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Going Beyond Telecenters to Foster the Digital Inclusion of Older People in Brazil: Lessons Learned from a Rapid Ethnographical Study

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Telecenters take on a prominent role within the current information and communications technology (ICT) ecosystem in Brazil. They are seen by a great many as a key means to foster the digital inclusion of the older population in the country. This paper draws upon a rapid ethnographic study conducted with 78 older people in a center that teaches computer classes to seniors in Brazil. The results show that providing older people with technological infrastructures is not enough to strengthen their digital inclusion if their basic and non-instrumental needs are not taken into consideration in defining educational activities to be carried out in public centers. Participants' basic needs when it comes to interacting with ICT, such as coping with accessibility issues, were dynamic, whilst non-instrumental needs, fulfilled by using these technologies, such as interacting with relevant others, remained fairly constant throughout the study. Drawing on the results of the study, strategies for fostering the digital inclusion and well-being of older people in Brazil that go beyond telecenters are suggested.

Keywords: older people; digital inclusion; ICT use; ethnography; ICTD

1. Introduction

Despite important efforts to foster digital inclusion in Brazil, most of its aging adults have never accessed the Internet. In this paper, we aim to contribute to foster the digital inclusion of older people in Brazil. Thus far, we argue that social policies have concentrated on providing older people with an appropriate technological infrastructure, which is of the utmost importance if we want them to access digital resources. Without a technological infrastructure, it is very difficult (or impossible) to bridge the digital divide. However, we argue that assuming that this physical aspect of digital inclusion will encourage older people to use computers and the Internet is risky. If they have the infrastructure and technology, but we do not know how to put them at the service of our older citizens, we might not achieve our objective.

A core concern that has emerged among ICTD scholars over the last few years is a disproportionate emphasis in current ICTD discourse on fulfilling basic needs of users in low-resource environments without adequate attention to user-motivated concerns addressing which would enrich their lives rather than merely provide access and satisfy of basic needs. (Johri & Pal, 2012)

We argue that a similar concern can be raised in the field of ICT and aging, wherein most technologies designed for older people (60+) are intended to help them to conduct basic

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activities of daily living on their own, such as bathing and cooking, without paying enough attention to the question of how these technologies enable them to meet non-instrumental needs, such as personal growth and self-expression (Vines et al., 2015). These two concerns, together with the potential digital exclusion of older people, especially in developing countries, demand further information and communication technologies and development (ICTD) studies that address older people's basic and non-instrumental ICT needs.

Although providing citizens with a technological infrastructure and places (e.g. telecenters) where they can use computers and go online is a step forward towards increasing their digital inclusion, why would older people want to go to telecenters? What daily needs do they have that could be fulfilled by using ICT? And how do we enable older people to meet their needs in public access centers (PAC)? Do we organize formal or informal courses, or both? Warschauer (2004) claims that what is most important is not so much the physical availability of computers and the Internet, but rather people's ability to make use of these technologies to engage in meaningful social practices. We consider that understanding older people's situated use of ICT is important, as answering these and related questions should (and could) help us to identify a number of basic and non-instrumental needs in their ICT use and serve to inform the design of technologies and social policies that truly enrich their lives.

Statistics regarding technology penetration show that although the Internet access in Brazil is increasing, the older population is not included in this digitalization process. Telecenters have been put forward as a way of putting Brazilian people online. Discussing about open ICT ecosystems and the developing world, Smith and Elder (2010) highlight the fact that "each successive round of new ICTs brings new possibilities to improve or transform human activities and relationships". The digitalization of the Brazilian population brings possibilities to use new services, such as communication, searching for information or leisure. This transformation poses the risk of increasing the social exclusion of those individuals who are not keeping up with these new trends. In our study, we have focused on older people, who, despite running the risk of being digitally excluded, have mostly been overlooked from ICTD research (Fernández-Ardévol, 2014).

In addition to technological infrastructures, which seem to have been the focus of current policies in the ICT ecosystem in Brazil, we considered that understanding how (older) people – another element of an ICT Ecosystem (Open e-Policy Group, 2005) – use ICT is key to introduce effectively these technologies in developing countries, given that why people use these technologies and how they use them should provide us with challenges and opportunities to inform the design of technologies (and infrastructures) that give support to a number of their basic and non-instrumental needs.

We present the lessons learned from a rapid ethnographical study (Millen, 2000) conducted in an educational center in Sao Jose dos Campos, Brazil (Casa do Idoso), with approximately 80 older people with little to moderate previous experience with ICT. The results show that the basic needs of our participants to use ICT were dynamic. Their non-instrumental needs, which were not so strongly connected with conducting tasks with the technology, but with the benefits of carrying them out, remained fairly constant, that is, were independent of their experience with ICT. The basic needs were related to being able to use ICT independently. Participants without previous ICT experience had difficulties using the keyboard and the mouse. By contrast, those with more experience with ICT had more difficulties in creating accounts and performing tasks that require a large number of steps for them, such as sharing files via Skype. The participants' basic needs changed as their experience with ICT increased. With respect to their non-instrumental needs, interacting with relevant others was seen as a way of reducing isolation and a strong motivation for learning (and using) ICT. Sharing multimedia content and feeling in control of their privacy were key and time-persistent (i.e. regardless of ICT experience) elements of this

computer-mediated communication. Online videos, such as those available on YouTube, enabled evocation of memories and were seen as a potential means of increasing knowledge and skills.

A number of implications for fostering the ICT uptake in Brazil can be drawn from the results. We argue that ICT courses which take (basic and) non-instrumental needs at their core can make a substantial contribution towards empowering older Brazilian people to uptake ICT, and that using multimedia and communication tools in these courses is key to keep them digitally engaged and increase potentially the fit of ICT in their lives. We discuss these opportunities further at the end of the paper. We review previous and related works in the section that follows.

2. Related work

2.1. *Changes in the ICT ecosystem of Brazil and the situation of older people*

Due to the low level of Internet access in Brazil, policy-makers have issued laws and social programs aimed to increase physical access to technology and thereby overcome digital inequalities. In 2005, the Brazilian government invested in various program, equipment, infrastructure and tools to extend technological access to the poor (Nemer et al., 2013). These first attempts were mostly concerned about lowering the price of computers and pushing them into people's homes, failing to provide social and educational programs that could lead to appropriation of the technology. This strategy was not as successful as planned because the target people did not use the technologies as they were supposed to (Nemer et al., 2013) and the number of computers acquired did not live up to expectations (Passos, 2012). The government's current approach is geared towards individuals and communities, promoting the spread of local area network houses and telecenters. These centers seem to take on a central role in the ICT ecosystem of Brazil, by providing Internet access to the general public and, in some cases, offering computer sessions to communities (Nemer et al., 2013).

Whilst the number of households in Brazil with at least one computer increased from 10,6% in 2000 (IBGE, 2000) to 38,3% in 2010 (IBGE, 2010), a 2013 survey on the use of ICT in Brazil (CETIC.br, 2013) shows that 86% of the people aged 60 + years have never accessed the Internet and 84% have never used a computer. This percentage is much higher than the entire population (41%). The survey argues that the most significant reasons for this non-use of computers amongst older people in Brazil are a lack of interest (81%), followed by a perceived lack of ICT literacy (67%). Although the penetration of mobile phones among older Brazilian people is higher (61%) than that of computers and the Internet, older people in Brazil use mobile phones chiefly for making and receiving calls: only 3% reported having accessed to the Internet from their phones in the survey. Other groups who are also mostly digitally excluded are young and adult people living in rural areas (70% of them) or in poor families (75% of them).

Focusing on reducing Brazilian digital inequalities, previous ICTD studies argue that PAC can promote digital inclusion in the country (Reinhard & Anne Macadar, 2006; Lemos & Martini, 2010; Nemer et al., 2013). Yet, recent research draws attention to the fact that centers of public access "may be bringing the benefits of computers and the Internet to a broader sector of the younger population in low-to-medium socio-economic status, but further marginalizing those that are worse off (those in extreme poverty, and the elderly, among others)" (Gomez, 2014). In fact, those centers are known to be primarily attended by the youth (Madon et al., 2009; Lemos & Martini, 2010; Gomez, 2014). Figure 1 shows the age distribution of users of PAC in 25 countries (including Brazil). The figure depicts that usage tends to be heavily concentrated around youth and dramatically declines among older adults. A recent survey on centers of public access in Brazil showed that 62% of the users were aged between 16 and 24 years old and only 4% were older than 60 years old (CETIC.br, 2014).

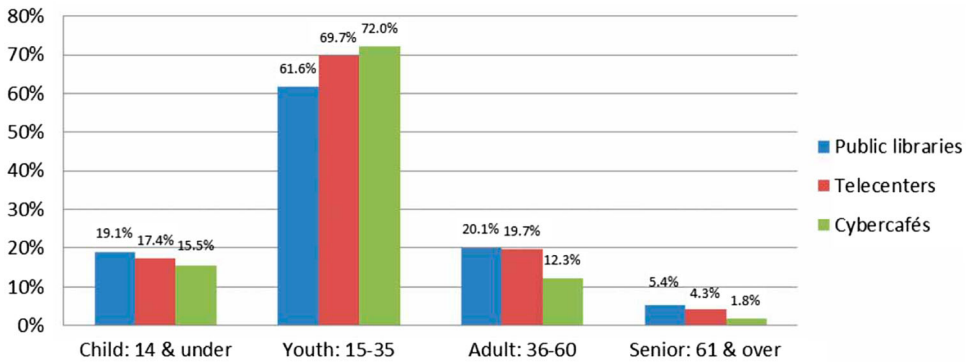


Figure 1. Age distribution of users of PAC (Gomez, 2014).

This low participation of older people in centers of public access can be accounted for the fact that they feel intimidated by the high presence of youth (Roman & Colle, 2002) or because there is a shortage of activities targeted at them. While we could have decided to focus on this element of the ICT ecosystem in Brazil – namely, why older people do not turn up in telecenters – we decided to work with those who do take computer lessons in other places in order to (a) understand their situated ICT use and (b) inform the design of better strategies and technologies to increase their digital inclusion in the country.

2.2. Children and women in ICTD, and older people?

While it is widely agreed that the older population runs a severe risk of being digitally and socially excluded, this user group has mostly been overlooked in ICTD research. ICTD scholars tend to focus on children (Hussain, 2010; Salinas & Sánchez, 2009), women (Shroff & Kam, 2011) or low-literate people (Thies, 2014). To illustrate this fact, we conducted a desktop-based search using different combinations of the words: elderly, older people, older adults, ICTD and ICT4D in two databases – Scopus and Web of knowledge – and Journals – *Information Technology for Development* and *International Journal of Educational Development*. This search yielded a few studies, which we review next.

Sa-nga-ngam and Kurniawan (Sa-nga-ngam & Kurniawan, 2006) addressed the browsing behavior of older people from three different countries: the UK, the USA and Thailand, finding that older people from developing countries had more difficulties in browsing than those from more developed ones. Bailey and Ngwenyama also made an interesting contribution to the field (Bailey & Ngwenyama, 2010). They focused on the intergenerational interaction in five telecenters in Jamaica. Their research highlighted that the digital inclusion of older people facilitates their social inclusion too. The results showed that the involvement of the older generation in the telecenter environment is useful for exposing older users to ICT, building new social ties and promoting knowledge transfer. The outcomes of their empirical study also highlighted that despite the fact that the older generations faced more difficulties in the ICT introductory lessons than did the other groups, there was much less sponsorship of classes for them. Fernández-Ardèvol (Fernández-Ardèvol, 2014) pointed out that most empirical studies in aging and ICT refer to developed countries. She conducted a case study on the use of mobile phones by 20 older people in Peru. The results revealed that voice calls was the most used service and that the participants of her study had difficulties in using the device due to a lack of skills. The results also suggest that the participants were dependent on their children for

using or obtaining a mobile phone. Similar findings were highlighted in a survey conducted with 271 older Internet users in Brazil (Leme et al., 2014), which showed that although most of the participants had mobile phones, they experienced difficulties in handling them. Yet, those aged 50–60 years and with higher educational attainment reported having fewer problems using their mobile phones than those aged 60 + years and with lower educational levels.

With the exception of Leme et al. (2014), none of the studies reviewed above have worked with older people in Brazil. Our study, which combines opinions and first-hand observations of ICT use, deepens and widens the results of the survey presented in Leme et al. (2014), as we discuss later.

2.3. Design of ICT for older people

As stated in Rogers et al. (2014), the focus of previous research on digital technologies for older people has primarily been on the “downside of ageing”, that is, helping to compensate older people’s frailties and the assumed needs that arise with age. Research on assistive technology is a noteworthy example of this trend (e.g. Bobillier Chaumon et al., 2014; Hening et al., 2013; Magnusson et al., 2004).

We are Human–Computer Interaction (HCI) scholars interested in contributing to the well-being and social inclusion of older people mediated by ICT. While assistive technologies can and should work toward this end, we aim to explore how contemporary ICT are used by older people, in developed and developing countries, who experience normative age-related changes in functional abilities, that is, are able to conduct daily activities on their own (Ferreira et al., 2014). Achieving this goal rests on understanding older people’s situated use of ICT. To this end, we have turned to ethnography; we consider that its focus on “gaining an insider’s view of a situation” and “gathering information in the settings in which the activities of interest normally occur” (Blomberg & Burrell, 2009) should help us to achieve the goal of our research. However, and despite being the backbone of HCI research over the last decade (Liu et al., 2014), and among the first methodologies used in ICTD research (Toyama, 2010), ethnography has seldom been conducted in the ICTD studies with older people reviewed above.

3. Description of the study

3.1. Approach: rapid ethnography

Due to time and resources limitations, we conducted what has been named as rapid ethnography (Millen, 2000), instead of a more classical, longer term approach. Rapid ethnography is a collection of field methods intended to provide a reasonable understanding of users and their activities in a limited time in the field (Millen, 2000). The core elements applied in this study were narrowing the research focus, using key informants and interactive observation techniques and drawing on computer-assisted analysis.

3.2. Setting: a reference center in Brazil

Casa do Idoso, São José dos Campos,¹ is a reference center in Brazil that promotes free activities in the areas of welfare, education, sports, recreation and culture for people aged 60 + years. These activities are offered as either regular courses, which require prior registration, or free activities throughout the day. Coordinated by the Department of Social Development of the Municipality of São José dos Campos, the first unit was founded in the city center in 2007. With the success of the first center, the project was expanded and at the time of writing this manuscript, there are three operational units in the municipality of Sao José dos Campos.

We conducted our study in the city center unit, which receives around 600 older people on a daily basis. Computer classes are organized as part of regular courses, whose sessions last one hour and a half and are conducted twice a week. The computer room has 15 computers and participants tend to work individually with them. During the rapid ethnographic study, eight initial level and four advanced courses were running in the center. Conversations with members of the staff indicated that the ICT courses attracted so much interest that there was a waiting list.

3.3. Participants: a mix of women and men

A total of 78 participants, aged 60+ years, took part in the study (43 women, 35 men); 44 of them were enrolled in the course on introduction to the ICT. They had less than 6 months of experience with computers. The focus of the course was on learning how to use the mouse, keyboard and MS Word and on providing older people with the basic aspects of Internet use (e.g. access to websites and e-mail). Thirty-four participants were enrolled in the advanced level course. They had more than 1 year of experience with ICT and were familiar with several Internet applications, such as e-mail, online social networks, search engines or newspapers portals. In conversations with the instructors of the course, they told us that the course focused on Internet because participants were very interested in using online communication tools (e.g. sharing files on the e-mail, Skype, online chats or Social Network Sites (SNS)), accessing information online (e.g. online maps or videos) or using online media edition and creation tools (e.g. creating an online card or editing a photograph).

The staff of the center reported, and our observations confirmed, that most of the participants who take part in the activities in Casa do Idoso come from poor families and have low levels of educational attainment. One of the instructors [IIM2]² claimed that the computer classes attracted a few users with a higher socioeconomic level: “There is one participant that has been city councilman. There are others that their children are for instance lawyers or journalists”. Our observations and conversations with the participants revealed that most participants had low socioeconomic levels. Their educational attainment was low (most of them had completed primary school only). Still, they were all capable of reading and writing. Most participants came from poor families from the municipality and only 7% came from middle-class families.

Four course instructors (2 women, 2 men), aged between 28 and 38 years, also took part in our study as key informants. Two instructors held a Computer Science degree and were the official teachers and responsible for the ICT courses (introduction and advanced levels). The other two were teaching assistants.

4. Data gathering and analysis

Over one month, the fieldworker – and first author of the paper – was a teaching assistant in these courses (60 hours). She conducted participant observation (DeWalt & DeWalt, 2010) in order to develop a close-up view of the participants’ interactions with ICT. She observed how they interacted with several ICT (such as Skype, e-mail systems, SNS, MS Word and multimedia editing tools), talked with them about their experiences of using these technologies and with teachers of the courses as well. While teachers of the introductory course to ICT proposed most of the activities, these were suggested by the participants themselves in the advanced level course.

Following up on the active role of the participants, the fieldworker also carried out four Participatory Design (PD) (Spinuzzi, 2005) sessions in order to explore further their interests. In particular, participants showed big interest in online video portals. Thus, PD sessions focused on strategies for searching, watching and sharing online videos. Thirty-two older people participated in these sessions. First, examples of video-sharing sites (such as Youtube or Vimeo) and video on demand portals from local TV channels were presented to the participants. Second, the

participants created their own prototype by selecting among several key interaction elements of these portals, such as content searching and video recommendation modules, and functions for sharing and writing comments. Finally, these PD activities were aimed at stimulating discussion about the video portals and possibilities for searching and sharing content online, and participants voiced their opinions about these aspects (Ferreira et al., 2014).

Semi-structured interviews were also conducted with four computer instructors in an attempt to understand further the context and triangulate the results. The interviews were carried out individually, in the cafeteria or at the classroom in the center, before or after the courses. The interviews were conducted at different stages of the study. Before starting the participant observation activities, an interview was performed with the main course instructor in order to understand better the setting and practices. During the activities, short interviews were conducted in order to gain the point of view of the different instructors (and teaching assistants) and validate/challenge the observations and conversations with the participants, all of which helped us to plan the following activities (e.g. observations, conversations and interviews). At the end of the data collection period, a final round of interviews was carried out with the course instructors with the aim of deepening and widening our initial findings.

Fieldnotes of *in situ* observations and conversations with the participants (and instructors) were taken during or immediately after the sessions (interviews), depending on our participation in them. The entire body of collected data was coded line by line (Open Coding), resulting in several preliminary categories (Axial Coding), applying an adaptation of Gilbert's interpretation (Gilbert, 2008) of Grounded Theory (Strauss & Corbin, 1998). Open and axial coding were both conducted at the end of each day of fieldwork. This analysis was used for planning the following activities (e.g. observations, conversations and interviews). The preliminary categories were discussed among the authors until agreement was reached. This data analysis led to the following main and subcategories, which we use to present the results:³

- *Basic ICT-mediated needs*: accessibility, access to technology and need of support.
- *Non-instrumental ICT-mediated needs*: keeping in touch with friends and relatives, multimedia enriching their leisure and communication, and searching for information related to their hobbies and interests.
- *Main off-putting factors*: privacy and interaction is content dependent.

5. Results

5.1. Participants' basic ICT-mediated needs

Coping with technical accessibility issues (e.g. size of elements of user interfaces), difficulties in having physical access to computers and a lack of independence (i.e. relying on support provided by relatives or instructors) when using them were the most important and basic needs that participants had to fulfill in order to use ICT autonomously and truly uptake these technologies. We discuss them next.

5.1.1. Accessibility

Participants had to cope with several accessibility problems due to their low ICT literacy and the fact that most of the technologies they used in the courses were not well enough adapted to their needs. When starting to use computers, the most important accessibility issue was related to a low familiarity with the input devices, that is, keyboard and mouse. However, with more experience, difficulties typing and using the mouse were largely overcome, or, at least, reduced to a great extent. By contrast, a recurrent accessibility issue was setting up accounts and signing

in. The comment made by [PAF30] from the advanced level course about the Captcha when creating an account illustrates this fact: “What is this? I can not see anything!” Another common difficulty was to perform interactions that required too many steps. To be able to overcome these interaction issues, the participants had to develop their own solutions, such as taking notes about punctuation and accentuation keys, as depicted in [Figure 2](#). More details on the accessibility issues and the solutions adopted by the participants are presented in [Table 1](#).

5.1.2. Access to computers

Participants and instructors claimed that their first encounters with the Internet were mostly through computers borrowed from younger family members or the ones available in free public spaces (such as Casa do Idoso). Some participants pointed out that sharing computers with other family members often lead to arguments, as the comment made by [PAF17] from the advanced course shows: “I used to use my son’s computers at home. But now he has put a password and I can’t use it anymore. He says I do a mess on everything, can you believe it?” Participants also considered that a proactive behavior was essential for them to get access to Internet. This factor can be an issue if we acknowledge the fact that the majority of today’s older people exhibit a passive behavior when they start using ICT.

With more ICT experience, most participants either bought their own computer or asked their sons to pass on their old computers to them. As one of the instructors [IAF4] said to the fieldworker: “It is very common that they come to the initial level course without a computer and after some time they buy one. In the advanced level course most of the participants have a computer at home.”

5.1.3. Peer support

Participants with low ICT experience reported needing support when using computers. Their first strategy was to ask their children for help. Yet, this strategy often did not solve all their needs. Some participants complained that their children did not have either enough time or the patience to teach them. Another strategy, more successful, in their opinion, was to apply for ICT courses targeted at older people. Indeed, one of the teaching assistants [IIM2] told the fieldworker: “They often come to ask questions out of class. They ask about everything, e-mail, Facebook ...” [Figure 3](#) shows a participant receiving support during the course on introduction to ICT.

5.2. Participants’ non-instrumental ICT-mediated needs

We observed, and participants confirmed, that they took advantage of ICT to enrich several aspects of their daily lives. By using ICT, our participants had the opportunity to open and

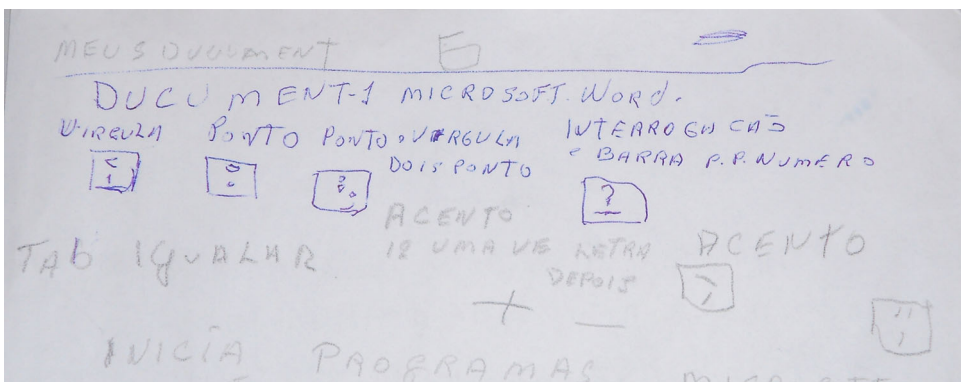


Figure 2. Participant’s notes regarding punctuations and accentuation keys.

Table 1. Main interaction issues and solutions.

Issue	Description	Participants' solutions
Using the keyboard and the mouse	<p>The keyboard main accessibility issues are the size of the symbols and understanding the function of some keys (such as enter, shift or tab). The punctuations and accentuations keys are too small and many participants could not see the difference, for instance, between the dot and the comma</p> <p>Coordination problems and lack of precision made it difficult for the participants to use the mouse when, for instance, using the Windows Start pull-down menu</p>	<p>In order to minimize these difficulties, participants take notes related to the keys and their functions.</p> <p>To improve their coordination with the mouse, participants practiced and performed a lot of exercises, such as drawing in MS Paint</p>
Creating accounts and login	<p>The participants needed support to sign up online (e.g. e-mail or Skype) and could not accomplish the task independently</p> <p>Another main issue is to remember their username and password to sign in</p> <p>An extra difficulty is added to the process when the system requires a Captcha test to finalize the process. Participants did not understand why they did not write what they could barely see in the image</p>	<p>Relying on the support of other people for registration.</p> <p>Taking notes of their username and password</p>
Too many steps	<p>For those participants without much ICT experience, interactions that require few steps, less than three, and use the main function of the application were easy to perform. For instance, once the video player on YouTube is already opened, running a video only requires one click in the play button. On the other hand, more complex tasks, with many steps and that differ from the basic flow of the application, such as adding a new friend to or receiving a file via Skype, were difficult for those participants without much ICT experience and they required support</p>	<p>Participants with little ICT experience tend to focus their interaction on the basic features of the applications and start to explore more complex tasks when they feel more confident (practice)</p>

use new communication channels for them, such as e-mail or online social networks. Using these tools made them feel more socially included and keeping up with the times, thanks to having access to popular communication channels among the young. Working with different types of media was considered a very pleasant leisure activity, contributing to their well-being and also enriching their communication. Furthermore, participants used the Internet to search for information related to their interests.

5.2.1. *Using the computer for keeping in touch with friends and relatives*

Most participants used the computer for keeping in touch with family members and people from their community. An example of this situation is when, at the end of an advanced level class, a



Figure 3. Participant receiving support during introduction to ICT class.

participant [PAF15] called the instructor [IAF4] to show a video she had received by e-mail: “Come to see it! It is a video about my grandson. It is from his graduation day! My daughter sent it to me.”

The e-mail was the most popular computer-mediated communication tool. The participants started learning to use the e-mail in the initial level course, but many of them already used it, before coming to class, even with a limited knowledge about computers. After having some ICT experience, participants started to use SNS, which became a very popular tool among them. Sharing pictures via e-mail and SNS was a very common practice, as the instructor of one the courses [IIM1] told the fieldworker: “Many of them publish things in Facebook, add pictures . . . For instance yesterday a student published something on my wall.” The participants with more practical knowledge of ICT also used Skype to talk with their family members (mostly living abroad) – probably, in an attempt to spend less money on intercity phone calls.

5.2.2. *Multimedia, enriching their leisure and communication*

Working with multimedia content motivated the participants to learn ICT. For instance, the participants used search engines for seeking pictures online. They also downloaded pictures from their cameras and transferred them onto the computer in order to send them via e-mail. Participants reported that they enjoyed looking at pictures of, for instance, their birthday party on the computer. This brought back nice memories of key moments in their lives. [Figure 4](#) illustrates this fact, showing two participants watching an opera video in their free time.

Another, much stronger motivation for working with multimedia was related to communication. Participants were very motivated to search, edit and share content with people they knew. Receiving a picture, a video or a multimedia presentation by e-mail triggered their interest in learning how to work with this type of content.

- Instructor [IAF4] talking with the fieldworker about advanced level course participants: “They enjoy sending and receiving MS Power Point presentations by e-mail. Many of



Figure 4. Participants watching video in their free time.

them ask me how to do it. They want to learn to create their own presentation with cool effects in the introduction and music.”

Sharing media is a common practice among the participants. Once they learn to use the Internet, both the least and most experienced users shared pictures and MS PowerPoint presentations by e-mail. Participants received several e-mails with media content and forwarded them to their contacts, including people they knew but were not very close to, such as colleagues or instructors from the center. In addition to the mail, participants with more ICT experience also shared media in SNS, mainly Facebook.

- A participant [PIF7] talking with the fieldworker during an initial level course: “Can you give me your e-mail address? I will send you very beautiful things. Can you send me some pictures from Spain? I really like beautiful pictures!” A few hours later, the participant e-mailed the fieldworker an MS PowerPoint presentation with pictures and a religious message.

5.2.3. Searching for information related to their hobbies and interests

Apart from keeping in touch with people they cared for, participants searched for information online related to their interests and/or hobbies. It was not uncommon to see participants searching for news while waiting for a course to start. In this case, ICT were used as a strategy to enrich their offline activities, such as Do-It-Yourself, as the following extracts illustrate:

- A participant [PAF22] talking with the fieldworker during an advanced level course: “I often watch videos on the Internet. I especially like handcraft videos, last month I learned to do some handmade boxes by watching these videos.”

- After one session a participant [PAF30] asked the fieldworker: “Can you teach me how to send these images to myself by e-mail? They are so beautiful I want to save them and later on use them in my paintings.”

5.3. Main off-putting factors

In addition to having to deal with and/or overcome accessibility and access to technology issues, there were other factors that put participants off using ICT. The main issue was related to a perceived lack of privacy online, which is strongly connected with a deep distrust of the technology.

5.3.1. They need to feel in control of the technology

Privacy was a big concern among all the participants. They needed to feel in control of the technology to decide “who can see what” online. Participants reported not feeling comfortable enough when sharing content online with people they did not know – close groups of known people were preferred (e.g. friends on Skype or Facebook, or sending an e-mail to a group of people).

Instructor [IAF4]: “Participants often ask lots of questions about Facebook. Some want help to upload pictures. They have doubts in relation to public and private messages.”

Thus, it was little surprising that some participants started to be very selective when adding new contacts in communication tools, such as Facebook or Skype, or, in the case of those with almost no previous experience with ICT, reporting “being afraid” of using them.

5.3.2. Interaction is content dependent

The participants’ interaction with ICT was always content dependent. Popular topics of interest among the participants were, for example, their favorite singers, famous TV presenters, religion or topics they felt attached to (such as their family or neighborhood). When the activities proposed in the courses were of no or little interest to the participants, they reported not seeing the reason for learning to use a particular type of ICT. By contrast, when the technology enabled them to work with or access content in which they were interested, they, as we have shown throughout this section, were fairly active learners and ICT users.

6. Discussion

A first and pertinent question to discuss is the extent to which the results support the claim made in this paper. We conducted our study in a social center. Thus, how do the results carry over to telecenters? While we acknowledge the fact that having conducted our study, or part of it, in a telecenter would have enriched this paper, we consider that the results back up and illustrate in detail the need of going beyond telecenters to achieve the goal of fostering the digital inclusion of older people in Brazil. Providing older people with a technological infrastructure and places where they can go and use computers and the Internet does not necessarily mean that they make the most of the technologies or do actually use them. Warschauer (Warschauer, 2004) made a similar claim in his oft-cited book *Technology and Social Inclusion: Rethinking the Digital Divide*. In this paper, we concur with and extend his point by focusing on older people in Brazil, which was not addressed in the book, and on stressing the need of both being aware of their basic needs when it comes to using ICT and enabling older people to meet them. Doing so rests on having a group of people who can provide support and design suitable educational activities. Moreover, when these basic needs are fulfilled, older people – at least, our participants – aspire to meet non-instrumental ones that make them feel more socially included

and close to their relatives, for instance. Telecenters *per se* are, therefore, not sufficient to achieve this digital inclusion.

Having discussed how the results relate to the claim made in this paper, it is worthwhile to reflect on the novelty of the findings and how they are related to previous studies. To begin with, going beyond telecenters by taking into account and supporting the evolving needs of ICT use of older people might be evident for some scholars. For instance, previous ICTD studies have argued for going beyond meeting people's basic needs (Johri & Pal, 2012). A similar claim has been made by user value studies. According to Boztepe (Boztepe, 2007), value as experience is created as a result of the interaction between what the product provides and what the users bring in terms of their goals, needs, limitations, etc. Previous studies in this field argue for understanding how values change over time (Parasuraman, 1997), (Boztepe, 2007), (Nurkka et al., 2009). Our results support these claims with field evidence, and provide a lively and detailed account of participants' experiences, based on ethnography, strengthening an approach that does not predominate in ICTD research. For instance, we identified the ways in which ICT enriched participants' lives and showed that non-instrumental needs such as remaining or keeping in touch with relatives were always independent of participants' experience with ICT. The focus on telecenters in ICTD is still dominant, and the low participation of older people in them suggests that the claim made in this paper needs to receive further support to become more widespread. Overall, there is room for strengthening older people's digital inclusion in developing countries by drawing upon the results presented in this paper. We suggest some ways forward next.

6.1. Evolution of needs at different stages of interaction

A significant result of this study is how our participants' needs varied as their level of experience with ICT increased. To understand it, we applied a cross-sectional approach (Kim et al., 2014). Following this approach, we compared the data from users with different levels of experience, from the initial course (who were having their first contact with computers and Internet) to the advanced level course (more established ICT users). The results showed that while some of their needs were time-persistent, others were more evident only in their first encounters with ICT. Participants' basic needs when it comes to interacting with ICT, such as coping with accessibility issues, were dynamic, while non-instrumental needs, fulfilled by using these technologies, such as interacting with relevant others, remained fairly constant throughout the study. These results strengthen the fact that, in addition to focusing on the basic needs when promoting older people's digital inclusion, it is also necessary to take into consideration their non-instrumental needs, which are related to how ICT can enrich their lives, in order to promote their appropriation of the technology.

6.2. Older people require different digital inclusion strategies than younger users

By comparing our results with previous studies with younger users of public access environments, we observed similarities in relation to participants' needs, which can be fulfilled by using ICT, and also differences in their learning process and accessibility issues. Our findings show how communication, leisure, working with multimedia content and searching for information that is related to older people's interests can enrich their lives. Those needs were similar among men and women, and concur with previous studies with younger users of public access environments (Bar et al., 2013; Gomez, 2014).

In relation to their learning process, previous research has indicated that older users might feel intimidated to learn in the same environment than the youth (Morris, 1992) and (Roman

& Colle, 2002). Our observations indicated that participants faced accessibility issues that can be more critical due to age-related changes, which may require more attention on those specific issues when learning a tool. Difficulties to interact with input devices, such as keyboard and mouse, can be more significant to older people due to limited manual dexterity. In addition to this, creating accounts, remembering passwords and performing tasks with many steps can be more critical to older people and seem to be related to age-related changes in cognition, such as declines in fluid intelligence and memory (Czaja & Lee, 2006). These results indicate that although older people may have similar non-instrumental needs as younger ICT users, they are faced with different accessibility issues which are mostly overcome or dealt with with the support of instructors.

6.3. ICT courses contribute to older people's empowerment and digital inclusion

According to Warschauer (2002), Gurstein (2003) and Johri & Pal (2012), in addition to providing physical access to ICT, users also need to feel capable of using them. Focusing on older people in the UK, Dickinson et al. (2005) suggested that the provision of training courses to overcome the lack of experience with computers and the Web is a necessary short-term approach to encouraging the participation of older people in the digital world. Concurring with previous research, the results of our study highlight several aspects that indicate that educational centers, which teach ICT to older adults, contribute to their ICT uptake and digital inclusion. Our results indicate that besides the need of having access to a computer and Internet, our participants faced other basic issues such as accessibility problems and need of support. These findings take forward previous strategies for digital inclusion in Brazil, supporting the claim that providing older people with ICT education is key to fostering their digital inclusion.

Most of our participants were afraid of using computers. Yet, after having some initial guidance at the center, they were more motivated to practice and also use other technologies at home. Participants reported feeling empowered by the classes and felt more confident. Other ICTD scholars highlight the importance of empowering users to help themselves (Johri & Pal, 2012; Liang, 2010; Norris, 2001). The results of our research showed that educational centers can empower participants to teach others with less ICT experience. Participants of the courses, after some time, and ICT experience, felt empowered to start helping other participants.

6.4. Using multimedia and communication to introduce older people to ICT

According to Carmichael (1999), having a positive initial experience when starting to interact with a novel technology can contribute to eliminating the common feeling among older people of being intimidated by it. In the same vein, researchers on user value have argued that users' previous experience with a tool influences their user experience when interacting with similar products (Boztepe, 2007; Kim et al., 2014). Several authors (Illich, 1973; Sen, 1999; and Johri & Pal, 2012) have discussed the importance of technologies that enrich people's lives besides fulfilling their basic needs in developing countries. We believe that using topics and applications which will be accepted by older people, as they are appealing and accessible, when introducing them to ICT, will motivate them to make the effort to learn those tools and have an initial positive experience using ICT.

Working with multimedia and communication tools has proved to be very appealing to our participants. Our results also showed the value of online video portals as a tool to enrich older people's access to information and communication. Thus, our results indicate that applying tools related to multimedia, online video portals and communication, to introduce ICT to older people, can promote an initial positive feeling about technology, enrich their daily life and contribute to

fostering the ICT uptake in Brazil. A previous study, with a younger user group in Brazil, indicated that computer-based communication and leisure activities may offer an alternative pathway to gaining digital literacy (Kolko et al., 2014). Our results take further these findings, indicating that communication and leisure can be also a successful learning strategy in relation to introducing ICT to the older population, which might appear surprising in the face of widespread stereotypes about older people, thereby opening the possibility for them to transfer and apply this knowledge when using other ICT.

6.5. Further challenges and opportunities

When talking about ICTD, digital inclusion and older people, the discourse tends to focus on engaging those who either are not using or have given up using ICT (e.g. (Olphert et al., 2005)). While this approach is to be commended, we have tackled it from a different perspective, concentrating on those who have taken the step to learn and use them. This begs the question of what lessons learned from working with older people using ICT can or could be applied to studies and policies of digital inclusion with other groups of older adults.

Our results suggest that besides providing older people with physical access to technology, policy-makers and technology developers could also focus on other, less basic, needs of older people to use ICT. Their reasons for using these technologies, how they use them and what they get from using them (e.g. feeling more socially included and active) should be taken into consideration when proposing strategies to foster the digital inclusion of older people in developing countries. Participants' motivations to use ICT were strongly connected to feeling socially included and keeping up with the times.

Also, our results suggest that policy-makers could focus on strategies for providing training programs which are meaningful for the older citizens (i.e. related to what they want to do with the technologies, to fulfilling the needs identified in this paper) and foment support from peers and (younger) experts. These results take one step further, proposing solutions, to a previous survey which showed that the most significant reasons for the nonuse of computers among older people in Brazil were a lack of interest, followed by a perceived lack of ICT literacy (CETIC.br, 2013). One strategy for these training programs is to provide computer courses in centers where older people feel comfortable to attend, such as community centers or public libraries. Another strategy is to take advantage of the telecenters' structure and promote older people's participation in them by providing training courses specifically targeting the older population.

We believe these aspects, which stress the importance of focusing on the "human" element of an ICT Ecosystem, can apply to other scenarios and countries. A limitation of this research is that our user group consisted of older adults with a low socioeconomic level and interested in ICT. We did not include other groups of older people, for instance, those who do not take ICT courses, with high ICT experience or from different socioeconomic levels (such as nonliterate users).

7. Conclusions and future work

In this paper, we have presented a rapid ethnographical study conducted with older Internet users in Brazil. By observing and talking with them, we identified a number of important basic needs to effectively use ICT, and non-instrumental needs which ICT could help them fulfill and enrich their lives. The latter has been largely overlooked in previous ICTD research. Participants' basic needs to use ICT were related to accessibility issues, access to technology and need of support, which evolved as their ICT experience increased over time. Participants' non-instrumental needs

were mostly focused on keeping in touch with people they cared for, enjoying free time and taking one step further their knowledge and skills. These needs were more time-persistent – regardless of their experience with ICT. We have argued that by meeting these non-instrumental needs, ICT contributed (or can potentially do so) to improving the perceived well-being and social inclusion of our participants.

In light of these results, we have also discussed strategies for fostering the ICT uptake in Brazil and the relative relevance of different elements of its ICT ecosystem. We have made a case for going beyond telecenters, which, despite being a step forward toward bridging the digital divide in Brazil, is not enough if we fail to consider the importance of providing older people with educational activities that enable them to meet their basic and non-instrumental needs, and how they evolve over time. Technology developers could also take into consideration older people's accessibility issues and the use of technology as inputs to design more inclusive tools.

In our future work, we aim to keep exploring the basic and non-instrumental needs of ICT use by older people in developing and developed countries, as further ICTD research is still needed if we aim to bridge the digital generation divide.

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Notes

1. Casa do Idoso, São José dos Campos: http://www.sjc.sp.gov.br/secretarias/desenvolvimento_social/casa_do_idoso.aspx
2. The code for participants' identification consists of (a) their role in the research (P=older participant, I=instructor), (b) the course level on which they were enrolled (I=initial, A=advanced), their sex (F = female, M = male) and the numerical ID that the fieldworker assigned to them.
3. More details on the data analysis process are presented in Appendix 1.
4. We used the software NVivo in order to facilitate the data analysis. (<http://www.qsrinternational.com/default.aspx>)

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Appendix. Body of collected data and analysis

The data collection process resulted in a set of fieldnotes. These notes described the activities in the center, the observations of participants' interactions with ICT and the conversations between them and the instructors. The notes were taken in the participants' (and the first author) mother language, Portuguese. Examples of the notes and the initial coding process (line by line) are provided in Tables A1 and A2. These fragments were translated to English and edited by the authors to keep participants' privacy. Table A1 illustrates the notes taken when the first author helped a participant at the end of an activity. Table A2 shows a fragment of a semi-structured interview with an instructor. In addition to the fieldnotes, the first author also collected part of the course workbook and took pictures of the center's facilities and participants' notes (Figure 2).

The field notes were coded line by line (Open Coding), resulting in several preliminary categories (Axial Coding).⁴ In the following, we present the preliminary categories, and subcategories, that emerged from the Axial Coding:

- Factors which can potentially contribute to the ICT uptake: communication, multimedia, online video portals and context dependent.

- Factors which can potentially limit the ICT uptake: accessibility, privacy, fighting against settings issues and need of a proactive behavior.

These preliminary categories were discussed among the authors until agreement was reached. In these discussions, we changed the name of some categories, deleted and grouped them into other categories. This data analysis led to the main and subcategories presented in the body of the paper.

Table A1. Fragment of field note – interactions with a participant.

<p>After finishing the class activity [PAF30] calls for my help. “Can you teach me how to send these images to myself by e-mail?” “I also would like to send this on, is it possible?” She points to the desktop wallpaper landscape image. The previous images she mentioned referred to a cat and a tree that were used in a class activity. I explain to her how to do it. [PAM25] pass behind us when leaving the class and interrupts our conversation: “I also want this image of a cat. Can you please send it to me by e-mail as well?” [PAF30] confirms to him that she will do it and we keep adding the images to her e-mail. She gets very excited when she sees that it worked and that she already has the images in her e-mail account. She gets very happy and now wants to send many other images from the computer to her mail. She likes the images of landscapes, plants, butterflies ... I ask why she wants all these images for. “They are so beautiful I want to save them and later on use them in my paintings. Did you know I do some paintings? I will bring something I did in the next class to show you”. When she leaves I asked the teacher if she had ever taught her to use Google images. She says yes and that she loved it.</p>	<p>Asking assistance Difficulty to share files, interest in pictures, saving images trough mail Interest in impersonal images Interest in pictures, Sharing pictures by mail Enjoying working with computer Feeling empowered, interest in pictures Interest in impersonal pictures Using ICT for daily activities Searching pictures online</p>
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Table A2. Fragment of field note – semi structured interview with teacher.

Fieldworker: What are the things that interest the students the most? [IAF4]: <i>Everything related to the Internet.</i>	Interest in the Internet Requiring assistance Facebook, Using Facebook at home, Interest Facebook, Sharing pictures on Facebook, Difficulties sharing pictures on Facebook, Privacy
Fieldworker: What about online social networks? [IAF4]: <i>Participants often ask lots of questions about Facebook. They use it at their home and ask me many questions when they come here. I also added it to the program of the course to help them. Some want help to upload pictures. They have doubts in relation to public and private messages.</i>	
Fieldworker: Do they publish things on Facebook? [IAF4]: <i>They have many doubts on this. They do not know what is public and what is private. They ask all the time who can see each thing. They are also very interested in images and photographs.</i>	Difficulties Facebook, Privacy, Need of control, Interest in pictures, Interest in photos
Fieldworker: Do they have digital cameras? [IAF4]: <i>Yes, many of them want to learn how to download the pictures of their camera to the computer. They asked for it and I prepared a special session address this issue. They really liked it and showed lots of interest.</i>	Using ICT at home, doubts downloading pictures, requiring assistance Interest in photographs
Fieldworker: Besides the printed material of the course they also take lots of notes during class, don't they? [IAF4]: <i>Some of them take notes of everything. But most of them only take notes of the things that are more important. I prepared the workbook step by step, with images of the interfaces but even then many people take extra notes during class.</i>	Taking notes, selectively taking notes Offering training Learning strategy
Fieldworker: What about online videos? Have they watched them before? [IAF4]: <i>They are very interested in this. I could not teach it to all courses yet but for some of them I taught how to use Youtube and the web of "Mais Você" (a famous Brazilian TV program). They liked it a lot. Many of them watch videos from home.</i>	Interest in videos Applying local content in training, Interest in videos. Watching videos at home
Fieldworker: And online maps? [IAF4]: <i>We did one activity with Google maps. They had to search for the place they live. They enjoy seen their house there.</i>	Using Google maps. Learning throw exploring community
Fieldworker: Yesterday one woman told me she had a fight with her son because he added a password so she could not use his computer. Is that common? [IAF4]: <i>"Yes, around three people have told me something similar to this already. They said their children or grandchildren added a password in the computer so they can't use it anymore. Many others also comment that they ask their children or grandchildren for help with the computer but they do not have the patience to explain to them"</i>	Problems sharing computer with family Difficulties having access to a computer Requiring assistance, Family not helping