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Document downloaded from:

<http://hdl.handle.net/10459.1/57350>

The final publication is available at:

<https://doi.org/10.1016/j.ijhcs.2009.10.004>

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Telling the story of older people e-mailing: an ethnographical study

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Abstract

While e-mail is the Internet application most used by older people, very little is known about how they interact with e-mail systems and use them in their daily lives. We undertook a 3-year ethnographical study aimed at revealing and explaining real life e-mailing. We describe and discuss the nature of e-mail use in terms of social circles; frequency, type of content and patterns of communication; relationship with other technologies and activities; motivation and interactive experiences. Within this context of everyday use, we uncover and explain the (relative) importance of several interaction barriers, such as cognitive load, difficulties using input devices and perception of visual information. We claim that cognitive difficulties are much more relevant than difficulties in reading from the screen, for instance, so challenging results of current HCI research with older people. We show and discuss some implications for designing better e-mail systems (and interactive technologies) for older people.

Keywords

Older people; ethnography; e-mail; real life use; accessibility barriers; interactive experiences

1. Introduction

Populations are ageing at the same time that Information and Communication Technologies (ICT) are becoming integral to work, education and daily life. However, the current cohort of older people has experienced ICT for a relatively short period late in their lives, and this is not the most favourable situation for learning or using them. Older people differ considerably from the standard user in Human Computer Interaction (HCI) (Dickinson *et al.*, 2007) and experience changes in major life functions as a result of the ageing process (Birren and Schroots, 2001). E-mail is of great benefit to them (Lansdale, 2002) and is the Internet application they use most (Dickinson *et al.*, 2005). While

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several e-mail systems have been designed for them (Arnott *et al.*, 2004; Dickinson *et al.*, 2005; Hawthorn, 2000), our review, discussed later, reveals inconsistent results. We argue that this inconsistency is mainly due to an insufficient understanding of the everyday interactions of older adults with e-mail, and ICT in general. No relevant extended ethnographical study of HCI with older people is available², and we undertook a 3-year one of the everyday interactions of nearly 400 older people with e-mail in a context of real life use. We show how distinctive patterns of e-mail use and interactions can be identified for this user group.

We identify and explain the communication established within social circles showing that motivation, trust and support play a key role in determining the membership of older people's e-mail networks. We discuss the patterns of frequency and content of e-mails, which differs for relatives and close friends but at the same time reflects similarities and differences with more traditional communication channels, involving distinct and intense emotions regardless of the small number of e-mails involved. We show how older people turn e-mailing into a social and intimate activity, which impacts on reducing isolation and TV consumption while the use of other traditional means of communication is reinforced. This use for socialisation is at odds with the professional and private use for which most systems have been designed. We reveal that difficulties in understanding terminology, remembering task-related steps and using the mouse limit more severely older people's interactions than do difficulties understanding icons or perceiving visual information, contradicting what is generally accepted in current research with this user group. We explain the relative significance of these barriers through analysis of two key motivations for older people's ICT use, independence (not relying on others) and inclusion (not feeling different or in need of special assistance).

While these findings call for a re-design of e-mail systems, some designs that provide only marginal improvements (e.g. making interface elements bigger) might not be acceptable, as they do not support inclusion. Diminishing cognitive load is a key aspect, which might be achievable by replacing e-mail jargon with terminology grounded in older people's experience with traditional mail and level-structured design (Baecker *et*

² As stated in section 2.2, much research has been focused on design compensating for the effect of age-related changes in functional abilities. Far less consideration has been given to daily practices of older people with ICT.

al., 2000) or wizards. Supporting and enriching the emotional and accomplishment feelings created in older people's interactions could lead to new interfaces.

The rest of the paper is organised as follows. We review e-mail systems for older people and ethnography in HCI. Then, we describe our ethnographical study and present the results. Next we discuss the findings and a number of implications for design. Finally, we present the main conclusions and future research perspectives.

2. Related work

Older people are defined as adults ranging from 65 to 80 years old that experience normal age-related changes in functional abilities³. We chose to concentrate on communication (and supporting systems such as e-mail) as it serves critical helping functions in ageing (Nussbaum *et al.*, 2000). Two initial research questions guided our ethnographical work: (i) which are the most and least relevant e-mailing functionalities for older people in their use of e-mail? (ii) which are the accessibility barriers that hinder older people's interactions most and why? Both questions were motivated by the importance of this functionality in providing a good quality of interaction and the need to compensate for age-related changes in functional abilities when designing for ageing (Fisk *et al.*, 2004; Hawthorn, 2000).

We now discuss previous work on e-mail systems for older people and how they use e-mail and communicate. This is followed by a review of ethnography related to our work.

2.1 E-mail systems for older people

SeniorMail, Simple Mail and Cybrarian are three relevant e-mail systems targeted at older people. SeniorMail is a redesign of the Microsoft Outlook Express interface to “simplify both learning and using e-mail by simplifying screen design, providing users with very simple linear search spaces with few options, increasing the size of fonts and controls and attempting to reduce both windows management tasks and scrolling” (Hawthorn, 2003; p: 39). Simple Mail is “a simulated e-mail system with a simplified and clear user interface which had been created in consultation with older people” (Arnott *et al.*

³ Age-related changes in vision, hearing, cognition and mobility due to the normal process of ageing that do not limit the ability of an older person to carry out ADL (Activities of Daily Living) and IADL (Instrumental Activities of Daily Living) on his or her own.

al., 2004; p: 112). The simulator has a list of 5 essential functions (read mail, write mail, address book, help and close) provided in a simplified welcome window with big buttons. Cybrarian aims to “show that it is possible to design an e-mail system for older people with no experience of Internet use” (Dickinson *et al.*, 2005; p: 1). Central to its design are simpler screens by reducing functions and navigation, and increasing the size of elements. The system produced is “significantly more usable, and preferred to, an industry-standard equivalent e-mail system” (*ibid*, p: 19).

Common to these systems is compensation for age-related changes in functional abilities and the lack of experience with the technology. Neither social relationships nor interactive experiences were considered. However, social relationships play a central role in communication (Nussbaum *et al.*, 2000) and ageing (Krause, 2006). As our interactions with technology can involve emotions, values, intentions and strong feelings, understanding these is a step towards better design, for example in experience-centered design (McCarthy and Wright, 2004). However, the focus on accommodating the decreasing functional abilities is the key and most widely spread approach within HCI research with older people, examples ranging from the development of training materials and programs (Czaja and Lee, 2003; Mayhorn *et al.*, 2004), to the design of input and output devices (Fisk *et al.*, 2004), web accessibility (Dickinson *et al.*, 2008; Kurniawan, 2008; Newell *et al.*, 2006), user interface design (Hawthorn, 2000; Zajicek, 2004) and research methods (Barrett and Kirk, 2000; Dickinson *et al.*, 2007; Lines *et al.*, 2004; Zajicek 2006).

However, the results of design and evaluation of SeniorMail, Simple Mail and Cybrarian are inconsistent. For instance, while SeniorMail used unconventional post-boxes, SimpleMail used more conventional metaphors (claiming that older people found them easier to understand), and Cybrarian used no iconic metaphors. Whereas SeniorMail and SimpleMail use e-mail jargon (e.g. forward and attach), Cybrarian reports difficulties in understanding this technical vocabulary. The three systems all provide reduced functionality. However, SeniorMail supports window and file management tasks, which are not offered by the other two systems. While the approaches are heterogeneous and the results are even contradictory, the three papers all reported positive evaluation. This offers a very inconclusive overall picture.

Some inconsistency can be expected since older people are a very heterogeneous user group (Nichols *et al.*, 2006; Zajicek, 2004). However, we believe that this inconsistency is an indication that further and deeper research taking real use outside labs into account is warranted. Selwyn *et al.* (2003) and Quadrello *et al.* (2005) adopted a contrasting approach aimed at characterising use. Through a household survey, Selwyn *et al.* showed that the most popular Internet application was sending and receiving e-mails, most of the use taking place at home, where support was available from the immediate household and relatives. Through questionnaires, Quadrello *et al.* revealed that older people e-mailed their grandchildren who lived far away more frequently because this avoided the expense of telephoning, while grandmothers were more frequent users than grandfathers. Both studies provide very interesting but partial results about use, and it was to go beyond them and obtain stronger evidence we undertook our ethnographical endeavour.

2.2 Approaching ethnography within HCI

There is growing awareness in HCI that the traditional focus on cognitive aspects of single users performing tasks efficiently should shift onto understanding social context of system use, and real-life interactions and experiences (Bannon, 2000; Blomberg *et al.* 2003; Bødker, 2006; Hughes *et al.*, 1995; Moggridge 2007; Shneiderman, 2002). Ethnography is deeply relevant for achieving this understanding, from the seminal works concerned with work practices (Blentley *et al.* 1992; Hughes *et al.* 1994; Suchman, 1983), to more recent studies into domestic technologies (O'Brien *et al.*, 1999), use of mobile ICT in taxis (Elafuf-Calderwood and Sørensen, 2006) and experiences felt by teenagers sending text messages (Kasesniemi and Rautiainen, 2002). The main virtues of ethnography in HCI are (i) to make visible the context of system use, social practices of interactions and communities' sensibilities which might not otherwise be encountered (Macaulay *et al.*, 2000; McCarthy and Wright, 2004); and (ii) to provide explanatory frameworks for whatever is observed that offer us new ways of imagining the relationship between people and technology (Dourish, 2006).

Ethnography has been challenged on its veracity (Button *et al.*, 2000), and its usefulness in interaction design has also been questioned by arguing that it is too time consuming (and expensive) and does not provide representations of real world interactions that can

be used by designers. Even if clear “implications for design” have been taken as a key evaluation criterion for ethnographical studies to be relevant to HCI (Dourish, 2006), we agree that “ethnography is deeply relevant for design even when those bullet points are not present” (Dourish, 2007, p: 4), since the valuable material lies in both revealing and explaining how technology becomes integrated into real practice. However, as Cockton (2007, p: 285) says we need to “position evaluation criteria for ethnographic work in HCI in some middle ground between naïve ‘implications for design’ and the ‘accept us on our own terms’” This is because (agreeing with Dourish) ethnographers and designers have collective responsibilities for creating better interactions within HCI. Techniques have been created to provide design inspirations and translate ethnographical results to designers such as Personas (Pruitt and Adlin, 2009), Work Models within Contextual Design (Beyer and Holtzblatt, 1998) and Cultural Probes (Gaver *et al.*, 1999) – although our technique is slightly different, as discussed in 5.1.

A number of forms of “reduced” ethnography such as quick-and-dirty or lightweight, concurrent and evaluative ethnography (Randall *et al.*, 2007) have been developed to fit ethnography better within software processes. New ethnographical approaches such as conceptual rhetoric, defamiliarization and exotic tales have also emerged as a result of the perspective that “new contexts of design demand the development of new approaches to develop new understandings” (Crabtree *et al.*, 2009, p: 880). These replace detailed observations of interaction practices and explanatory models with “culturally approved texts” (ibid, p: 885), which offer designers a range of practices which are not so deeply rooted in empirical studies of situated actions and the careful explication of how those practices are organised or internally ordered. However, our approach is more related to those ethnographical approaches (Suchman, 1983; Anderson, 1994; Blomberg *et al.*, 2003) which have provided valuable contributions in the past and present, and considers that “There is no substitute for gaining tacit and implicit knowledge of cultural behaviour than living among people and sharing their lives” (Dewalt *et al.*, 2000; p: 291). We agree with Crabtree *et al.* that the “reduced” and “new” approaches might undermine the key contributions and value of ethnography in system design, such as conveying the importance of social aspects to design, revealing interesting and social phenomena as displayed by members of groups, evaluating implemented systems and addressing the

discrepancy problem between system and use, etc.

Thus, although some recent studies have been supported by ethnographical interviews, such as (Dewsbury *et al.*, 2007) on the design of applications to support older people in their own homes and (Santana *et al.*, in press) on a home-based communication system for older Mexican people,, very little is know about how older people interact with and make use of ICT in their daily lives (Sayago and Blat, 2009). Considering that older people are “extraordinary” users in several aspects we maintain, as we have argued earlier, that classical ethnography⁴ is needed. This paper reports key findings from the study we have carried out.

3. Description of the ethnographical study

3.1 Context and participants

This study was carried out in Àgora, a 20-year-old association within an adult centre in Barcelona (Catalonia, Spain), from 2005 to 2008. Àgora is strongly committed to integrating into society people who are alienated from it or run the risk of being so, such as immigrants, non-educated and older people⁵. This integration is done through informal learning in free courses in a wide array of subjects, with a monthly enrolment between 1000 and 1500 people. We name them ‘participants’ hereinafter, following Àgora’s terminology.

Àgora and its participants consider mastering ICT to be essential element for inclusion, and many courses in computing and Internet are offered, as well as frequent workshops, most of them aimed at older people, who are particularly disadvantaged in ICT. Participants decide which technologies they want to master in courses and workshops, whose content is oriented towards supporting their use in daily life, rather than following pre-established syllabuses imposed by teachers. Àgora supports dialogic learning (Flecha,

⁴ Consisting of a long period of immersion (minimum one year) into the daily activities of a community of people, combining observation with participation (Llobera, 2003)

⁵ About 50% of the current Catalan population had its origins from rural areas from elsewhere in Spain. The immigration happened in the 40-50s last century. Immigrants had very low literacy levels, especially women. More recently, Barcelona had another different (foreign origin) strong immigration wave. In 2006, 13.1% of the total Catalan population belonged to this wave, most of it coming from Morocco, South America, Pakistan, India and Romania, with difficulties in their integration into society due to language barriers. A significantly deep and extensive description and analysis of the introduction of the network society in Catalonia can be found in (Castells *et al.*, 2002).

2000)⁶, and as a result the traditional division between teachers and learners is blurred: it is common to see older people, who started courses with little acquaintance with ICT but who progressed quickly, becoming tutors in new courses offered. Encouraged by this participatory philosophy, courses and workshops provided extensive material of real ICT use and our observations and conversations initially took place there.

We worked with 388 participants who originally came from other Spanish regions and lived in Barcelona and its outskirts. They were fairly representative of relatively deprived older people in a developed country. Older people living in Spain have low literacy levels (*Informe*, 2004) and 350 participants had left school when 12 at the latest, while the rest, 38, had left school when 16. Half of the less educated participants had used technologies such as calculators and cash registers in their jobs, but none had ever used a computer or accessed the web before taking the courses. Those participants with higher educational levels (10%) were familiar with basic ICT concepts (e.g.; clicking and windows management) through use in their jobs. For both groups, their main motives behind taking up ICT courses were: (i) not to lag behind in society, (ii) to remain closer to their nearest and dearest, and (iii) to enjoy the opportunity for learning that they did not have in their childhood. Although they were motivated to (learn to) use ICT, which is not representative of older people (Newell, 2008), the participants are technology pioneers and show the real use that older people are making of ICT, which will be generalised in the future. We believe this generalised real use to be the goal of ethnography aimed at improving older people ICT design.

3.2 Data and methods

The ethnographical data consisted of *in-situ* observations and conversations with over 200 participants 2 to 3 times per week (2 to 4 hours each time). These took place while they made use of some aspect of ICT during courses workshops and meetings which were all coordinated by one of the authors (see Table 1 in Appendix)⁷. In the case of some 175

⁶ Dialogic learning assumes that knowledge is not always disseminated from the top down to students, but can flow from the bottom up, sometimes from individuals with no degree or academic background (such as older people), who would reject formal or academic activities because they think they are unable to create new knowledge or scholastic skills are difficult to acquire in later life, producing knowledge on the basis of their own experience and the exchange of information with other people.

⁷ Meetings are organized monthly to discuss the positive and negative aspects of the courses and activities carried out in Àgora. They provide also an opportunity to discuss aspects of the use of ICT in which participants have a special interest. Workshops are hands-on sessions on technologies that are very

participants, we attended courses, meetings and workshops as observers. 20 of the participants took part in a number of courses and were also involved in other association activities. The rest enrolled in at most one or two courses per year⁸ and went to Àgora weekly to access the Internet or attend meetings and/or workshops.

We relied on written field notes, having found that recording with video, audio or laptops disturbed the participants, since they write down their notes by using paper and pencil and are used to seeing other people doing the same.

The ethnographical data was analysed by using open, axial and selective coding and the constant comparison technique of the Grounded Theory approach for qualitative analysis (Glaser *et al.*, 2006). We analyzed the data while gathering them every 3 months so that we could identify emerging issues and focus on them from then on⁹ (Charmaz and Mitchell, 2007). The first stage of the analysis was for one of the authors to read the entire field notes to gain an overall sense of the data. The notes were re-read and open-coded to produce an initial code list (adapted from the participants' language), which was discussed between the two authors and re-worked until the analysis reached theoretical saturation with respect to the amount of information. At the same time, we established relationships between categories identified in open coding through axial coding. The data was then selectively coded in terms of core and subcategories from the initial and axial list. Our iterative analysis considered previous work on the use by older people of technology-based communication¹⁰, iTV applications (Eronen (2006)), type of content of phone communication (Reed and Monk (2004)), and user requirements for web-based interactive TV services (Mitchell *et al.* (2007)). The observations and conversations were complemented by twenty in-depth personal interviews lasting one hour and conducted in Àgora as the research progressed. We transcribed each of them, read the transcriptions aloud in a second meeting and asked the participants to confirm, change or add information.

popular among participants.

⁸ Due to personal responsibilities (e.g.; looking after their grandchildren or ill relatives) or because of illness.

⁹ We identified quite quickly (by month 6) that e-mail was particularly relevant because of the importance of reducing isolation and being or remaining close to key members of their social circles, which reinforced our initial idea of focusing on e-mail. This is consistent with the predominance of e-mail in the courses, workshops and meetings in Table 1.

¹⁰ In addition to Quadrello *et al.* (2005) and Selwyn *et al.*, (2003) already cited

The core categories that emerged from our analysis¹¹, which we use to tell the story of the use of e-mail by older people e-mailing, are:

- Nature of use: social circles; frequency of e-mailing; type of use and objective of the communication; geographical distance; socialisation; isolation; feeling of being alive; required and non-required functionalities; experience with paper mail; free-time use and priorities in daily life; relationship with TV and phone; emotion; accomplishment
- Interaction barriers: independence; inclusion; consistency; life experience; terminology; vision; remembering steps; input devices

4. Findings

The results are divided into two sections, nature of use, and interaction barriers. Both include relevant extracts from our field notes, preceded by [genre letter, age] for participants (e.g. [Woman A, 68]) or by [Researcher] for ourselves. The original Spanish conversations have been translated by the authors.

4.1 Nature of e-mail use

4.1.1 Social circles

Participants communicate mainly with their grandchildren¹² and children, who are key members of their social circles and encourage them to e-mail. Participants have a strong interest in e-mailing them as it allows them to be or remain closer in several ways:

1) When relatives live far away, e-mailing is cheaper than speaking over the phone.

[Woman A, 67]: My children are living in the Canary Islands because of work opportunities, and calling them is much more expensive than writing an e-mail. What's more, using e-mail allows me to be somehow closer to my grandchildren, who are living there too, because they are always using computers and now I can share photos and send greetings to them. It's great to be in touch with your children and grandchildren, they are very important for me

2) When older people live close to their children or grandchildren, daily work can hinder contact. Phoning might be quite impossible, whereas e-mailing makes the communication

¹¹ We stopped gathering information when we identified similar patterns of behaviour being repeated which did not add anything new to the analysis.

¹² Chat systems are preferred to communicate with grandchildren aged between 3 and 7, while e-mail is used to contact teenagers and young adults. Synchronous chat has an additional advantage of being more suitable for the writing difficulties of the aged, while asynchronous e-mail appears to be more suitable for teenagers and young adults who work or have hectic agendas (taking care of babies, for example).

feasible.

[Man B, 72]: My son is working downtown (Barcelona). I have not moved (he lives in the outskirts), because I'm old and my son has to make his own way in the world. Even though we're not very far away, we do exchange e-mails. Sometimes he sends me e-mails from his work [...] I can't communicate with him while he's working, but as he uses the e-mail a lot, he can send me e-mails from work. I ask him questions about e-mailing and his work and family. It's very nice to receive e-mails from your son. You know, I am his father!

3) E-mailing helps older people to feel more included in family meetings in which references to e-mail in a work context tend to be frequent.

[Man W, 73]: Listen, I have something very nice to tell you (smile). Yesterday, we had dinner with my children. They started to talk about e-mailing, because we were talking about their work. They were very surprised when I broke in and started to use these words we use in class, like attachments and e-mail address. I could join in the discussion. I still remember when years ago I got so irritated that I asked them to change the topic of the conversation when we all met together in family events. Yesterday, I took part in the conversation, and that was very important for me

This participant attaches a strong emotional significance to being included in the dinner with his children. Inclusion is as a key aspect for older people, as we show later in the paper.

Half of the participants e-mail their close friends, who are also very significant members of their social circles. While relatives are a source of motivation, they are not usually supportive, being either unaware of the difficulties their older relatives have in e-mailing, or claiming that they have other more important things to do than to help them. When supportive, they are not good teachers because they are not sufficiently patient, and use over-technical language. This shows the impact of over-accommodation in intergenerational communication on real e-mail use. Under- (baby talk) and over-accommodation have been discussed in other contexts of ageing, such as health care and daily relationships (Nussbaum *et al.*, 2000).

Close friends are a source of support and make older people feel more confident about their ability to e-mail and more motivated towards exploring the technology. E-mail opens up another communication channel.

[Researcher]: Do your children or grandchildren help you to e-mail?

[Woman T, 73]: I think that I speak for the whole group when I say that they're not good teachers for us. They speak in a language we don't understand. We ask them to go slowly but they don't take any notice. We ask them to repeat something and they tell us that they have other things to do. The end result is, we've had

to find support somewhere else. And we have found it here, in Àgora, with our friends. You teach your children lots of things, and when you need help from them, you find that they don't have time to teach you to e-mail. That's life my friend!

[Man U, 71]: Apart from writing e-mails to my grandchildren, which I think that is something that everyone my age does, I also write e-mails to some of my friends. In fact, they persuaded me to learn how to e-mail, to share photos and other information we have in common and to establish another way of getting in touch with each other. We do lots of things together and learn from each other. Friends are very important in my life and I think that happens in everyone's life, so having e-mails from my friends is very valuable.

The importance of close relatives and friends in e-mail communication concurs with (Antonucci, 2001) study of social networks, social support and sense of control in ageing; but unlike older Japanese people (Kanayama, 2003), our participants do not e-mail to make new friends, both men and women relying on traditional and, in their view, safer strategies. Our participants e-mail their close friends because they are trustworthy. This reluctance to meet unknown people and the importance of trust can be accounted for by social emotional selectivity theory (Carstensen, 1991).

[Researcher]: You know you can meet people by using e-mail. What do you think about that?

[Woman H, 79]: Well, I'm not interested in it at all. I have my friends and my relatives. And I know that they are good people. If I wanted to meet new people, I would travel, or go to school, to the gym... This is how people my age met their partners and made friends... I think that it's much more natural than just writing e-mails. What's more, I have heard that meeting people online can be dangerous, and I don't dare to take any risks at my age, you know.

[Man Q, 75]: I totally agree with her. I love meeting new people, you know that. I think that we learn a lot when we socialise, and that's very important when you are an old person. But I prefer to stick to the things that I know work well. Meeting people by e-mail might work for those older people who can't go out, like my neighbour, but for those who still have some energy, we go to the places she told you before so we can socialise and meet new people.

4.1.2 Frequency of use and content

Participants communicate relatively infrequently with their grandchildren and children, 4 to 6 e-mails per month, while more often with friends, 3 to 5 e-mails per week. E-mails sent to relatives are longer than those to friends, with personal and family affairs being a typical topic with relatives (e.g.; asking how the children are settling down in a new flat or explaining aspects of their everyday life), while they share photos, jokes, information (most of it downloaded from the web), or suggest going for a drink with their friends. The

exchange is seen as largely symmetrical with friends, while participants do not expect replies from relatives of the same length and frequency.

[Researcher]: How often do you e-mail, [name of the participant]?

[Man M, 69]: It depends. I send two or three e-mails per month to my grandchildren and children. They are busy working and studying, so they don't have a lot of time to write to me. But all the same we are in touch by e-mail, despite that. I send more e-mails to my friends, but don't think I send a lot. Between 3 and 4 a week. We share photos and jokes, mainly, something to pass the time".

[Woman P, 75]: I get more e-mails from my friends than from my adult children or grandchildren.

[Researcher]: Why?

[Woman P, 75]: Well, because they are busy working and studying; we send two to three e-mails per month, just to ask how things are going. However, with my friends, we share lots of things, like gossip, jokes, information about our hobbies, etc. You don't talk about the same things with your relatives as you do with your friends, you know.

[Researcher]: Where do you find this information?

[Woman, 75]: We take this information from the Web; there are lots of things there

The previous extracts, in particular the sentence “You don't talk about the same things with your relatives as you do with your friends, you know”, indicate that real world communication patterns are mapped into the digital domain, being used in an analogous way. However, e-mail is seldom used when something bad happens to relatives or friends. Traditional channels such as face-to-face conversations and phone calls are preferred since they are regarded as a more personal and appropriate way of communicating serious matters. The voice of another person, touching and seeing him or her creates the atmosphere that is needed and e-mail does not provide it.

[Woman Z, 70]: I like spreading good news. For instance, I recently sent my friends the photos of the wedding of my daughter. But we were sad because one of my grandchildren had an operation and couldn't enjoy the wedding. He went to the Church, but in a wheelchair. I didn't send a lot of e-mails when my grandson was in hospital; I wasn't in the mood. Even when he got better, I didn't announce it by e-mail...

[Researcher]: May I ask why not?

[Woman Z, 70]: Yes, you may! Because in that kind of situation we talk by phone and in person... e-mails aren't good for talking about serious matters, you know.

[Woman G, 72]: I was with her. She phoned me. We need to be there, with the person, when something bad happens.

Older people e-mail more often in special events such as birthdays, Christmas and weddings. The content also changes.

[Man B, 68]: I do send a few e-mails, just to my children and grandsons, and some friends. But I must

admit that I can send at least 20 e-mails in Christmas. I like sending Christmas greetings to all my relatives. My son, who has studied graphic design, designs the greetings. This is a sort of tradition in my family. But apart from that, I don't send many e-mails; well, I think that I send the e-mails that I need to.

The “small” number of e-mails is considered as appropriate for the type of communication. The perceived value of e-mailing does not depend on how many e-mails are sent or received, it lies in the socialisation and the emotional experiences associated with them, as we discuss later on.

Participants do not e-mail siblings or partners, despite their being very relevant members of their social circles in other contexts (Krause 2006). They do not support or stimulate e-mail communication, and participants find it odd to use e-mail with them. Also, some sort of division of labour between partners can be a pattern for shared e-mail use, as happens in other daily activities, such as driving or mastering the TV controller.

[Researcher]: And you, do you e-mail your brothers and sisters?

[Woman W, 72]: No, I don't really e-mail them, although they are online.

[Researcher]: Why is that?

[Woman W, 72]: Because we're all grandmothers, so we want to talk to our grandchildren and children. But we don't use e-mail to talk amongst ourselves. Well, sometimes we send photos, but we don't use it much. We either pop in or ring. It's a bit odd to e-mail your sister. We e-mail the younger generation or our friends.

[Researcher]: What does your husband think about you e-mailing?

[Women I, 65]: He doesn't mind. But he doesn't like to think too much. He's tired, he says. What's more, he has the cheek to tell me that with one of us being able to e-mail our children and grandchildren, then that's enough. When the computer is ready, my husband comes over and starts to dictate what he wants me to write.

[Researcher]: Really?

[Woman I, 65]: Yes, but I take my revenge, and he has to drive and explain to me how I can set up the TV using the incredibly complicated TV controller!

4.1.3 Geographical distance and its relationship with other means of contact

This frequency of use and type of content is largely independent of the geographical distance between older people and their relatives¹³, but e-mails are longer if relatives live far away and participants spend more time writing them. They reported trying to

¹³ Participants do not have friends living far away.

compensate for the lack of “direct” contact with them - as they did with traditional letters.

[Woman L, 75]: [...] I have children here in Barcelona, Portugal and Germany. [details about her children] When I write to the ones who live far away, I spend nearly 30 minutes writing. Lots of things in my e-mails...[smile] But, when I write to the ones living in Barcelona, because I see them much more frequently than the ones in Portugal, I don't spend so much time. Maybe 5 or 10 minutes, no more, for sure.

If relatives live far away, the phone is much less used, because of cost savings.

[Woman M, 69]: [...] My children live and work in France. They urged me not to use the phone to talk to them because it would be very expensive. Instead, they encouraged me to learn to e-mail, and now that I have learned more or less, we write e-mails. I do call them sometimes as well, but not very frequently.

While this agrees with (Quadrello *et al.*, 2005), our observations contradict theirs of proximity reducing e-mail in favour of face-to-face or phone conversations: e-mail reinforces traditional communication in two ways:

1) Participants phone friends up to inform them that they have sent an e-mail

[Researcher]: Does the e-mail affect your use of the phone?

[Man K, 66]: I use the phone in much the same way I did before e-mailing. You know that you can pay for both things, and using one more than the other doesn't matter. Also I sometimes call my friends (and children, grandchildren) so that they know that I have sent them an e-mail.

2) Information exchanged by e-mail becomes the topic of face-to-face communications

[Man 68]: I talked with my grandchildren, children and friends about our e-mails. When I meet my friends, we start to talk about the document that somebody sent us, the joke that I sent to them a week ago, or someone that has been sending lots of e-mail during that week. With my children and grandchildren we do the same. We talk more, and about more relevant things, I think

4.1.4 E-mailing and other daily activities

While phone and face-to-face communication do not decrease, participants reported watching much less TV. They feel much more useful when e-mailing than when watching TV. They pointed out that they were more selective about the programmes they watch.

[Man K, 66]: ... But I must admit I watch less TV. I learn when I'm e-mailing, I feel that I am doing something useful. I don't have the same feeling when I watch TV

[Researcher]: Does it affect your use of phone and TV?

[Woman E, 80]: No, not the phone. I don't pay more for e-mailing and phoning. There are even some

issues, such as illnesses, that should be talked about on the phone. But, I must admit that I watch TV much less. Now, I decide what I want to watch on TV, and I spend more time working with my PC, e-mailing and doing other things online.

E-mailing does not replace other activities such as going for a walk, travelling or paying visits to friends and relatives. E-mailing is considered as another very valuable activity that fills their free time, but not as high priority in their daily life.

[Man C, 65]: I'm not forced to e-mail. My son has to e-mail at work, you know, he even e-mails at the weekends. I e-mail because I like to be in touch with my little grandchildren and children. But I have to say that e-mailing doesn't prevent me from doing other things. For instance, I walk 20 Km everyday. It is good for me. And, if one day I can't e-mail because I have to go out with my wife or something, it doesn't matter. I can read my friends' and relatives' e-mails the next day

[Man O, 78]: We do not need to e-mail everyday, not like we had to go to our farms to take care of our animals and machines day in, day out, when we had to work. We take our time to send and read letters, when we feel like it

4.1.5 Socialisation, emotion and accomplishment

Participants' main motivation for e-mailing is to socialise as it allows them to remain closer to their social circles and, moreover, the individual activity is turned into a social one. Ageing tends to increase isolation and they avoid e-mailing from home, which can potentially isolate them further. E-mail has to reduce isolation *both* digitally and physically. Participants appreciate the company of close friends when e-mailing: more than 82% e-mail from the association, even when they can do it from home, which is only preferred by less than 8% who claim to do so because of reliability.

[Researcher]: Where do you e-mail?

[Man J, 75]: I e-mail here, in Àgora (the association). I walk here every day. When I get home after having walking around the city for a couple of hours, I have a shower, eat something, and then head towards Àgora. I check my e-mail. 30 minutes, more or less. And I probably meet some friends, and go for a drink. I do that every single day.

[Researcher]: Do you have a computer at home?

[Man J, 75]: Yes, I do. And with Internet. But I prefer to come to Àgora.

[Researcher]: How come?

[Man J, 75]: Because at home you are alone, or your wife is interrupting you...I go to Àgora, and have a chat with people there

[Researcher]: Where do you e-mail?

[Man P, 72]: I mostly e-mail at home.

[Researcher]: Why?

[Man P, 72]: Because I have my room for the computer, with a high-bandwidth Internet connection. It works better than the PCs in Àgora.

[Researcher]: But I have seen you here, e-mailing...

[Man P, 72]: Yes, it's true. I do that several times a week. Having a computer at home shouldn't mean being tied to one place and not moving. That's what I think. I have my computer, and if the computers don't work in Àgora, I can check my e-mail at home. But of course I e-mail and do other things in Àgora. I can't spend too much time at home, and I need to see the street!"

This “social” pattern of e-mailing differs from the current dominance of individual and private e-mail in other population age groups. Participants e-mail with close friends nearby and allow them to read their messages. Reading e-mails together is a way of sharing good and bad times, news or information. This is also a sign of trust and friendship; intimacy is preferred over privacy. Very similar results were found in teenagers’ use of mobile phones (Kasesniemi and Rautiainen, 2002) – they swapped their mobile phones to read each other’s messages too.

[Woman W, 74]: Maria, Pedro, please come over, quickly! Look, I've got a photo of my grandson. He's four. He's so cute, isn't he? Please read on, you might give me a hand. Her mother tells me that she's having problems in feeding them. He does like vegetables, but he should eat them. I was about to tell her to try doing... but, what do you think? (Maria and Pedro answer). Umm... I'll reply to her. Please, let's do it together because I want to tell her what you have just told me. And I do not want to forget anything. I want to use colours too but I don't really know how to do it. We can do it together, can't we? [Maria and Pedro] Yes, sure. Better three minds than one old brain!

The joy of receiving e-mails from grandchildren and children is not related to either their number or content. They are very important for older people and caring enough about them to send an e-mail from work, even if it is just to ask how they are, makes participants feel meaningful, special and still important to people they love. Reading children’s e-mails creates quality time, in which efficiency or performance aspects of e-mail as a working tool play no role.

[Researcher]: [...]have you heard that, he e-mails a lot!

[Man I, 68]: He receives more messages from his relatives than me, for sure. But I have to say that I don't need many e-mails. Having something to read, and knowing that this piece of writing has been written by someone you love, is very valuable for me.

[Woman U, 65]: Yes! The same for me. I don't think the number of e-mails makes any difference. The most important thing is receiving and sending...I even think that too many e-mails would be a bother for us...we

want to take it easy”

[Man R, 78] “When we worked, we were under pressure. We were in a hurry and we had lots to do. We didn't enjoy ourselves much. I think that I speak for the group when I say that we don't use e-mail as a working tool. We don't want to. We enjoy sending and receiving e-mails. We feel very good when we see an e-mail from our grandchildren; they find time to write to us, and we enjoy having time to read and re-read the messages, even printing them out!

E-mailing creates a feeling of accomplishment. Participants are well aware that their ICT involvement contradicts sociological stereotypes. The images portrayed in mass media about ageing are negative (Robinson *et al.*, 2004) and a widespread stereotype is that older people and new technologies are antagonistic species. These negative images permeate their lives and are potentially harmful. Nevertheless, e-mailing accomplishment “contravenes” these social rules, boosting their self-esteem and creating the feeling (difficult to explain with words) that “despite being old, we can”.

[Researcher]: You are excited today. Have you won the jackpot?

[Woman I, 73]: Better than that. Have you ever realised how important is it for me or for older people to e-mail?

[Researcher]: I'd like to hear your ideas

[Woman I, 73]: There are no words for this. Apart from being in touch with our nearest and dearest, and being more active, and all the things you can see here, we are teaching ourselves that we can still do things that people believe we can't do because of our age. We are showing them and ourselves that we can. I never thought I would be able to e-mail, especially because I only studied until I was twelve. And I'd never touched a computer.

[Woman O, 68]: You said it. I've put a lot of effort into e-mailing. Getting the e-mail to work has been a very big achievement!

4.2 Interaction barriers

4.2.1 Inappropriate and excessive functionality

A number of functions are inappropriate for the type of use we have described. For instance, participants do not use BCC since they do not need to hide a recipient in their communications.

[Man R, 70]: And..let me tell you another thing. This BCC will probably be very useful for you in your work, but we don't use e-mails for work. We write e-mails to our friends and relatives, so we don't need to make people invisible in our e-mails”

Other functions aimed at an efficient management of e-mails and addresses are not really needed, as participants exchange few e-mails with few people. Participants reported being overwhelmed by the functions provided by e-mail systems and feel that systems should be simpler, meaning having a number of functions appropriate for their communication.

[Man, 76]: I think that e-mails have lots of features, even more than we need.

[Researcher]: Why makes you say that?

[Man, 76]: Because we write very few e-mails, especially compared to young people who are always sending and receiving e-mails.

[Researcher]: What do the rest of you think?

[Man V, 66]: I totally agree with him. E-mail programs have many things. I think that we need something simpler. We only exchange e-mails with a few people and some things like these...filters...addresses...and options and all that jazz is over the top.

[Woman O, 67]: Take it easy, my friend. I'm sure someone needs all these advanced things, like organising e-mails. I know that because my daughter works with e-mails every day and uses all those features. But we just need something that allows us to send and receive e-mails, nothing more.

4.2.2 Managing attachments and e-mails: making e-mail their own

Participants do very little management of their attachments, be they pictures or documents. They just open attachments, without saving them. This reduces cognitive load: the e-mail itself provides retrieving clues and the “saving” folder is one thing less to remember. This behaviour parallels their life experience with paper mail.

[Man P, 72]: How can I see this picture?

[Researcher]: You can click over here. And you can either save it or see it.

[Man P, 72]: No, I want to see it.

[Researcher]: Don't you want to save the picture in a folder?

[Man P, 72]: Will it be in this e-mail next time?

[Researcher]: Yes, this picture will be in your e-mail unless you delete the message.

[Man P, 72]: So, that's ok for me.

[Researcher]: Why?

[Man P, 72]: Because it is easier. Let me tell you that I still have some old photos my wife sent me by post, and they are in the envelope. I can read her letters and see her photos. What's more, I don't need to wonder where they are. I should be able to remember they are in the envelope.

[Researcher]: And in the computer?

[Man P, 72]: The same thing. I can create a folder anywhere and save the photo there. But it's another

thing to remember where I put the photo! Having the photo in the e-mail makes my life easier. At least I only need to go to the e-mail!

Received e-mails are not organised either: participants do not separate e-mails from friends and relatives into different folders. They only keep those e-mails they like most or are very important to them, despite the low number of e-mails received, especially from relatives. This deleting strategy is related to their old habits with paper mail and also reduces cognitive load. We will discuss this further below.

[Researcher]: You know that you can organise your e-mails into folders, don't you?

[Woman S, 74]: Yes, I know. But...why do I need that? I receive very few e-mails, and I think that having folders would be more difficult than having all my e-mails in a single place"

[Man X, 70]: I only keep those e-mails that I like most. I see the photos or documents my friends sent to me. If I like them, I keep them in the e-mail and send them to other friends. But if I don't like the e-mail very much, I just delete it so that it does not take up too much space.

[Researcher]: What do you mean by space?

[Man X, 70]: I am doing the same as I do with my paper mail. I still have some lovely letters... and I have a record of the bills, of course. But if I receive things I don't like, I just throw them in the bin"

4.2.3 Do not hurry

Avoiding making mistakes is much more important than being efficient. We have found this preference in general computer use as well (Sayago and Blat, 2008). The main reasons are:

1) At their initial stages of learning, older people are afraid of using computers. They think they may break them or delete important information.

[Man L, 73]: Computers have very important information and are expensive.

[Researcher]: Why do you say that?

[Man L, 73]: I have seen my grandchildren and children studying and working with them. They have all their life there. Here we work a lot with computers, so I don't want to damage that computer because it might have other people's information and Agora would need to spend a lot of money repairing it. So, I prefer to go slowly and take steps when I'm sure of my ground.

2) Making mistakes is associated with rushing and detracts from their pleasant use of e-mail.

[Researcher]: Come on! The faster you go, the more e-mails you can send!

[Male T, 74]: Slow down! We, and I speak for all of us, don't need to rush; really, we don't want to use computers in a hurry, not like you! We want to take our time, because we have been rushing all our lives; before, in our jobs; and now, with our grandchildren. We want to relax and use computers slowly

3) Making mistakes places extra cognitive demands on them to overcome errors

[Researcher]: But, come one...this sounds very like the typical image of older people, you could try to be a little bit more efficient!

[Man E, 65]: (smile). Let me tell you something. The faster I go, the more mistakes I make. And, the most important thing is this: if using computers is a hard task for oldies, as you sometimes say!, you can't imagine how difficult it is to recover from your own mistakes, when you have no clue about how to fix them!

4) Making mistakes frustrates their goal of independence

[Woman U, 70]: It is very frustrating not to be able to do things with this machine on my own.

[Researcher]: Don't despair!

[Woman U, 70]: I know, but the point is that I have been able to bring up my three children, working at the same time, and taking care of my mother and husband. And I haven't needed help from anybody. But I can't move forward on this screen unless you help me.

4.2.4 Using the keyboard and the mouse; alternative devices

The keyboard is useful. Typing makes their process of writing easier and their notes more readable (they regarded their handwriting as difficult to read by others). Participants only use the most basic keyboard functions: letters, lower and upper case, punctuation symbols and they find the editing functionalities helpful.

[Researcher]: You are always complaining about the mouse, but I have never heard you complaining about the keyboard, which you use to send e-mails as well.

[Man H, 75]: The keyboard is not a problem for me. Once I learned how to use capital letters and other symbols, writing with the keyboard is really easy, and even easier than using paper and pencil. You know, I can choose different sizes and fonts, I can write, delete and write again without worrying about the paper or the pen, and I'm 100% sure that people will understand my handwriting! But the mouse is a headache. Sometimes it doesn't move in the direction you want it to, and my hands are older"

The mouse is more difficult to use due to age-related changes in manual dexterity. Even so, participants reject alternative input devices because they wish to feel integrated: when asked, they refuse point-blank. It could give the impression that they are either different or in need of special assistance. When interacting with computers they want to use the devices that other people normally use, especially their grandchildren and children. This need for inclusion resonates with the hallmark of Inclusive Design (Clarkson *et al.*, 2003).

[Man Q,73]: I don't want to use special things. I don't think that I'm stupid. And I'm not in need of special help. I want to use the things that people use. I know that I'll have more difficulties because of

my age. But being old shouldn't mean that I can't use the mouse.

[Woman U, 70]: Joysticks? I think that my grandchildren use them to play videogames, but for sending e-mails, they use the mouse. Imagine if they saw me using a joystick to send e-mails...I don't want them to think that their grandmother is frail. I do have problems using the mouse as you can see...but I'll have less problems tomorrow.

4.2.5 Perceiving visual input and difficulties remembering steps

Participants regularly use software with standard-sized information, such as MS Word, Google and Yahoo! They also own interfaces with small-sized elements, such as the mobile phones that they use every day, and which are not specifically designed for older people. This contrasts with their very relevant difficulties in remembering steps.

[Woman R, 72]: We always get stuck at the same point. You have explained the same thing to us lots of times, but I still have difficulties remembering how to send a photo. I have to repeat and repeat it so that I can remember some steps. But even so, I still have problems remembering the steps. I think there are too many!

[Man O, 68]: The size of the letters on the screen is ok. I mean, I wear glasses to read my newspaper, so if I have problems in reading the computer screen, I put my glasses on and the problem is over. But the solution is not so easy when I have to remember how to do something with the computer. I think that I, and old guys in general, need to do the same thing many times so that we can get to remember how to do it. For instance, when I finish my class, I go back home and I remember things. But if I don't use the computer for a week, I forget everything! It's very frustrating!

Failing to remember steps is a very important interaction barrier as it reduces independence. Participants have struggled to be independent individuals throughout their lives and want to remain so in their older adulthood, when one of the prevailing concerns (Schaie *et al.* (2005)) is the ability to maintain an independent lifestyle, use of computers included.

[Woman F, 68]: I know that I ask you a lot of questions. But I want to remember how to do this on my own. Always remembering. This is the biggest problem. I don't want to rely on you, because you are not always available to help us and because I have to do it on my own. But I tend to forget things. I wish I could remember things better. It would help a lot with e-mail.

[Man X, 72]: I enjoy e-mailing and, in general, using computers, independently. When I started to e-mail, I was so reliant on other people that I got the impression I was useless. I didn't want to bother people, you know. Today, I'm able to do my things on my own, like watching my movies, sending e-mails and that kind of thing. I am quite sure that the highest priority for the rest of the people in the session is to e-mail and use PCs or do whatever they want without depending on anyone

Participants do not enlarge or otherwise modify the text when e-mailing. Altering the size of elements reduces the number of elements on the screen and increases horizontal or vertical scroll, making tasks more difficult. In terms of their inclusion goals, they prefer to put their reading glasses on or get closer to the screen (Sayago and Blat, 2009).

4.2.6 Terms and icons

Participants have difficulties understanding e-mail terminology, they asked us often about the meaning of “attaching” and “forwarding”. They very seldom asked about icons and this was not because (Rogers *et al.*, 2002) non-experts find them easier to understand than words. While participants write the meaning of words (such as equating “attach” with “send an e-mail with a photo”) in their notes, they do not do the same thing with icons, which are largely overlooked, except for the ones associated with main applications¹⁴. Participants always look first for the name of the functionality rather than the associated icon, because terms convey the meaning of functionalities more consistently and provide more support in remembering. This holds for all their computer use.

[Man W, 68]: We first learned the name of the functionalities and where they were. We prefer to stick to what we know, because it makes us feel comfortable and we make fewer errors. What's more, we think that words or names are easier to understand than images, especially those used in computers. They may be easier to understand for you, but for me, for instance, better “delete a message” or “save a message” than click on a ‘red cross’ or ‘on a disk’, which I find difficult to remember.

[Researcher]: If you click on this icon, you can delete an e-mail.

[Women S, 74]: Ah! I didn't notice this icon.

[Researcher]: Did you see it?

[Women S, 74]: Yes, I'm not blind! What happened is that I was looking for the “delete” option, I mean, the word, because I think that every application uses different images [referring to icons], and I have to remember many different things... it makes my life difficult! (smile).

5. Discussion

5.1 Some implications for designing better e-mail systems

A number of design implications can be drawn from the results. Older people wish to be independent and ordinary computer users. Thus, a first question is whether there is room

¹⁴ The bird of Mozilla Thunderbird, the big E of Internet Explorer, or the W of Microsoft Word

for systems specifically designed for them. Our results indicate that design approaches providing only marginal gains, by using non-standard input devices or enlarging system elements, do face acceptance barriers.

Regarding strategies of use, reduction in the cognitive load barrier is a key factor. Consistent terminology grounded in everyday life (or life experience) should help and does not differentiate older people from younger adults. Making easier to remember the steps to perform functions is important as this difficulty is permanent - older people do not e-mail very frequently. Wizards for the few functions used might provide a solution, which is also used to support irregular users and can be removed or hidden as appropriate. An alternative is level-structured design (Baecker *et al.*, 2000), beginning with basic functions and options and allowing for more complexity depending on the development of users' skills.

A new type of design should support and enrich experiences created when older people use e-mail systems. A much better quality of interaction would be provided by affective interfaces when e-mailing grandchildren and children, facilitating the authoring of long personal e-mails with direct access to personal photos; friendly and intimate interfaces when e-mailing close friends, with links to online resources that appeal to them integrated in the systems and allowing the sharing of messages; and cheerful interfaces congratulating users on difficult achievements after an effort

By providing these inspirations and implications for interaction design, we have run the risk of oversimplifying or hiding the complexity and richness of the ethnographical insights. How they can or should be translated to design, and by whom, is an open and current debate (Cockton, 2008). We have chosen to let the real users speak, selecting carefully only very few and relevant fragments¹⁵ from a 3-year study. In a related web¹⁶ we have selected pictures that complement these voices and help to make both a stronger and richer connection between the participants and the reader¹⁷.

¹⁵ The selected texts are representative of what we have both observed and analyzed, even taking into account their own stereotypes or misrepresentations.

¹⁶ <http://www.tecn.upf.edu/~ssayag/TellingOlderPeopleStoryEmailing>

¹⁷ Both the Personas technique and the Contextual Design models could have added redundancy to the paper and been too simplistic to represent our results.

5.2 Value and limitations of the results

We reveal and explain the nature of e-mail use by older people and its relevance for their communication and lives, which are important aspects for researchers who seek an improved understanding of use and interaction. We identify, describe and segment social circles, patterns of frequency of use and content that map (or do not) from the real world to the digital realm, and other details such as the relationship with other technologies; we include motivations, expectations and interactive experiences.

Widespread accepted research on older people focuses solely on compensating for age-related changes in functional abilities; in contrast, we have found that cognitive load is a much more important factor. The relative relevance of interaction barriers has not been addressed before and the ethnographical approach to understanding this in a deep way is new in HCI with older people.

We worked with motivated users with scant educational competences and very little previous experience with ICT, making them part of a very important (and growing) sector: ordinary older people willing to use ICT. E-mail has a strong impact on their quality of life, contradicting reports ((Dickinson *et al.*, 2006)) that computer use has no demonstrated impact on the well being of older adults. They accept, are excited by and want to use e-mail, challenging also the widely spread negative stereotype of older people as computer users, recently captured in (Newell, 2008; p: 11) “older people are much less confident with and accepting of information technology and [...] are less likely to be excited by, or desirous of learning to use, unfamiliar technology”. Whether the results can be extrapolated to other users is a topic of further research. We have indicated differences (and similarities) with previous studies in different cultural contexts. More ethnographical studies should help to move research forward.

As very little ethnographical research with older people and ICT has previously been carried out, we adopt a classical approach rather than a “reduced” form, which might have skimmed the surface of interactions and use. We have also run some more quantitative experiments on some of the issues, which corroborate our assertions¹⁸ and

¹⁸ We explored the interactions of older people with online forms in two different contexts and shown that increasing the size of asterisks does not make older people fill in forms more correctly. In three web sites for three different retired persons associations increasing the size of web elements was much less relevant than better navigational structures that help older people to interact with fewer and clearer clicks,

are reported elsewhere. Our 3-year ethnography is possibly relevant to other research fields, such as intergenerational relationships in ageing. We have reported only aspects significant for HCI, without being too restrictive, which might have hindered comprehension of the story.

Finally, a remark should be made with respect to gender differences. One of our concerns was to understand these, as previous studies of the maintenance of social relationships through e-mail show gender differences (Boneva and Kraut, 2002). We have not identified them in any of the aspects we have discussed in this paper.

6. Conclusions and future work

We have explored through a detailed ethnographical study the way in which older people use e-mail as this will ground improvements in the accessibility of e-mail and other ICT. We have focused on a communication tool, as it is key for the users.

We have shown that older people use e-mail in their free-time within a restricted social circle of two different groups: relatives (with a frequency of few e-mails per month but quite detailed and very emotionally significant), and close nearby friends (with few e-mails per week exchanging some web based information for socialising). This use has little to do with office work context for which e-mail systems were designed. Our users send, reply, forward, attach, and view attachments, while functions such as managing messages or addresses are largely irrelevant.

Older people are motivated to use ICT because they perceive it as an important element for inclusion in contemporary society, and they fight the isolation which can increase with age. They use their glasses instead of large font sizes and reject input devices alternative to the mouse, since they want use ICT in a similar way to their social circles.

Cognitive load is their most significant accessibility barrier: they do not save and manage attachments within the file system as this would add more things to remember. They also find it difficult to remember task-related steps. Icons are largely ignored while they adopt

and also when adapting an online web site to its mobile (PDA) version. Terms were also more relevant than icons in the design of a video web browser, blogs and Flickr prototypes in two different associations. Searching by writing the query terms allows older people to find more information and faster than searching by clicking. More details at <http://www.tecn.upf.edu/~ssayag/TellingOlderPeopleStoryEmailing>

the cognitive strategy of understanding the terminology. This understanding is closely associated to a “mental model” of the traditional paper mail, which might provide a useful metaphor.

Individual and private e-mailing is turned into a social activity which builds intimacy, sending and receiving e-mails in the company of close friends and allowing them to read their messages as a sign of trust.

This challenges currently accepted views on the relative importance of different accessibility problems to older people, and stereotypes about their (lack of) motivation to use ICT or their actual use of these technologies. Other findings offer a new way of looking at the interactions of older people and ICT. This stresses the importance of ethnographic methods and ascertaining use, social circles, motivation and interactive experiences for dealing with accessibility barriers (and thus, designing better interfaces for older people).

Let us conclude this paper by indicating some of our current lines of research. First, motivated by the importance of the paper mail metaphor or mental model, we will be exploring this as framed by the importance of lifelong experience for older adults. We are re-examining all our ethnographical data to understand better the role of this experience in enhancing older people's interaction with e-mail and other ICT. Second, we will explore new e-mail interfaces designed to support and enrich the experiences we ethnography have unveiled. Third, we intend to combine our findings with the analysis of some controlled experiments we have carried out and are currently undertaking in order to better ascertain the impact on interaction of the accessibility barriers we have identified.

7. Acknowledgements

We are deeply grateful to Àgora participants who supported us both in becoming more mature as researchers and also part of their community, and who were always willing to tell us their stories as well as allowing us to share them with the rest of the world. Thanks to our colleagues F. Girardin, D. Hernández-Leo and E. Arroyo for useful discussions, to D. Griffiths for improving our English and our ideas, and to our very thorough and stimulating reviewers.

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Appendix A. Ethnographical implementation

Year	Type of activity / Technologies	Description of activities	Duration	Total Part.	
2005	Courses: Gardens and Towns in the World	E-mail, MS Word, MS PowerPoint	Downloading pictures from the Web about National Gardens and create reports using MS Office tools and Web Pages. Sending their reports to their relatives, friends and instructors by email.	6 months for each course. 2-hour session every week	36
	Course: Internet	E-mail, Google, Yahoo!	Using the email and several strategies to look for online information.	2 courses. 1 month each course. 2-hour session every week	36
	Public meetings	Technologies used in the courses	Discussing the positive and negative aspects of the technologies used and the best and worst aspects of the courses	2 meetings. Between 2 and 3 hours.	40
2006	Course: Online communication	E-mail, chat, blogs, wikis, forums, Google, Yahoo!	Learning basic and advanced aspects of online communication: email, chats, blogs and forum. Learning basic and advanced aspects of strategies to look for online information	4 courses. Lasted 3 months. 2-hour session every week	76
	Workshops	E-mail, multimedia content edition and finding online information	Special sessions on email, multimedia content edition and finding online information.	3 workshops. 2-hour session every workshop	18
	Public meetings	Blogs, Yahoo! Flickr, E-mail, wikis	Discussing the value of online technologies to support educational practices in ICT. Discussing the positive and negative aspects of these technologies for their daily lives	2 meetings. 2-hour session every workshop	24
2007-2008	Course: Advanced aspects of computing	MS Word, MS PowerPoint, MS Excel, E-mail, Google, Yahoo!, Yahoo! Flickr, Google Earth	Learning advanced topics of computer management, documents editing, online communication and searching, multimedia.	4 courses. Lasted 3 months. 2-hour session every week	76
	Course: Online resources	File management, Windows management, Google, Yahoo!, Blogs, E-mail	Advanced topics of computer management, creation of documents online, online searching and communication	Course lasted 6 month. 2-hour session every week	18
	Workshops	Blogs, Yahoo! Flickr, E-mail, wikis	Discussing the value of online technologies to support educational practices in ICT and social factors mediating the adoption of ICT	2 workshops. 2-hour session	24
	Public meetings	MS Word, MS PowerPoint, MS Excel, E-mail, Google, Yahoo!, Yahoo! Flickr, Google Earth, Blogs, File management, Windows management	Discussing the positive and negative aspects of the technologies used and the best and worst aspects of the courses	3 meetings. 2 hour-session	40

Table 1: Ethnographical implementation