (Frings-Hessami & McKemmish, 2021; Frings-Hessami, 2022) and these decisions should be reviewed throughout the lifespan of the records in order to meet the evolving needs of stakeholders and the evolving technological and socio-cultural contexts. In this article, the author applies this archival principle to the use of information in an ICT4D context and argues that it can help with assessing the information needs of marginalised communities and the technologies and formats that should be used to ensure that the information provided to them will remain accessible for as long as they need it.

Methodology

This article is based on data collected two years after the end of the PROTIC project in two stages: firstly, through semi-structured interviews of a sample of PROTIC participants from the village of Borokoput in the district of Satkhira, and secondly, through a survey of all the participants from that village. Due to the COVID-19 pandemic which resulted in the closure of international borders and made it difficult for Bangladeshi research collaborators to travel within Bangladesh in 2021, the semi-structured interviews were conducted remotely over the phone by an Australia-based Bangladeshi research assistant who had previous experience of conducting research in the village. The interviewees were recruited through her personal contacts. Eleven former project participants were interviewed between April and July 2021. Efforts were made to interview women who had different levels of education and who owned different types of phones (i.e. women who still used the project phone, women who had acquired another smartphone and women who only owned a basic phone). The interviews were difficult to organise due to the different time zones, the heavy workload of the village women, the poor connectivity, and the fact that many women had changed their phone numbers or no longer had a phone. Interviewing women who no longer owned a phone proved too difficult to organise. The interviewees were asked questions about the ways they used to access information and to preserve information two years after the end of the ICT4D project. Specific questions dealt with their use of notebooks to record information during and after the project. After 11 interviews, the author was satisfied that the sample was large enough because the stories the women told the interviewer were becoming similar to stories heard previously. All the interviews were conducted in Bangla, translated into English by the research assistant and analysed by the author. The interviewees are referred in this paper by the codes P1-11.

The second stage of the data collection consisted of a survey of all the project participants in the village. The survey was conducted face-to-face in the village in December 2021. Although it was still not possible for the author to travel to Bangladesh, the situation in the village at the time was conducive to the conduct of a face-to-face survey. To administer it, one woman from the village, who had been one of the project participants and had experience working for a local NGO, was recruited. The decision to employ a project participant to conduct the survey was motivated by the fact that the ethics approval for the PROTIC project had expired. As a consequence, researchers were no longer allowed to use the list of project participants. Therefore, to reach all the participants, it was necessary to involve somebody who was well acquainted with the village and the ICT4D project. Engaging one of the participants who knew the other participants and had experienced the project herself greatly facilitated the recruitment of participants. Through her own contacts, the surveyor managed to locate all the 100 project participants including those who had changed their phone numbers and a few who had moved out of the village. Ninety-five were interviewed face-to-face at their home or another location convenient to them, three were interviewed over the phone because they no longer resided in the village, and only two could not be interviewed because they were not in the village and could not be reached by phone.

To facilitate the data collection, translation and analysis, the survey was conducted with the software Kobo Toolbox, which can be used on a mobile phone, allows for offline data collection and can accommodate Bangla script. The surveyor was trained to use the software by an Australia-based Bangladeshi research assistant who was in daily phone contact with her to guide her throughout the conduct of the survey. The survey used multiple choice questions

and questions with free text answers. The participants were asked questions about their use of phones and notebooks and about their preferred ways to access and preserve information. The surveyor also took pictures of some of the notebooks (with consent from the participants) as examples of the types of information they wrote in them. The data collected during the semi-structured interviews informed the design of the survey questions with options listed in multiple-choice questions being options mentioned by interview respondents. As will be discussed in the following sections, employing an unexperienced researcher to conduct a survey led to some problems, which impacted on the quality of the data collected. The answers to two questions had to be discarded because the surveyor changed some of the answers. Nevertheless, the survey produced interesting data on access to and preservation of information by the former project participants, and supported the findings of the semi-structured interviews. The survey transcripts were translated by the research assistant, then analysed by the author. The transcripts of each interview were read individually to assess their internal consistency, then the data was imported into an Excel spreadsheet and analysed by using reflexive thematic analysis. Survey participants are referred to by the codes S1-98, corresponding to the order in which they were interviewed. Therefore, S1 is not the same person as P1. In order to give a voice to more participants, none of the women who took part in the semi-structured interviews are quoted in this article for their answers to the survey questions.

The following sections present the findings of the research on the ways the participants preserved information during the ICT4D project, on their use of notebooks to access and preserve information after the project and on their preferred ways to access and preserve information. In each section, the findings from the phone interviews are presented before those of the survey since they informed the design of the survey questions.

Information preservation during the ICT4D project

During the PROTIC project, the participants were sent every week three text messages, two text messages on localised agricultural matters prepared by agronomists and one on the weather forecast. The participants also had access to a call centre, which they could call if they did not understand those messages or if they wanted to ask other questions on agricultural matters. This call centre was very popular with the participants who called it regularly to ask questions for themselves and for their relatives and neighbours (Frings-Hessami et al., 2020; Tithi et al., 2021). Research conducted during the project showed that the participants started writing in notebooks information that they received by text messages and through the call centre in order to preserve the information for later use (Frings-Hessami et al., 2020). The research conducted for this article aimed at investigating how common that practice of writing in notebooks was and what factors motivated it.

All the eleven women who took part in the phone interviews in the first stage of the research had used a notebook to record information during the PROTIC project. They explained that they wrote down information that they received during training sessions and when they called the PROTIC call centre to ask questions. Types of recorded information included names of pesticides recommended by the project's agronomists, techniques to cultivate vegetables in saline soil, and instructions to make organic fertilisers. Many women carefully wrote down the date they phoned the call centre, the problem they faced, the recommended medicine and

its dosage and/or the way to administer it (see Plate 1). They captured that information in a notebook so that they would not have to call again if they faced the same problem later on or if one of their neighbours was confronted with the same issue. The project participants not only used the call centre to ask questions for themselves, but also for their neighbours. Therefore, writing down the answers to those questions enabled them to save time and to help others who may face the same problem in the future. P5 explained that:

“Many times, people from the village came to me and talked about their goats’ and chickens’ diseases, so I had to find out solutions for them from the PROTIC call centre. Let’s say, I asked for solutions for my neighbour’s farm animals’ diseases. Then, if that medicine worked, I wrote the name of the medicine in my notebook so that we would be able to solve the problem ourselves in the near future if necessary.”

In addition to writing information communicated to them verbally to keep a record of it, many women also copied in their notebook information they received in digital format as a form of backup. Nine out of the 11 interviewees said that they transcribed all or at least some of the text messages that were sent to them during the project. P11 explained that:

“I lost SMS once during the project as my phone had stopped working. After repairing it, I could not retrieve those SMS. From that time, I started writing every SMS in my notebook. I didn’t miss any single SMS, weather-related or others. My daughter helped me to write those SMS. At the time I lost my SMS, some of our PROTIC members had already started writing SMS in their notebooks. I also brought their notebooks home and my daughter helped me to copy those in a notebook that I received during PROTIC training. I didn’t really use it before that as you know we don’t really need to write many things on a day to day basis. But then it became my PROTIC SMS notebook.”

Similarly, P7 said that she heard that other women were writing PROTIC information in notebooks and started doing it as well, but that she only started doing it regularly after she had problems with her phone. Others started when they realised that the project was coming to an end and that they would no longer receive support with their phones:

“When we used to get SMS, we did not think that PROTIC would close one day. Then when we realised that the PROTIC project was coming to an end, I started writing the SMS in a notebook.” (P9)

Some of the women, like P11, wrote all the text messages that they received, but most of the others only wrote those they found particularly useful, for example, text messages on goat diseases for those who were raising goats.

There is a clear link between the women’s decision to transcribe the text messages on paper and their understanding of the fragility of digital technologies. They created analogue backups of information provided to them in digital format because they thought that paper records would last longer than digital records.

Among the 98 women who took the survey, 91 (92.86%) used a notebook during the project. All of them wrote down information they received from the call centre and some of them also transcribed SMS. The exact number of women who transcribed SMS is unclear because the surveyor only recorded seven “yes” answers to the question asking participants whether or

not they wrote SMS in their notebooks. This number is lower than the number of interviewees, nine, who said that they transcribed at least some of the SMS and explained in their interviews why and how they did it. Of those nine women, seven were recorded in the survey as having answered “no” to the question asking them if they wrote SMS in their notebooks. This can be attributed to the fact that the surveyor assumed that she was expected to check the women’s notebooks for transcribed SMS. If the women answered “yes” to the question but were not able to show their notebooks because they did not have them with them at the time of the interviews or did not have time to go looking for them, or if the surveyor could not find in the notebook that they showed her anything that looked like an SMS, she changed their answer to “no”. This was due to a misunderstanding about her role and the objectives of the survey rather than to a deliberate attempt at manipulating the data, and can be related to the instructions she received over the phone from the research assistant who trained her and was in daily contact with her to guide her through the process. For the first three participants from whom the surveyor collected data on the first day, she recorded “yes” to the SMS question. The research assistant raised some concerns about the quality of the data she had collected that day due to some of the free text answers being very short and advised her to “cross-check” data and ask for clarifications if some answers contradicted each other. The surveyor then decided – without first asking if that was appropriate – to check the notebooks for evidence of text messages, and subsequently only recorded “yes” to four out of the following 94 interviews. In those four cases, she took a picture of the notebooks that showed text messages (see for example Plate 2). She only took pictures of 39 notebooks. Therefore, 52 women, that is 57.14% of those who said that they had kept a notebook, did not show her their notebooks at the time of the survey. This may partly explain the low number of “yes” answers to the SMS question. It is also possible that some women may have had more than one notebook and showed her a notebook that did not include transcribed SMS. The surveyor may have had only a quick look through some notebooks and missed or did not recognise the SMS. Whatever the reason, not recording as “yes” the answers of women who were not able to show evidence of having written SMS did not produce an accurate record of the stories that the women told her, which is what the research was interested in capturing.

Given this issue with the quality of the data, it is difficult to estimate the total number of PROTIC women in the village who transcribed SMS in their notebooks. However, since the majority of the interviewees did it and others talked of doing it during the survey, it can safely be assumed that a large number of women who said that they used a notebook during the project to write down PROTIC information wrote at least some of the PROTIC SMS. In any case, it is clear that the majority of the project participants were conscious of the fragility of the information they had been sent in digital form and that a large number of them used notebooks in an effort to alleviate this limitation.

The photos of notebooks taken by the surveyor illustrate different types of information captured and different styles used by the women to organise information in their notebooks. Seven out of the 39 photos taken show the text of SMS (see for example Plate 2). The majority display information likely obtained from the PROTIC call centre. Many include succinct summaries of information presented in columns, such as date – problem – solution, or date – time – problem – solution (see Plate 1). Others present a similar structure without drawing columns. A few pictures include more detailed information, such as the method to make organic fertilisers or to prepare a balanced diet for cows, which the women may have

learnt through training sessions rather than by calling the call centre. Some notebooks appear to be carefully maintained (e.g. Plate 2), while other show information hastily written down, which is to be expected when taking notes during or immediately after making a phone call to a call centre.

The answers to the survey and the photos of notebooks show that the project participants had a higher level of literacy than the average in their district. According to the 2011 census, only 46.61% of rural women in the district of Satkhira are literate (Bangladesh Bureau of Statistics, 2015b), but all the project participants had at least some minimum level of literacy. All of them said that they had attended school and only two of them had completed less than four years of schooling whereas 33.81% of women in the district had not completed any year of schooling and 20.95% had only attended up to Grade 1-4. The majority of the participants reported that they had attended secondary school, with the median being up to Grade 10 (10 years of schooling), and 12 of them held a university qualification (which they may have completed during or after the PROTIC project).

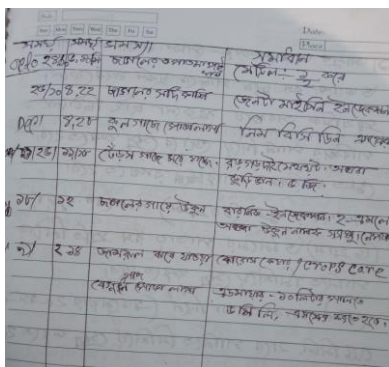
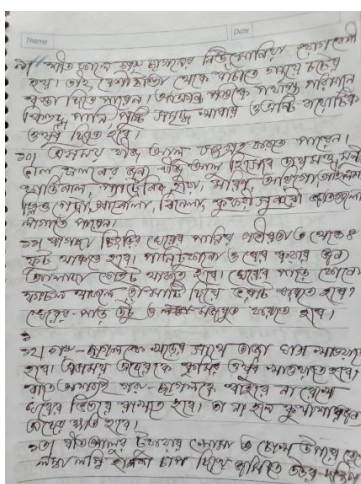


Plate 1: Notebook showing information from the PROTIC call centre with columns for date, time, problem and solution (S77)



Information access and information preservation after the ICT4D project

At the end of the PROTIC project in June 2019, the women were allowed to keep the project phones, but by then, some of the phones were no longer working, and most of the others

stopped working in the following months. Among the women interviewed between April and July 2021, only two out of 11 (18.18%) were still using the PROTIC phone, four (36.36%) were using another smartphone and five (45.45%) were using a basic phone with no internet access.

The interviews revealed that although women may own a smartphone, their internet access was very limited because of the cost of data packages. Of the six interviewees with a smartphone, only one had internet access all the time. The others only bought data packages when they found a good deal. For this reason, they had to use other ways to access information when they needed information on agricultural topics. This usually meant consulting local “experts” such as the agricultural supplies shop in the nearest bazaar, the local vet, or the agricultural extension officers and the livestock hospital in the sub-district town.

The interviewees said that the information provided by PROTIC was still useful to them. In particular, they still used the new farming techniques to grow vegetables in saline soil that they had been taught. However, pests had become resistant to pesticides and new animal and plant diseases had appeared that required new forms of treatment and therefore new information on how to deal with them. Therefore, the women needed to access the information they had received during the project, as well as new information to deal with new problems.

Since it proved too difficult to interview over the phone women who did not own a phone, the interview sample was skewed towards women owning a phone. The survey conducted in December 2021 with 98 women showed that by then only 16 women (16.33%) still used the PROTIC phone and 16 women (16.33%) had bought another smartphone. The majority of the former project participants either own a basic phone (48 women or 48.98%) or did not own any phone (18 women or 18.37%) and therefore did not have internet access.

The interviews showed that two years after the end of the PROTIC project, most of the women still used their notebooks to access information they wrote during the project. Of the 11 women interviewed in the first stage of the project, nine still had those notebooks in their homes at the time of the interviews. The other two had lent theirs temporarily to a friend or relative. The majority of them (eight out of 11) still looked in their notebooks for information that they had written down during the project. The three women who no longer referred back to their notebooks felt that they did not need to do it because they had memorised all the information captured in them. Several women commented that they did not check their notebooks often because they had memorised the information they used frequently, but that they used their notebooks if they had forgotten the name of a medicine or wanted to check the exact dosage to apply. The notebooks were particularly useful if they wanted to start a new type of activity about which they had captured information.

Many of the women were still writing in their notebooks new information that they found useful although they did not have much to write because they no longer received regular information. However, when they found solutions for new problems, they wrote those solutions (e.g. names of the medicine and dosage) in their notebooks, particularly in cases where they had to try several solutions before finding one that worked. Their writing was not as systematic as during the PROTIC project when participants regularly met to discuss their problems and the effectiveness of the solutions suggested by PROTIC and encouraged each

other to write, but they were still writing down useful pieces of information and understood the advantage of doing it. For example, P3 commented that she wrote in her notebook all the new information she got so that she could use it in the future if necessary, while P11 explained that:

“Nowadays there are not many things to write like in PROTIC time. I also forget sometimes to write down things in my notebook. But I should write all the useful information otherwise you know it is another struggle to find out the same medicine by just describing the issue to the shopkeeper. Sometimes, I told my husband the colour of the packet, but a couple of times we got different medicines in a similar looking colour packet! So, that technique is not quite useful!”

Among the women who took the survey, 77, that is 84.6% of the 91 women who had a notebook, were still using it to check information that they had written in it. The notebooks were a handy source of information when they faced a problem for which they knew they had written down a solution. It is unclear how many of them were still writing new information in their notebooks. The survey recorded all women as having answered “no” to the question asking them if they still wrote in their notebook. As for the question regarding the practice of writing SMS in notebooks discussed previously, the surveyor took it upon herself to check the notebooks and changed the answer to “no” if she did not see recent dates in the notebooks. This may be explained by different reasons: some of the women did not show their notebooks to the surveyor at the time of the survey, or they may have had more than one notebook and showed her an older one. It is also possible that recent information was not dated. Not all women were recording a date for every piece of information they wrote in their notebooks. It is therefore possible that recent information was included in the notebooks shown to the surveyor but not dated. In their answers to the free-text questions, some participants mentioned that they were still writing information in their notebooks. It is therefore, difficult to estimate the proportion of women who were still writing in notebooks, but it is clear that some of them were still doing it.

Information access preferences

The phone interviews revealed different methods the participants used to access information after the end of the project. Some women who still owned a mobile phone and could afford data packages used the internet to access information. Those who did not have access to mobile phones used methods of accessing information that they had used before the ICT4D project, mostly relying on the local agricultural supplies shop, although a few mentioned that they occasionally called the Agriculture Extension Officer in the nearest town.

During the survey, the participants were asked to choose from a set list the sources of information they used when they needed information on agricultural topics (see Table 1). The information preserved in their notebooks was the source of information they most commonly selected (78), with a large number of them also selecting “asking other PROTIC women” (61). For problems they had encountered previously, the easiest and quickest ways for them to find a solution was to consult their notebooks or to ask PROTIC women who lived nearby if they remembered the solution or had written it in their notebooks. When they encountered

new problems for which they did not have a solution in their notebooks, they had to use different methods. They searched the internet if they had access to a smartphone with internet connection (27), or consulted with the local vet (72), the agricultural supplies shop (71) or the Agriculture Extension Officer (53).

Sources of information used after PROTIC	Number of women using them	Women who enjoy them the most	Women who use them the most
PROTIC SMS and other information on their mobile phone	6	1	0
PROTIC information in their notebooks	78	60	60
Other information in their notebooks	6	0	0
Other PROTIC women	61	30	6
Internet	27	19	12
Saved videos and/or audio recordings on their phone	4		
Local vet	72	8	4
Nearest agricultural supplies shop	71	12	14
Agriculture Extension Officer (by phone)	53	12	6
Agriculture Office or Livestock Hospital in the nearest town (in person)	27	3	0
Relatives	5	0	0
Neighbours	3	0	0

Table 1: Sources of information used by participants two years after the end of the project (out of 98 women)

The following two questions in the survey asked the participants the sources of information they enjoyed the most and those they used the most (see Table 1). These two questions offered free text boxes to give the women the opportunity to explain why they preferred a particular source of information and why they used it the most. The author expected that the surveyor would ask them their top favourites and would record only one favourite for each question. However, she recorded multiple answers for many women and it is often difficult to determine which one among the sources of information mentioned is the one they liked the most or used the most. For this reason, the multiple answers were taken into account in the analysis.

Sixty women said that they enjoyed looking for PROTIC information in their notebooks and 30 enjoyed asking other PROTIC women (22 mentioned both). Only 19 answered that they enjoyed using the internet to look for information, and even fewer answered that the option they enjoyed the most was to consult with the Agriculture Extension Officer (12), the agricultural supplies shop (12) or the local vet (8). When asked which source of information they used the most, again 60 women answered checking for PROTIC information written in their notebooks, but fewer answered using the internet (12), calling the Agriculture Extension Officer (6) or the local vet (4), while 14 answered visiting the agricultural supplies shop.

Fifty-three women answered notebooks to both questions, indicating that writing in notebooks was the option they enjoyed the most and used the most. They commented that they liked using their notebooks as a source of information because it is something that they can do from home, when they have time, which does not cost them anything, and for which they do not have to depend on anyone else. S26 explained that:

“My notebook is always in my house. When I have a problem, I look [in the notebook] for some of the advice I have received. I don’t have to go to anyone and my time is saved... I can easily solve the problems that arise with the information written in my notebook... When I go to the vet, I have to pay a fee. But when I look in my notebook, I don’t have to spend any money. It only costs me money for the medicine”.

Similarly, S60 commented that:

“It is not always possible to talk to someone, but I can easily solve my problem by looking at the notebook... I always try to use the PROTIC advice because I can find the information while sitting at home.”

In many families, the husband is away from home for several months each year, taking on labouring jobs to supplement the family’s income and the wife is left alone to take care of the house, the children, and the agricultural chores. The women, therefore, appreciate that with their notebooks, they can access information without leaving their home:

“I look for what is written in my notebook because I can see it whenever I want at home. In my family, I have to do all the work alone. There is no one to help me. I work in agriculture in addition to household chores. The information that I get sitting at home is very beneficial for me.” (S89)

S83 concurred: “After doing all the household chores, when I do the agricultural work, I don’t want to go out anymore. It is easy to work from home by looking at my notebook!”

Besides the convenience, the women appreciate that the information comes from experts who can be trusted. For example, S60 commented that: “I look for PROTIC information that is written in my notebook because PROTIC advice is very good”. The information included in their notebooks is often information that they have tried before and that has worked for them.

That information benefits the women, their families, and others in their community. The women’s relatives and neighbours also appreciate the quality of the information they wrote in their notebooks. S66 commented that: “If there are any problems in our water bodies [for prawn culture], my husband tells me to first check in my notebook”. Another woman (S96) explained that she recently moved with her husband to a different village and left her notebook at her father’s house where her sister-in-law now uses it to support her farming. If she encountered a problem for which she knew a solution was written in her notebook, she called her family or checked the notebook herself when she went there for a visit.

Even some women who owned a smartphone and enjoyed searching for information on the internet still used their notebooks when they knew the solution to a problem was written in them. For example, S72 said that she enjoyed using the internet, but the source of information she used the most was her notebook because she did not have to “pay any fee or use any internet [data] to see that advice”.

The second most preferred source of information for the participants was to ask other PROTIC women if they knew the solution to a problem. Other project participants may have written down in their notebooks or may remember something that they themselves did not write and did not remember, or they may have asked different questions to the call centre

because they encountered different problems during the project. Therefore, asking them was also a convenient and free way to get information.

Most women valued the information written in their notebooks and found it very helpful to address many of the problems they encountered with their farming activities. However, a few women found that the information they had written in their notebooks was incomplete and insufficient to deal with the problems they encountered after the end of the project. For example, S29 explained that: “In my notebook, only the names of medicines and the diseases PROTIC advised to use them for are written. But I don’t know how to use them and how much to use!” Because of that, she had to go to the drugstore to get information on how to use the medicine when she encountered those problems. For this woman, the recorded information was insufficient to deal with problems because she had not captured all the necessary details.

The notebooks could not help the women to solve all their problems. When problems that they had not encountered previously occurred, the women had to look for new sources of information. However, the information in their notebooks was still useful for them and worthwhile preserving for future use. The next section looks at the ways the project participants used to preserve information they may need again later on.

Information preservation preferences

The phone interviews revealed different strategies used by the project participants to keep information they may need again in the future. These strategies include a mix of analogue and digital methods, with some women using both. For example, P9 said that she downloaded and saved videos on her phone, but that if she thought that she might forget something complicated, she wrote it down. Other women who had a smartphone kept audio-recordings, videos downloaded from the internet or wrote information in the Notepad app on their phones. One woman who only owned a basic phone felt that it was more convenient to keep information on her phone because she carried it with her all the time whereas a notebook may get lost if one did not write in it regularly (P6). To some extent, the strategies that the women used can be attributed to personal preferences. However, what they were able to do in practice depended on whether or not they owned a mobile phone.

During the survey, the women were asked to choose from a set list the methods they used to preserve information that they may need again in the future (see Table 2). All of them selected memorising information as a method they used to preserve information. Most of them selected keeping books and printed papers (84) and writing in a notebook or on a piece of paper (74). Few of them selected methods that required access to a mobile phone: saving audio-recordings (20), videos (16), pictures (12) or SMS (8) or taking notes in an app (3) on their phones.

Methods to preserve information	Number of women using them	Women who liked them the most	Women who used them the most
Memory	98	62	46
Keeping books and printed papers	84	13	4
Writing in a notebook or on paper	74	54	48

Asking someone else in their family to save information for them	49	1	1
Audio recording on their phones	20	3	0
Downloading videos on their phones	16	6	2
Saving pictures on their phones	12	1	0
Saving SMS on their phones	8	0	0
Typing in the Notepad app on their phones	3	2	1

Table 2: Methods to preserve information used by PROTIC women two years after the end of the project (out of 98 women)

When asked the methods they enjoyed the most, 62 responded memorising information and 54 said writing in notebooks or on paper (see Table 2). As for their response to the information access questions, many women provided multiple answers and all the answers were taken into account in the analysis. With regard to the methods they used the most, 46 said memorising and 48 said writing in notebooks or on paper. Thirty-one mentioned both for the first question and seven for the second. Thirteen women said that they enjoyed keeping books and papers and four said that it was the method they used the most. Very few women said that they enjoyed methods of preserving information that required technology or that these were the methods that they used the most. Only six said that they enjoyed keeping videos on their phones, while three preferred to keep audio recordings. Two spoke of preserving information on an external memory card, one as the method she preferred to keep information, the other one as the method she used the most.

The women enjoyed methods to preserve information they can use themselves at home now and in the future. Memorising information is a very convenient way for them to preserve information because it does not depend on any physical artefact, and therefore is always accessible to them. However, it is not possible for them to memorise everything and they need to use other methods to keep information. Forty-three women answered “notebooks” to both questions, which means that for almost half of the women, writing in a notebook was the method to preserve information they enjoyed the most and used the most. By writing in a notebook, they were able to keep information and use it later for themselves and for helping others. This saved them time and money.

Another important factor for the women was that the information written in their notebooks was information they had selected and that they understood. S85 explained that: “I can understand what I wrote in my notebook. I can see the name of the medicine and get the medicine. I don’t have to waste time talking about it anymore.”

Some women who did not use a notebook at the beginning of PROTIC or did not use one at all during the project asserted that they had learnt from their mistakes and started taking notes of important information. For example, S17 commented that:

“I used to do audio recordings on the phone and I worked by looking at the PROTIC SMS. I didn’t realise that the phone would get damaged as it did... I didn’t write the information during PROTIC. Now I understand what I did wrong. So now when I go to training, I write what I have learnt in a notebook.”

Many women also enjoy reading. Many mentioned that they kept all the books and papers that they had been given and some said that they read them in their free time. S20, who had

lost her notebook, commented that she still had books to refer to when she did not remember something and that she enjoyed reading them in her free time.

Although the vast majority of the women maintained a notebook and said that they enjoyed doing it, a few women commented that they did not like doing it or that writing was not easy for them. For example, S12, who only attended school until Grade 5, said that she did not write in a notebook because she could not write well. Instead she made audio recordings and worked by listening to them. A few women who still had a smartphone preferred using it to record information because they carried it everywhere. Yet, for the majority of the women who no longer owned a smartphone, notebooks were an easy and convenient way to keep information.

Discussion

The findings from the interviews and the survey show that the majority of the participants in the ICT4D project in that village took the initiative to preserve information by writing it in notebooks because they wanted to be able to access that information later on and they felt that paper documents would last longer than digital data preserved on their phones. This shows that information had not been provided to them in formats that met their needs after the end of the project.

Two years after the end of the project, the participants still used their notebooks to refer to that information because it was a source of information that they could easily access and that did not cost them anything. They appreciated the fact that using their notebooks at home was something they could do on their own when they wanted and that they did not have to go out to ask for information, which saved them time and money. For the women who could afford the cost of a new smartphone and of regular data packages, accessing the internet on their phones presented the same advantages, with the additional advantage of being able to access new information. However, for the majority of women who could not afford the cost of a new smartphone, the notebooks were a convenient way to keep information, which saved them time and money if they needed again information that they had previously accessed. For this reason, many of the women carried on with the practice of writing new information in their notebooks. They continued using a format that met their needs.

If we apply a Continuum theory perspective to the analysis of the information provided, accessed and used during and after the PROTIC project, we can see that the information provided during the project did not meet the longer-term information needs of the project's main stakeholders, the participants, because it was not provided in formats that were sustainable. The text messages were intended to provide information to meet immediate needs, not to be preserved for future use. Future uses of information objects were not considered in the design of the project because the focus was on building digital literacy skills, not on developing an information corpus. It is only near the end of the project that the development of an app containing all the text messages was considered (Anwar & Frings-Hessami, 2020). From an archival perspective, this constitutes a lifecycle approach, where records are appraised when they no longer meet current business needs (Williams, 2006; Millar, 2017), rather than a Continuum approach, where all the future needs of different stakeholders for the records are considered before records are created and throughout their

lifespan (Frings-Hessami, 2022). Applying *proactive appraisal* (Reed, 2010; Frings-Hessami & McKemmish, 2021) to the evaluation of the stakeholders needs for information in the present and in the future and of their capacity to use the records in the present and in the future would have encouraged discussions of the technology, the literacy skills and the digital skills necessary to access and use the information in the present and in the future, and consequently, a discussion of appropriate formats and supports in which to store the information so that the communities can keep using it.

An interesting finding from the survey is that many of the women reported that they liked to keep books and printed materials and that they often read them in their free time. Despite the low levels of literacy in rural areas of Bangladesh and traditional practices of transmitting information orally (Stillman *et al.*, 2021), the women in the study enjoyed reading and writing. Since their level of literacy is higher than the average in their district, more research needs to be done to determine to what extent their reading and writing practices are representatives of practices of other women in their area and how they may differ from those adopted by men. The next phase of the author's research will investigate the methods to access and preserve information used by men and women who were not involved in the PROTIC project.

Conclusions

Little is known about how individuals in rural communities in developing countries preserve information. By reporting on the findings from semi-structured interviews and a survey with participants in an ICT4D project in Bangladesh two years after the end of the project, this article gives a glimpse into the problems that village women face with accessing information and their motivations to preserve information for future use. Although paper notebooks did not solve all their problems, they were the best option available to them in their circumstances. Notebooks are a cheap and easy way to record information that the village women will be able to consult in their own home, in their own time, when they need the information again. More research is required to assess to what extent the participants' practices were influenced by their participation in an ICT4D project and whether they are representative of practices of rural communities in their area.

This article has highlighted limitations in ICT4D practice which has not addressed the preservation of information provided during ICT4D projects. The author suggests that Continuum theory can provide a framework to plan ICT4D projects so that they address the information needs of marginalised communities after the end of the projects. Continuum theory provides a multidimensional framework to analyse the information needs of various stakeholders through space and time. In particular, the application of *proactive appraisal* during the planning stage and throughout the projects can ensure that the longer-term needs of the communities for information and their capacities to use specific formats will be considered.

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